

Issue no. 88

OCTOBER
1982



RATES
USA \$12.00 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand/Robinson Engineering Inc.

I would like to thank everyone for the messages of encouragement I have received this last month. The support I have gotten has been great. As I said last month, your input is greatly appreciated. Please drop me a post card and let me know what you would like to see in the newsletter. If you've found a better way to do something on the KR, take a few minutes to jot it down so we can pass it on to other builders. Even if you are not an artist, drawings will show many ideas very well and pictures, whether under construction or finished, are always welcome.

FLY-IN! October 15-17t Eloy, Arizona. Thats right. MAPI's home field. Should bring a good number of KRs*..

QUESTIONS & ANSWERS

- Q. What has ever happened to the KR-3?
- A. The KR-3 is currently in Gilbert Duty's shop undergoing engine testing. A 2nd prototype is due to be built soon and if all goes well we should hopefully see something soon.
- Q. Can I widen my fuselage 2"? I'm 6'2" and it's very tight. If I do, must I then lengthen the fuselage 2" to compensate?
- A. Many builders are adding 2" to V to the cockpit width. It makes a big difference in comfort for us larger pilots. There is no need to lengthen the fuselage just to compensate for the change in width.
- Q. I have been told that I should not use Dynel on my KR-2. Why?
- A. You may use Dynel if you want to, but fiberglass is much easier to use. Dynel is no longer manufactured and any supplies that are left have probably been laying around for awhile and should be checked before use. The Dynel that was made during the last years of production is much stiffer than the original and therefore does not form curves very well. You will also find that Dynel is much harder to finish into a smooth surface without adding weight. Also, many builders have reported cracks developing in their wing fillets that were constructed with Dynel.

Want to add more strength to your wings? Cover your wing surfaces with 2 layers of fiberglass. This will almost double the strength and will only add about k lbs a wing. It is also a good idea to cover the leading edge with ^ layers instead of 2. Some builders have had bugs penetrate the 2 layers in flight.

RAND/ROBINSON HAPPENINGS

I've just talked to Jeanette today and there are new parts lurking around the Rand plant. They are just finishing up a mold for a new fiberglass fuel tank. This will be a 2 piece tank to mount in front of the instrument panel. Unlike the early tanks, this one will have a top and bottom that will be joined and sealed before installation in the aircraft. You will then build the forward and install it over the tank. It also has a indentation for radios. Should be available in about 2 months. Tank will hold about 16 gallons. I will let you know when they are ready for shipping.

They are also about finished with the engine cowling made to fit the HAPI engine. It should also be available soon. They also plan to make one for the REVMaster AND FAST engines in the near future. The quality on all of the new fiberglass from R/R is very good. It Fitsi

EL MIRAGE

Wes Evans and his beautiful KR-2 won the Ken Rand Memorial Award for the 2nd year in a row. Looks like Wes is going to have to add a trophy rack on his KR if he keeps showing it at airshows.

KR PLANS

The new KR plans are now at the printer and will be available soon. The plans have not been changed or re-engineered. This is just a new printing. The new price will be \$95-00 a set.

BUY - SELL - TRADE

FOR SALE....New R/R easy eye tint canopy for KR-2. \$80.00 plus shipping. New Dix crossover exhaust for VW (except REVMaster with bottom oil cooler) \$150.00 Floyd Koppenhaver (71?) 692-2572 Days.

FOR SALE....KR-1, N52KK. 1600 VW, Great American prop. 2 hrs. T.T. Signed off by FAA and new annual by A & P. Asking \$3,300. Vern Meyer (816) 7^1-^778 No Collect.

FOR SALE....KR-2 project. On gear, (DeFreeze tri gear), heel brakes, Approved for cover, horiz. stab, glassed. Have glass cloth, some foam, Diehl cowling, Pollywagon windshield, shoulder harness, belts, and fittings. Controls installed. Many extras. Also New REVMaster 2100D engine. Well over \$4-,000 invested. Make offer. Call (405) 223-55^4 after 5i00 pm, Central time or write to Geoff Jones, Rt. 5, Box 29, Ardmore, Ok. **73401.**

FLIGHT TEST PROPELLER...Save that expensive store-bought prop. I wish I had. Carve your own. Complete instructions. \$6.95 USA... Garth Hess, 881 Emory Ct., Upland, California, 91786.

Garth Hess sent me the chart on the following page. It can be used to figure estimated top speed based on prop pitch and engine rpm. You should remember though, these charts are usually done assuming that the prop pitch is constant all along the prop. Some aircraf wil . do better than the chart says they should, but usually not by much.

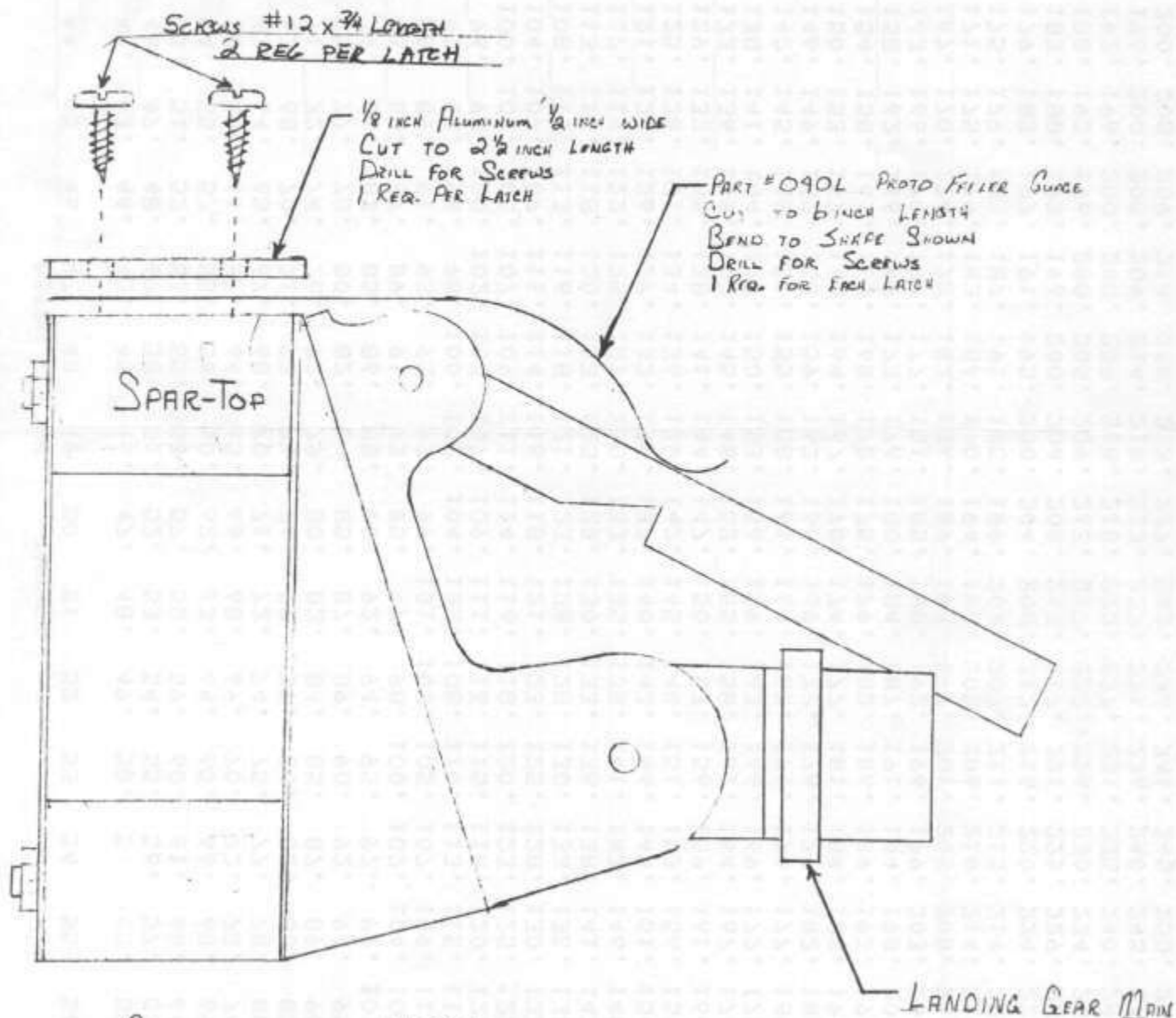
APPENDIX I

AIRCRAFT SPEED IN STATUTE MPH* ZERO SLIP* ENGINE RPM VS. PITCH

RPM	PITCH							IN	INCHES											
,100	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59
10	38*	39.	40.	41«	42*	43*	44.	45*	46.	47*	48.	49.	50.	51.	52.	53.	54.	55*	56.	57.
11	42.	43.	44.	45.	46*	47*	48.	49*	50*	51.	52*	53*	54.	55.	56*	57*	58.	59.	60.	61*
12-	45.	47.	48.	49.	50*	51*	52.	53*	55*	56*	57*	58.	59.	60.	61.	63*	64*	65.	66*	67*
13	49.	50.	52.	53.	54*	55*	57.	58*	59*	60*	62*	63.	64.	65.	66.	68*	69*	70.	71.	73*
14	53.	54.	56.	57.	58*	60*	61.	62*	64*	65*	66*	68.	69.	70*	72*	73*	74*	76.	77*	78*
15	57.	58.	60.	61.	63*	64*	65.	67*	68.	70*	71*	72*	74.	75*	77.	78*	80*	81.	82*	84*
16	61.	62.	64*	65.	67*	68*	70.	71.	73*	74*	76*	77*	79.	80*	82*	83*	85*	86.	88*	89*
17 "	64.	66.	68.	69.	71V	72T	74.	76*	77.	79*	80*	82*	84.	85*	87*	89*	90*	92*	93.	95*
18	68.	70.	72.	73.	75*	77*	78.	80*	82*	84*	85*	87.	89.	90*	92.	94*	95*	97.	99*	101*
19	72.	74.	76.	77.	79*	81*	83.	85.	86*	88*	90*	92*	94*	95*	97.	99*	101.	103.	104*	106*
20	76.	78.	80.	81.	83*	85*	87.	89*	91.	93*	95*	97*	98*	100.	102.	104*	106.	108*	110.	112*
21	80.	82.	84.	86.	88*	89*	91*	93.	95*	97*	99*	101*	103.	105.	107.	109*	111.	113*	115*	117.
22	83*	85.	88.	90.	92*	94*	96*	98.	100.	102.	104*	106*	108*	110.	113.	115.	117*	119*	121.	123*
23	87*	89.	91.	94.	96.	98*	100*	102.	105.	107*	109*	111.*	113*	115.	118.	120*	122*	124*	126*	129*
24	91*	93.	95.	98.	100.	102*	105*	107*	109*	111*	114*	116*	118.	120*	123.	125.	127*	130*	132*	134*
25	95*	97.	99.	102.	104.	107*	109*	111*	114*	116*	118*	121*	123.	125.	128.	130*	133*	135*	137.	140*
26	98*	101.	103.	106.	108.	111*	113*	116*	118*	121.	123*	126*	128*	130.	133.	135*	138*	140*	143*	145*
27	102*	105.	107.	110.	113.	115*	118*	120*	123.	125.	128*	130*	133.	136.	138.	141.	143.	146*	148*	151.
28	106*	109.	111.	114.	117.	119*	122*	125*	127*	130*	133*	135*	138.	141.	143*	146*	148.	151*	154*	156.
29	110*	113.	115.	118.	121.	124*	126*	129*	132.	135*	137*	140*	143.	146.	148*	151*	154*	157 »	159*	162.
30	114*	116.	119.	122.	125*	128*	131*	134*	136*	139*	142*	145*	148*	151.	153*	156*	159*	162*	165*	168.
31	117*	120.	123.	126.	129*	132*	135*	138.	141.	144*	147.	150*	153*	156.	159*	161*	164*	167*	170*	173.
32	121*	124.	127.	130.	133*	136*	139*	142.	145.	148*	152*	155*	158*	161.	164*	167*	170*	173*	176*	179.
33	125*	128.	131.	134.	138*	141*	144*	147*	150*	153*	156*	159*	163*	166.	169.	172*	175*	178*	181.	184.
34	129*	132.	135.	138.	142*	145.	148*	151.	155.	158*	161*	164*	167*	171.	174.	177*	180*	184.	187.	190.
35	133.	136.	139.	143.	146.	149*	152*	156.	159.	162*	166*	169*	172*	176.	179.	182*	186*	189.	192.	196.
36	136*	140.	143.	147.	150.	153.	157*	160*	164*	167*	170*	174*	177*	181*	184*	188.	191*	194*	198.	201.
37	140*	144.	147.	151.	154.	158*	161*	165*	168*	172*	175*	179*	182*	186.	189*	193*	196*	200*	203.	207.
38	144*	148.	151.	155.	158.	162*	166*	169*	173.	176*	180*	184*	187*	191*	194*	198*	202.	205*	209*	212.
39	148*	151.	155.	159.	163.	166*	170*	174*	177*	181.*	185*	188*	192.	196.	199.	203.	207.	211*	214.	218.
40	152*	155.	159.	163.	167.	170*	174*	178*	182*	186*	189*	193*	197.	201*	205*	208*	212.	216*	220.	223.
41	155*	159.	163*	167.	171.	175*	179*	182*	186*	190.	194*	198.	202*	206*	210*	214*	217.	221*	225.	229 »
42	159*	163.	167.	171.	175.	179*	183*	187*	191.	195.	199*	203*	207.	211*	215*	219.	223.	227*	231.	23^,
43	163*	167.	171.	175.	179.	183*	187*	191*	195.	200*	204*	208*	212.	216.	220*	224.	228.	232.	236.	240.
44	167*	171.	175.	179*	183.	188*	192*	196*	200.	204*	208*	213*	217*	221.	225.	229.	233.	238.	242.	246.
45	170*	175.	179.	183*	188.	192.	196.	200*	205*	209*	213*	217*	222 »	226.	230*	234.	239.	243.	247.	251.
46	174*	179.	183.	187*	192.	196.	200*	205*	209.	213*	218*	222*	227*	231.	235*	240*	244*	248*	253*	257.
47	178*	182.	187.	191.	196.	200.	205*	209*	214*	218*	223 »	227*	231.	236*	240*	245.	249.	254*	258.	263.
48	182*	186.	191.	195.	200.	205.	209*	214*	218*	223*	227*	232.	236.	241*	245*	250.	255.	259*	264.	268*
49	186*	190.	195.	200.	204*	209.	213*	218*	223*	227*	232*	237*	241.	246*	251.*	256.	260.	264.	269*	274.
50	189*	194.	199.	204*	208*	213.	218*	223*	227*	232*	237*	241*	246.	251*	256.	260.	264.	269*	274.	279.

Bob Passmore's beautiful KR2, (See Feb. 1982) was damaged while in it's hanger in early September. A bad thunderstorm blew the doors in on the aircraft and damaged the prop, wing and flaps. We all wish Bob good luck in getting this beautiful bird back in the air soon.

From Sam Bailey, 91st West [^]th, Pratt Kansas, 6712[^]...Enclosed is a latch spring I used on my KR 1 and it seems to be working out ok. The 0[^]0L Proto feeler gauge or equivalent can be found at most all tool supply stores.



LATCH SPRING FOR KR1

NOTE = DRAWING IS AL TO SCALE



A Performance Tuned Exhaust
for the VUI Aircraft Engine

"The Sting" will give you a 5 to 15% increase in engine performance over the customary "straight pipes".

*Fuel economy is increased! You get more power from less fuel due to the efficient design.

*Exhaust valve life is prolonged due to the long tubes creating a "buffer zone" between the valves and rapid temperature change.

* Will fit 1600cc to 2200cc conversions. It's ready to bolt on your engine, nothing to fabricate.

"The Sting" is designed specifically for Revmaster, Diehl, and MAPI VW conversions as installed in a KR. Will fit most other VW powered aircraft also.

\$195*00 plus shipping



KR STUFF

KR T-SHIRTS...Now Available...
Cotton/Polyester Blend. State
Size...X-Large, Large, Medium,
Small. \$6.50 ea. or 3 for
\$18.00.

Embroidered Patches...\$1.50 ea.
or 3 for \$3.50

John Forrester
P.O. BoK 1*113
Englewood, Co. 80155

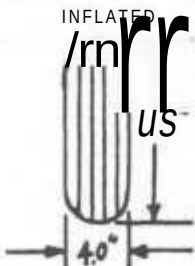


NEW! 11.400X5 6 PLY. RATED

TIRE WT. 3 LBS. TUBE WT. 5 LB.
LOAD RANGE C - 70 P.S.I. MAX.

This tire fills the sue gap. between the 500x5 aircraft tire and the 3.40-3.00x5 go-kart tire. Looks like a scaled-down 500x5. Fits KR-1 I 2's and is recommended by Burt Rutan for the variEZE and longEZE. Also fits most other experimental\$ using 5 inch rim's.

TIRE 6 PLY RAT. 25.00 TUBE 6.50 + SHIP I HAND.
MIKE LAMB P.O. BOX 3324, QUARTZ HILL, CA. 93534



BACK ISSUES

There is now a new pricing schedule for the back issues. This will be the schedule from now on. There are some back issues that were not available. I am in the process of having them all re-printed and will maintain a good stock of all back issues from now on. The new prices are as follows.

1 - 12 issues....\$1.00 ea.
13 - 2k issues.75¢ ea.
25 or more issues..500 ea.

All postage is included in the price.

We now have a catalog available.
Send \$1.00 to:

GREAT PLAINS

AIRCRAFT SUPPLY CO.

402-496-0366 BOYSTOWN, NE 68010

P.O. BOX 9



MINIATURE METRICS
LITCLITC HARDWARE
7801 14th STREET
WESTMINSTER, CAUF. 92683

Phone (714)894-4875
Amos, Anita and
Carey Anderson

Minature Metrics has several
services and products. Send
a S.A.S.E. for more info.

QUALITY...all material is air-
craft aluminum/steel as
specified in your plans.
Willed with precision then
deburred, bead blasted* final
finish reamed by standard air-
craft production proceduras
all in the interest of safety.

Left and right aileron
pulleys, mounted on bracket,
130.00 pair, postpaid

Aileron horns, and bellcranks
w/support brackets, hinge
bolts and spool spacers pro-
vided (assembled) 24 pieces.
187.00 postpaid

Rudder, elevator, tailtuheel
horns and hinges...11 pieces
plus 10 back-up plates H. AH.
pilot drilled for mount bolts,
160.00 post paid...now clear-
ance milled for full throw.

Propeller hub bolt 20 mm any
length!...812.00 postpaid

Nylon rudder pedal mounts,
6 pieces...822.00 postpaid

Control stick assembled as on
plans or modified...162.00 p.p.
With microphone switch and
pigtail...\$75.00 fitted.

No instructions are given
which conflict with plans
or Newsletter. We prefer
you refer to plans or consult
Rand/Robinson.

Wake check payable tot

MINIATURE METRICS
7801 14th STREET
WESTMINSTER, CA 92683

JOHN FORRESTER
P.O. BOX 4113
ENGLEWOOD, CO 80155
ISSUE # 88 OCTOBER 1982





Issue No. 89
November 1982

KR NEWSLETTER

RATES
USA \$12.00 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Fund!

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand/Robinson Engineering Inc.

TWICE THIS MONTH I have awoken to find the ground covered by snow. Winter has come to the Rockies and soon the rest of the country will be deep into the season that signals the end of the fly-in season.

It's been a good summer for fly-ins and KR's. Many new KR's took to the skies for the first time and they turned out in record numbers at fly-ins throughout the country. Oshkosh this year had a record turn-out and KR's were well into the top ten groups of homebuilt aircraft this year.

From the indications I've gotten, next year should bring out record numbers of newly completed aircraft, as builders spend the winter completing some truly beautiful KR's. I'm really impressed by some of the aircraft KR builders are turning out now. The quality has really come a long way in the last few years as builders become better acquainted with the techniques.

To all of you under construction and especially those of you who are already airborne with your KR, I would like you to begin planning to attend more fly-ins next season. Plan on attending as many fly-ins as possible. This is still one of the best ways to meet other builders and share ideas between a great number of people a one time.

Our KR's make excep-

tional cruising machines and the thrill of flying your own aircraft cross-country to a far-off fly-in is an extremely satisfying experience that should not be missed by any builder.

Lets really bring the KR's out in force next year! I will be at all of the major fly-ins and many of the smaller ones and I hope to see you there too.

THE KR CLUB is going to be undergoing some major changes in the days to come.

I am now putting together a complete directory of all KR Club members world-wide. This will be sent out in February, 1983, to all individuals who are active members as of December 31, 1982.

The directory will also list names and addresses of all of the major suppliers of parts, kits and supplies that are used in our KR's.

The KR Club will also be participating in some of the fly-ins next year, with awards to be presented to members with the best KR at that fly-in.

Club dues will remain at \$3.00 a year for all of those who join or renew before December 31. After that, dues will rise to \$5.00 a year.

I sincerely feel that all of you who belong to the KR Club will be pleased with the many changes, infor-

mation and activities planned in the coming year, so I strongly recommend joining or renewing before December 31 if you have not already done so.

I HAVE RECEIVED several requests for a "Product Evaluation Report" to be included in the newsletter. I think this is a good idea for helping builders to better evaluate products before you spend your money on something that may not be what you want.

The only thing we need is for companies that manufacture these parts to supply us with their product for evaluation.

If you come accross something that you would like to know about, contact the company and ask them if we may evaluate their product or let me know the name and address of the company and their product and I will contact them.

THERE IS NOW an updated guide to the various publications issued by the FAA, including those concerning aviation safety, advisory circulars, technical reports and education materials for aviation.

"The Guide to FAA Publications," FAA-APA-PG-5, will also explain aviation related materials offered by other Federal Agencies, such as the NTSB.

For your free copy, write to U. S. Department of

Transportation Publications Section, M-443.1, Washington D.C. 20590. You should enclose your name and return address on a return label or separate piece of paper.

ARE YOU KEEPING of the correct" logs on your KR? A recent survey found that most owners are not aware that as of October 14, 1981, you must keep a separate logbook for your propeller, as required by FAA Regulation 91.17(A)(2)(i).

In addition, you as the owner, are responsible for making sure that these entries are made in the log, whether you do the work yourself or have someone do it for you.

Be sure that you have all entries for engine, airframe, and propeller per FAR 91.165.

FROM ROBERT PATLOVANY, 6927 Heron, Houston, Texas, 77087.... "My KR-2, N5508N, now has 80 hours of flying time to its credit. My empty weight came out to 493 pounds. That included an 1834cc VW with turbocharger, Diehl Case, 20 amp alternator, battery, a panel full of unnecessary extras, plus a Radair 360 Com. and Radair 200 Nav. and indicator. I have this bird wired with navigation lights and a full panel of 17 circuit breakers. The empty weight also includes 5 quarts of engine oil and a leg-breaking, heated pitot tube.

The plans say the empty weight should be 450 lbs. basic, or 500 pounds with turbo. Those weights are correct. My aircraft is built exactly to plans. A 600 pound KR-2 is the result of construction errors.

I watched my Aerospace



Terry Kirkland, RR 1, Haveback, Ontario, Canada, KOL120. KR-2 with an empty weight of 546 pounds. Terry says that with his 1834cc VW and a 52x44 propeller, his is getting 145 mph top speed. First flight was September 21, 1981.

Engineering Professor build a wing almost identical to a KR-2 wing, but without the taper. He calculated all stress and found that one 6 ounce weave of fiberglass over the entire wing was sufficient. He did not recommend using just one layer on the leading edge, because any minor finishing errors would decrease the strength too much. He used 2 layers of 6 ounce cloth. A good alternative is a single layer of 14 ounce, high impact, tight-weave fabric which is impossible to damage or even bend with your hands. It also wets with very little epoxy.

Two references are really great for advice on keeping weight down. The Tony Bingelis article on Weight Control or Think Light...Build light... (Sport Aviation, page 32, February, 1978),

was my once-a-month attitude adjustment tool. The Finishing manual for the Vari-Eze, by Burt Rutan, is also good. The finishing instructions in the KR-2 plans book are not conducive to a light weight surface.

Don't try to build a tank. It will fly like one if you do. No matter how many layers of fiberglass you use, a 195 mph low pass down the runway or beach will leave bug dents in your leading edge paint".

FROM JAMES DEMICK, 4801 Trumbull Ave, Albuquerque, New Mexico, 87108..... "Just a few lines to let you know that N81JD is flying well. We have 31.7 hours now and I have 4.0 hours solo.

Olin has flown it to 13,000 ft. and he and I have been to 11,000 frequently. It handles very well with one two aboard.

I do wheel landings beautiful and it has very good directional stability both taking off and landing. During my dual training I did bounce it in on landing and broke one of those small aluminum castings that bolts to the spring bar and pivots in the large casting attached to the wing spar. I had a machinist make new pivot blocks from 6061-T6. They are thicker and precisely machined to fit the big spar castings. Also use 5/16 bolts for pivot bolts instead of 1/4 as all three were bent some.

I had the machinist overbend the spring bar a little bit, (d/8" each end), so gear does not splay out much at all. I had cut 3" off the spring bar to start with.

Sure like that Warnke prop. One thing I learned yesterday, certain kinds of auto fuel can be very hazardous. Yesterday I was at 7,000'+ when my engine began to surge and rpm decayed to 1,200 or 1,500 rpm. rio response to throttle, very lucky for me, I was not far from another field. I made one 360 to loose over 6,000' and get lined up for a downwind landing. Got the gear down and got a couple notches of flaps in before I was over the runway. Tough down was very long. Thought for sure I was going off the end, but at the last second, I kicked in hard left rudder and thank God I made ;j.t. Ma£e the corner and onto the taxi-way, engine completely dead. I checked for fuel contamination, tank fuel strainer, tank vent system, and gascolator, all with no problem. Pulled plugs-- found clean, compression test, (thumb in hole), oil-ok.

Put it back together, ran up and same thing, (this time on the ground). Power decayed till engine stgpped. Trouble began after engine was good and warm.

I drained more fuel out to be sure of venting and no contamination. Same thing-- ran fine until it got hot, so I drained out all the fuel, 15 gallons of regular automotive gas, and put in 100LL. Fired it up and it ran fine. I noted cooler engine temps even though ambient temp was at least 10° higher by the time I took off and returned to my airport. No further problems.

Moral...I can not recommend automotive gas anymore.

Just love my KR, flies hands off with one or two aboard. Best airplane for my money and time spent."

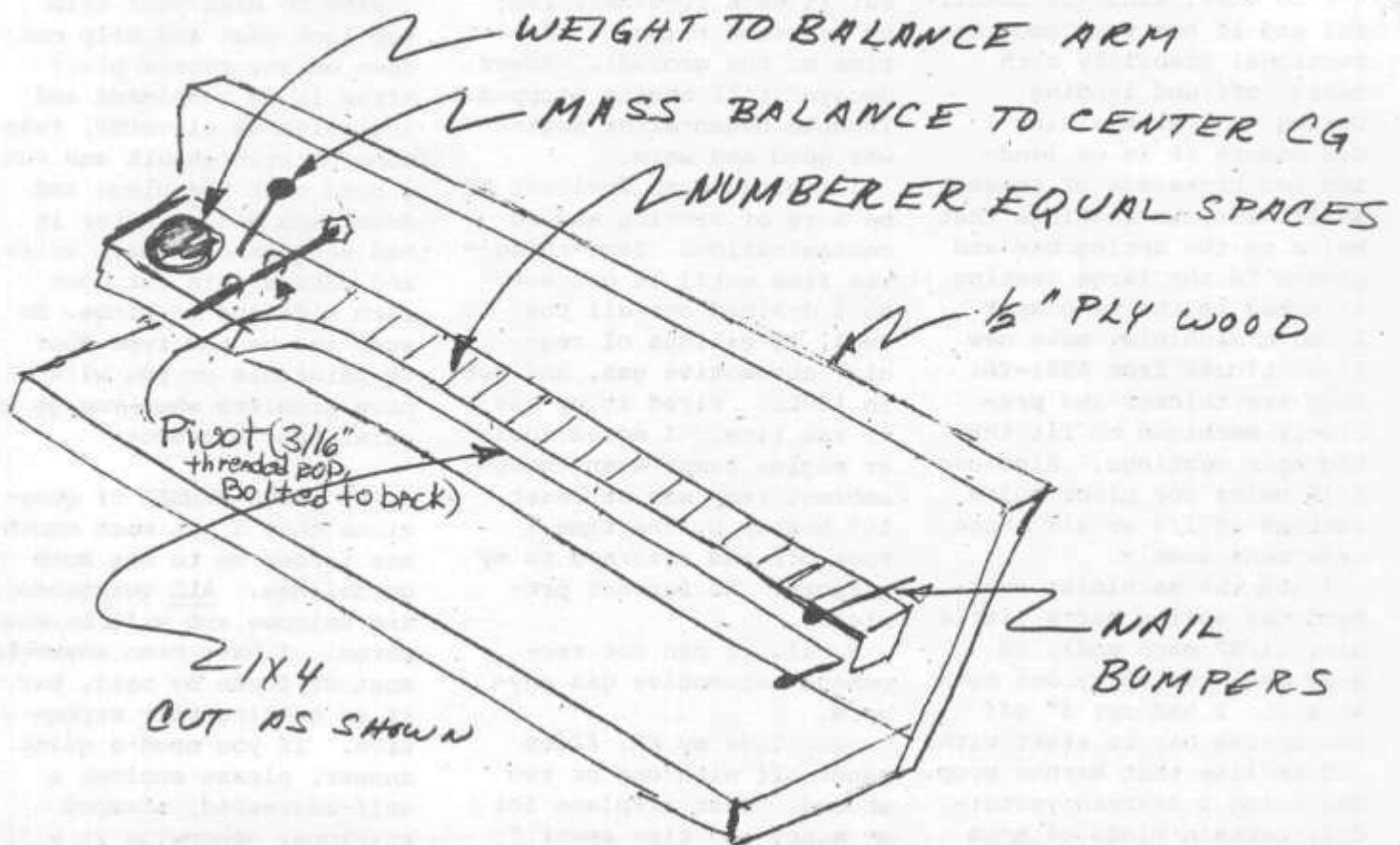
WANT TO MAKE your trim tab look neat and help cut down on any excess play? After it is completed and installed on elevator, take some bathtub chaulk and run a bead over the hinge and down each side. After it has set, take a sharp knife and make a thin cut down each side and on hinge. Be sure and us the type that is paintable or you will have problems when you go to paint your elevator.

THE LARGE NUMBER of questions that I get each month has forced me to set some guidelines. ALL questions are welcome and will be answered. I have been answering most of these by mail, but it is getting very expensive. If you need a quick answer, please enclose a self-addressed, stamped envelope, otherwise it will be in next newsletter.

QUESTIONS AND ANSWERS

- Q. Should the outer wing spars be covered with plywood on both sides?
- A. No. The Forward, Outer Spar should have a shear web on the full length of the aft side and only 12i" on the forward side. The Outer, Rear Spar should have full length web on the forward side and 12i" on the aft. side. This strong enough and any more just adds excess weight. Just be sure that you vertical pieces in the spars line up with the end of the 12i" shear web.
- Q. Does F.A.S.T. have a catalog available now?
- A. F.A.S.T. is in the process of having a new catalog printed for their jnomebuilt aircraft kits and supplies. It should be available ir> the next couple of months.
- Q. Should the tailwheel cables attach to the rudder cables inside or outside of the fuselage?
- A. They should be attached outside of the fuselage. Just find an angle that fits your aircraft and make sure that when deflected full to each side that the attach-in points do not interfere with the cable fairleads in the fuselage sides. Also make sure that the tailwheel has weight on it, or cables will be slack later.

NOTES - HOME MADE AND HANDY BEAM BALANCE



AFTER THE WEIGHT RATIO OF THE RESIN IS KNOWN WEIGHTS (WASHER) CAN BE SET ON THE BEAM FOR RESIN THEN HARDNER. I HAVE MIXED BATCHES UNDER 1/2 OZ WITH GOOD RESULTS

{ TERRY McCLAIN
RICK WHISENHUNT

BUY - SELL - TRADE

WANTED...Unused KR-2 Kit. Please contact me regarding price and location. Murray Jones, 1015 Marshall, Richland, Wa., 99352. 509-943-0300.

FOR SALE..New R.R cowling for KR-1. \$90.00 and you pay freight. Richard Powell, Rt. 2, Hickory Mill Rd., Salisbury, Maryland. 21801. 301-742-0238.

FOR SALE..KR-2 project. Fuselage on gear, signed off, outer spars lone, clear canopy. Some hardware. \$500.00. Ben Kruger, 2108 E. Keys, Springfield, II. 62702. 217-544-8774.

FOR SALE..R/R Canopy frame, original fiberglass type. \$50.00. You pay freight. Michael Goodman, 7995 Xavier St. Westminster, Co. 80030



A Performance Tuned Exhaust
for the VUI Aircraft Engine

*"The Sting" will give you a 5 to 15% increase in engine performance over the customary "straight pipes"!

*Fuel economy is increased! You get more power from less fuel due to the efficient design.

*Exhaust valve life is prolonged due to the long tubes creating a "buffer zone" between the valves and rapid temperature change.

* Will-fit 1600cc to 2200cc conversions. It's ready to bolt on your engine, nothing to fabricate.

*"The Sting" is designed specifically for Revmaster, Diehl, and MAPI VW conversions as installed in a KR. Will fit most other VW powered aircraft also.

\$195»00 plus shipping



KR STUFF

KR T-SHIRTS...Now Available...
Cotton/Polyester Blend. State
Size...X-Large, Large, Medium,
Small. \$6.50 ea. or 3 for
\$18.00.

Embroidered Patches...\$1.50 ea.
or 3 for \$3.50

John Forrester
P.O. BOX *n13
Englewood, Co. 80155

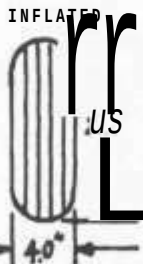


NEW! 11.400X5 6 PLY. RATED

TIRE WT. 3 LBS. TUBE HT. 5 LB.
LOAD RANGE C - 70 P.S.I. MAX.

This tire fills the size gap. between the 500x5 aircraft tire and the 3.40-3.00x5 go-kart tire. Looks like a scaled-down 500x5. Fits Kft-1 I 2's and is recommended by Burt Rutan for the warLEZE and longEZE. Also fits most other experimentals using 5 inch rims.

TIRE 6 PLY RAT. 25.00 TUBE 6.50 + SHIP I HAND.
MIKE LAMB P.O. BOX 3324. QUARTZ HILL. CA. 93534



CLASSIFIED AD RATES

Classified ad rates for newsletter subscribers with less than 25 words are free. If you have over 25 words, the cost is \$5.00 an issue.

Non-subscribers may place ads at the rate of \$5.00 an issue.

DISPLAY AD RATES

SIZE	1 time	3 times	6 times	12 times
1/8 pg.	\$15.00	\$14.25	\$13.50	\$12.75
1/4 pg.	20.00	19.00	18.00	17.00
1/2 pg.	40.00	38.00	36.00	34.00
full pg	80.00	76.00	72.00	68.00

All display ads should be "Photo Ready", or an additional \$20.00 ley-out fee should be enclosed.

We now have a catalog available.
Send Si.00 to:

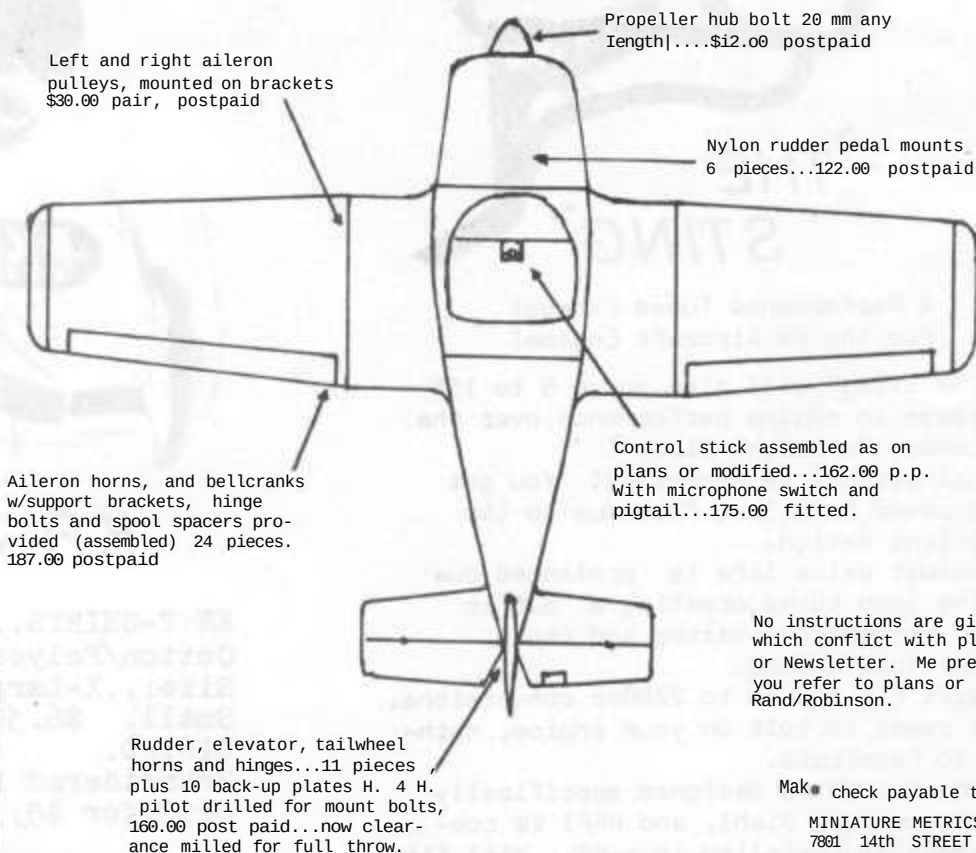
GREAT PLAINS

AIRCRAFT SUPPLY CO.
402-496-0366 BOYSTOWN. NE 6801\$
P.O. BOX 9

MINIATURE METRICS
LITEFUTCHARTOWAM
7801 14th STREET
WESTMINSTER, CALIF. 92683

Phone (714)894-4875
Amos, Anita and
Carey Anderson

Winature metrics has several
services and products. Send
a S.A.S.E. for more info.



QUALITY...all material is air-
craft aluminum/steel as
specified in your plans.
Milled with precision then
debarred, bead blasted* final
finish reamed by standard air-
craft production procedurea
all in the interest of safety.

Make check payable tot
MINIATURE METRICS
7801 14th STREET
WESTMINSTER, CA 92683

KR NEWSLETTER
P.O. BOX 4113
ENGLEWOOD, CO. 80155
ISSUE # 89 NOVEMBER 1982

1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"
1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"
1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"
1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"
1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"	1/2" x 1/2" x 1/2"



Issue no. 90 December 1982

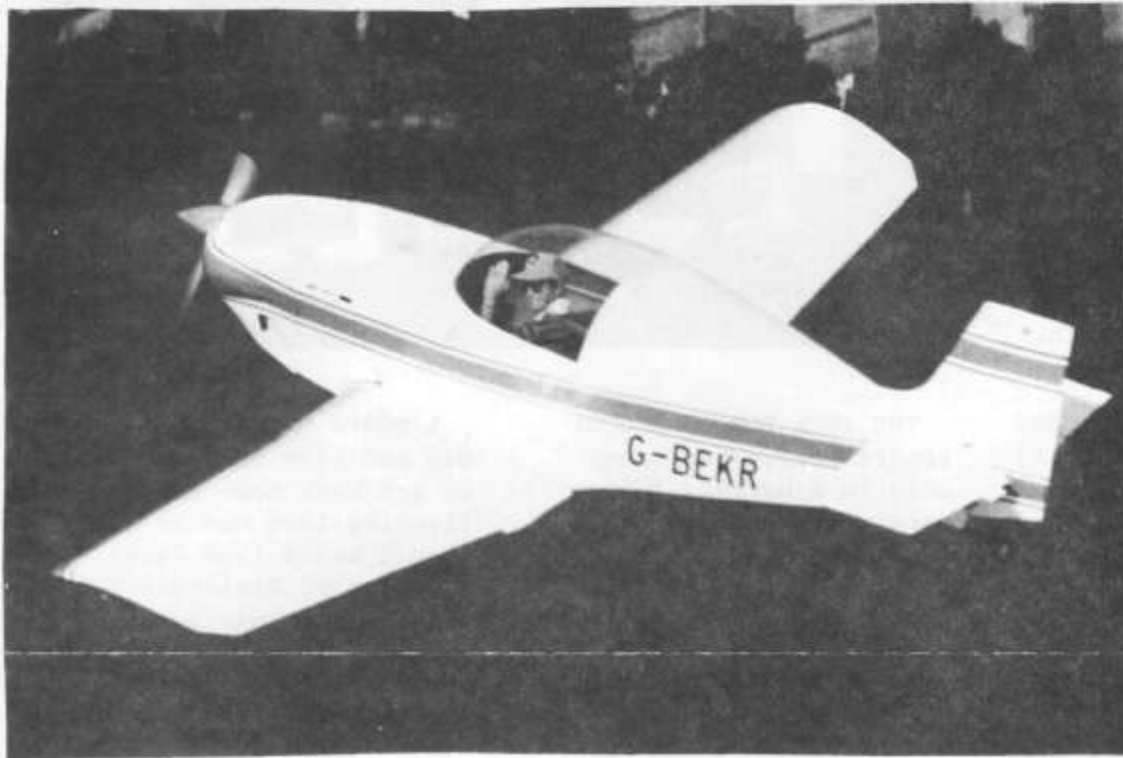
©1980 KR NEWSLETTER



KR NEWSLETTER

RATES
USA \$12.00 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand/Robinson Engineering Inc.



This beautiful KR-2 belongs to Ken Raven. Ken handles the R/R kits in England. He is also a Flight Purser on a 747 for British Airways. His KR-2 has been flying for almost 2 years. It is powered by an 1834cc VW with dual Slick Magnetos, Posa and HAPI exhaust. Cruise is 134 mph at 3000 rpm. This is with a 52" x 47" Great American Prop. Aircraft has flaps and Ken uses 65 mph over the fence to land on a 1000' sod strip. Beautiful job Ken!

RESPONSE TO THE KR CLUB has been very good this month. It looks like we should have a very full membership book next year. If you haven't joined or renewed yet, be sure and do it before the end of the year, so that you will be listed in the new world-wide directory to be sent out in February. If you renew before the end of the year, you will also be able to take advantage of the current membership rate of \$3.00 a year. Remember, it will be \$5.00 after the 1st of next year. There are lots of things being planned for KR CLUB members next year that should make membership very worthwhile for you.

I HAVE BEEN GETTING a lot of requests for current information on tri-gear KR's lately. A large number of builders are asking where they can obtain kits and/or plans for a tri-gear system for their KR. Many are also concerned about how this will affect the flight characteristics of their KR. Although I know of several builders who are currently constructing tri-gear KR's, I have not talked to anyone who has flown with the system. I know that there are some KR's out there with tri-gear systems that have flown, so maybe this will get some reports from them. The tri-gear should not affect the flight charact-

eristics, as long as you don't get too heavy. Landings and taxiing are the only thing that will be changed. I am listing the sources that I know of so that you may contact them for any information they have.

Bill DeFreze, 7530 Ironwood Dr., Dublin, CA 94566 415-828-2111. Plans are \$25.00 System uses R/R main gear parts and you make nose gear.

Aero Trading Ltd., 16 Cliff Rd., Torbay, Auckland, New Zealand. Phone 403-9397. Complete system: \$950.00. Drawings: \$25.00.

Mike Lamb indicated awhile back that if there was enough interest, he would develop a retractable system

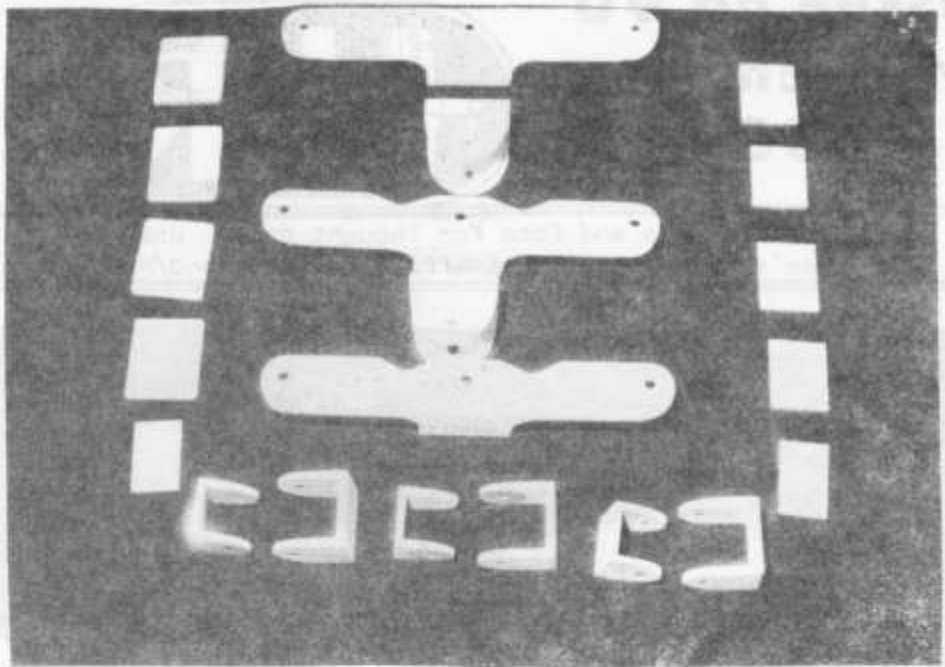
that could also be retro-fitted onto a KR that is already completed. I have not talked to Mike lately, so I do not know how much interest there has been in his system. You can contact Mike at 5327 West Ave., L-10, Quartz Hill, CA 93534

Any pictures and/or drawings any builders have would be greatly appreciated. I will put any information I get in upcoming issues.

JEANETTE RAND AND crew are currently very busy re-printing the plans for the KR-2. New plans should be much nicer and should be available later this month. New price is \$95.00.

WANT AN EASIER way to sand your wing fillets than using a jar? Take a piece of 2" foam and sand it into the shape of the curve you need. It should be the male part of the curve. Glue your blocks in place for your fillets and carve to rough shape. You can now take the carved piece of foam and use it like a sanding block. It will give you a much neater curve. Note: foam sands away easily, so you will go through a few pieces before you're done.

ARE YOU HAVING trouble aligning your axles? After drilling your gear legs, a drill press is best for this, clamp one gear leg to your spring bar. Now take a straight rod the same diameter as the hole in the gear leg and insert it through both holes in the housing. Now lightly clamp the other leg to the spring bar. You may then extend the rod until it lines up with the holes in the 2nd leg. Clamp, and drill mount holes. Be careful not to bend rod during fitting!



THE IDEA FOR A PRODUCT report really has taken hold in a hurry. I have received several letters stating they want reports on products. Most of the companies I have contacted have been all for it also. Most seem to realize that it is good for them also.

I have formed a team to do the evaluations and to help with the testing of products. This team consists of myself, a local FAA inspector, a local NTSB inspector, and another A & P. We will be using these parts and products and will try our best to give you honest evaluations of them.

A few builders have asked whether I will be taking reports from other builders. Information from other builders is most welcome, as that is one of the main basis of this newsletter, but as far as actual testing for this column, I would like to have the team do the testing whenever possible so as to keep the criteria constant in all testing.

I DON'T THINK the mailman had even had a chance to get back home from delivering last month's issues when I heard from Carey Anderson of Miniature Metrics. Carey was very pleased with the idea of a product report and immediately sent me a set of his rudder, elevator, and tailwheel hinges, horns, and back-up plates for testing.

Carey is a crew member for Pan American World Airways and has been on flight status for 37 years. He attended Aeronautical Trade College and worked with Howard Hughes on the B-25, B-26 and C-76.

For \$60.00, Carey will send you some really beautiful hinges for you KR! The care and workmanship was really something to see. The kit includes all hinges, horns, and back-up plates for the tail. They come pilot drilled and milled to allow full clearance for a full throw in your control surfaces.

Carey uses only the best aluminum in his parts and they are deburred and bead-blasted and finished in accordance with accepted con't.

aircraft standards. Carey and his family take great pride in what they manufacture and rightly so. You can reach Carey at:

Miniature Metrics
7801 14th Street
Westminster, CA 92683
714-894-4875

The test team is happy to give Miniature Metrics a perfect score on this kit. It is well worth your money.

ANYONE WHO HAS flown a KR or any of the similar type aircraft will tell you that what probably scared him the most on his first landing is the noise when the tail-wheel touches down. You'll swear that the tailwheel is gone and you're chewing up your tail on the runway.

I don't know of any way to completely eliminate this noise, but you can cut down considerably on it.

When you mount the tail-wheel spring, insert a thin piece of rubber, (1/8"), between the spring and the wedge on the bottom of the fuselage. You will also need to insulate the bolts from the wood or the sound will be transmitted into the tailcone and echo. The best way I have seen is to obtain some thin wall rubber hose with an inside diameter to match the bolts tightly. Drill your holes in the wedge and bottom of fuselage large enough for the hose and install. You will also have to use a thin rubber washer inside the fuselage under the bolt heads. Make sure all rubber used is thin so you will not have the tail spring moving around on you. (See diagram at right).

Q. Is the KR landing gear and tire size adequate for the average public grass airstrip?

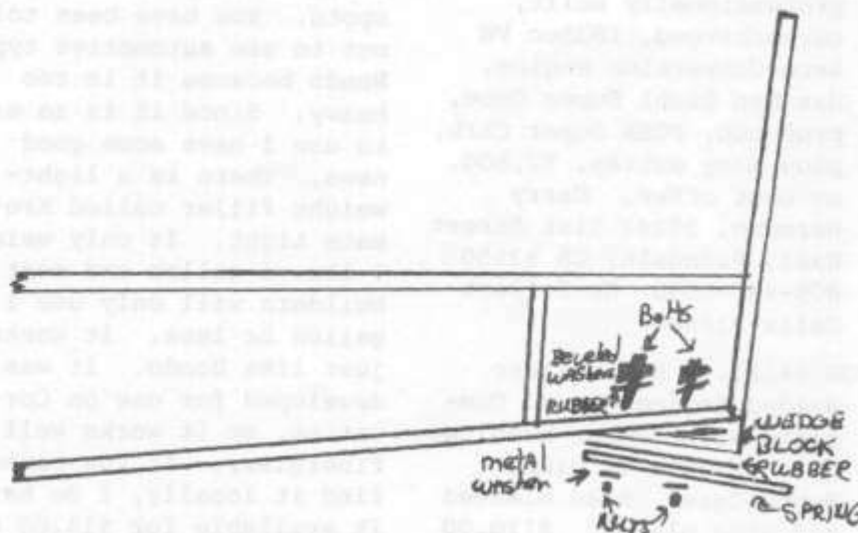
A. I do know of a few KR's that operate from grass strips. (see Ken's aircraft on page 1), The strip should be in very good condition however. The KR's were not designed for use from a rough strip. There have been some builders who have installed larger tires and wheels with good results. If your KR is equipped with flaps, you will probably not be able to use them on a grass strip. The flaps come down so low that they are liable to be damaged.

Q. I have seen several KR's painted in dark colors. I know this is not recommended procedure for composite aircraft and I wonder how some of these paint schemes have worked out.

A. All composite aircraft should be painted white. The epoxy resin used in the construction of composite aircraft: will begin to lose its strength at surface temperatures above approximately 160°. Most owners who have painted their aircraft with a darker color are keeping their aircraft indoors. Even then, I have heard of some that have developed blisters, bubbles, and skin separation. Remember, your life is riding on the strength of those wings. Keep them at full strength' see Issue #32 for a complete color vs. temp. chart.

Q. Does the POSA SuperCarb need carb. heat?

A. Despite several "experts" who claim the POSA will not develop ice, it can and has on several aircraft. All aircraft should have a source of carb heat. HAPI sells a good set of plans for this addition.



Make sure that you use a beveled washer inside the fuselage. Insert rubber washers under the beveled washer. Rubber tube around the bolt should extend up through the center hole of L rubber washer, but not thru the beveled washer. It should extend thru the center of the washer on the bottom of the spring.



FOR SALE...KR-2 Project. R/R fiberglass parts. Airframe 90% complete, less engine, instruments. \$1,500 Firm. R. Butler, P.O. Box 35, Cleveland, WI 53015 414-693-3246. (ed. this is the KR-2 that was on static display at Oshkosh 2 years ago).

FOR SALE...KR-2 Wood Kit. Contains all spruce and plywood for a KR-2. Unused. \$200 under cost. Doug Dahl, 304-232-6615.

FOR SALE...KR-2 Project. Major woodwork complete. Rudder and elevator glass-ed. Assorted materials & hardware. \$1,300 John Lein, 512-353-7679, week-nights after 8:00 pm.

FOR SALE...R/R Moulded Fiberglass Wing Tips for KR-2. \$70.00 full price. Never Used. I will pay freight. Walter Melton, P.O. Box 8176 CRB, Tucson, AR 86738 602-825-9730

FOR SALE... New "0" time, professionally built, turbocharged, 1835cc VW Aero-Conversion engine. Has Dan Diehl Super Case, prop hub, POSA Super Carb, plus many extras. \$2,500. or best offer. Harry Hermann, 37247 51st Street East, Palmdale, CA 93550 805-947-0550 No Collect Calls Please.

FOR SALE...1 New Heliarc Welded Engine Mount. Complete with rubber bushings. Fits VW case or Diehl Super Case. Bead blasted and Zinc plated. \$110.00 Also 30 yds. Dynel, \$30.00. Clyde Wetherbee, 817 Evans, Waupace, WI 54981 715-258-5191 after 5:00 pm.

WANTED...Unused KR-2 parts and materials. Am currently building. Drop me

a line with price and details. M.C. Anderson, 406 33rd Ave. S.W., Vero Beach, FL 32960.

I recently came across this poem and would like to share it with you. It was written by Margie Tifft.

Clouds, wisping over our wings like the soft flowing hair
of an angel,
Sunlight, kissing the canopy and caressing the people within,
We soar through the sky as one with the eagles and dance
with the swirling wind.
Snow-capped peaks reach for us, wanting to touch the
strangers who fly with such grace.
We belong here!
We've paid the price.
We are the wind.
Can't you see it upon our face?
To be a bird, to roll with the wind.
To see the beauty below as God must.
That is what we feel, that is why we are here.
That is why we must fly by our own hands.

SEASONS GREETINGS AND I WISH ALL OF YOU THE BEST OF SUCCESS
IN THE COMING NEW YEAR. MAY IT BE FULL OF PEACE & KR's.

FOR MANY YEARS we have all looked for something to use for easily filling in the cloth weave and other low spots. You have been told not to use automotive type Bondo because it is too heavy. Since it is so easy to use I have some good news. There is a lightweight filler called Kro-mate Light. It only weights 7 lbs. a gallon and most builders will only use 1 gallon or less. It works just like Bondo. It was developed for use on Corvettes, so it works well on fiberglass. If you cannot find it locally, I do have it available for \$14.00 a gallon. One of our local Vari-Eze builders used this for the total aircraft when he filled in the cloth weave. It turned out to be the lightest Vari-Eze ever built in Colorado.

WARNING! When you are join-in the top and bottom skins of your wings at the trailing edge, be very sure that there is not any foam at all left in this joint. It may seem all right at the time, but later on the joint will separate and begin to come apart.

COMING NEXT MONTH.

How to build and install an inspection panel in the tail of your KR. Flush fitting and very simple.

How to install an electric fuel gauge in your KR. Plus much, much more!

The KR Newsletter is published monthly by Forrester Aviation Supply and Technology, (F.A.S.T.), P.O. Box 4113, Englewood, CO. 80155. (303-693-8239) John Forrester, Publisher. Subscription rate: \$12.00 a year, \$30.00 for 3 years. COPYRIGHT 1980, KR Newsletter.



A Performance Tuned Exhaust
for the VIA) Aircraft Engine

*"The Sting" u/ill give you a 5 to 15% increase in engine performance over the customary "straight pipes"!

Fuel economy is increased. You get more pou/er from less fuel due to the efficient design.

*Exhaust valve life is prolonged due to the long tubes creating a "buffer zone" between the valves and rapid temperature change.

* U/ill fit 1600.cc to 2200cc conversions. It's ready to bolt on your engine, nothing to fabricate.

*"The Sting" is designed specifically for Revmaster, Diehl, and MAPI VUJ conversions as installed in a KR. Will fit most other VUJ powered aircraft also.

\$195*00 plus shipping



KR STUFF

KR T-SHIRTS...Now Available...
Cotton/Polyester Blend. State
Size...X-Large, Large, Medium,
Small. \$6.50 ea. or 3 for
\$18.00.

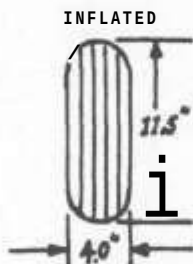
Embroidered Patches..\$1.50 ea.
or 3 for \$3.50

F.A.S.T.
P.O. BOX 4113
ENGLEWOOD, COLO. 80155



NEW! 1 I.400X5 6 PLY. RATED

TIRE WT. 3 LBS. TUBE WT. H IB.
LOAD RANGE C - 70 P.S. I. MAX.



This tire fills the size gag between the 500x5 aircraft tire and the 3.40-3.00x5 go-kart tire. Looks like a scaled-down 500x5. Fits Kft-1 I 2's and is recommended by Burt Rutan for the varLEZE and longEZE. Also fits most other experimentals using 5 inch rim's.

TIRE 6 PLY RAT. 25.00 TUBE 6.50 «• SHIP I HAND.
MIKE LAMB P.O. BOX 3324, QUARTZ HILL. CA. 93534

Ule now haVe a catalog available.
Send \$1.00 to:

GREAT PLAINS

AIRCRAFT SUPPLY CO.
402-496-0366 BOYSTOWN. NE 6801*
P.O.BOX9

CLASSIFIED AD RATES

Classified ad rates for newsletter subscribers with less than 25 words are free. If you have over 25 words, the cost is \$5.00 an issue.

Non-subscribers may place ads at the rate of \$5.00 an issue.

DISPLAY AD RATES

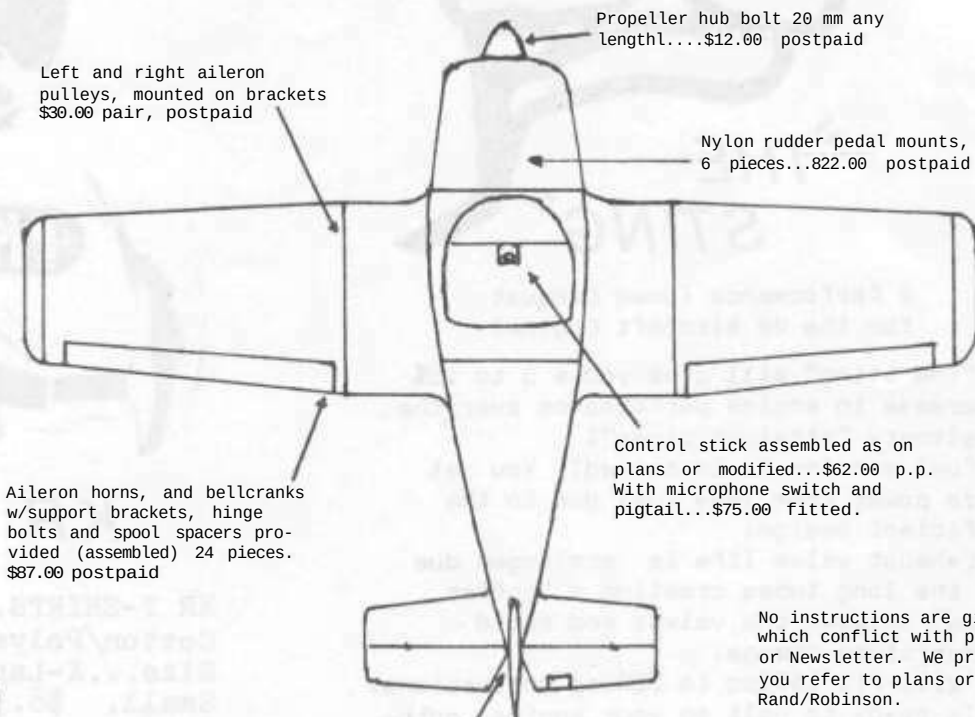
SIZE	1 time	3 times	6 times	12 times
1/8 pg.	\$15.00	\$14.25	\$13.50	] \$12.75
1/4 pg.	20.00	19.00	18.00	17.00
1/2 pg.	40.00	38.00	36.00	34.00
full pg	80.00	76.00	72.00	68.00

All display ads should be "Photo Ready", or an additional \$20.00 ley-out fee should be enclosed.

MINIATURE METRICS
LITEFLITE HARDWARE
7801 14th STREET
WESTMINSTER, CALIF. 92683

Phone (714)894-4875
Amos, Anita and
Carey Anderson

Winature Metrics has several
services and products. Send
a S.A.S.E. for more info.



QUALITY...all material is air-
craft aluminum/steel as
specified in your plans.
Willed with precision then
debarred, bead blasted, final
finish reamed by standard air-
craft production procedures
all in the interest of safety.

Rudder, elevator, tailwheel
horns and hinges...11 pieces
plus 10 back-up plates H. & H.
pilot drilled for mount bolts,
\$60.00 post paid...now clear-
ance milled for full throw.

No instructions are given
which conflict with plans
or Newsletter. We prefer
you refer to plans or consult
Rand/Robinson.

Wake check payable tot

MINIATURE METRICS
7801 14th STREET
WESTMINSTER, CA 92683

KR NEWSLETTER
P.O. BOX 4113
ENGLEWOOD, COLORADO 80155
ISSUE NO. 90 DEC. 1982

12	11	10	9	8	7	6	5	4	3	2	1
12.00	11.00	10.00	9.00	8.00	7.00	6.00	5.00	4.00	3.00	2.00	1.00
11.00	10.00	9.00	8.00	7.00	6.00	5.00	4.00	3.00	2.00	1.00	0.00
10.00	9.00	8.00	7.00	6.00	5.00	4.00	3.00	2.00	1.00	0.00	0.00
9.00	8.00	7.00	6.00	5.00	4.00	3.00	2.00	1.00	0.00	0.00	0.00
8.00	7.00	6.00	5.00	4.00	3.00	2.00	1.00	0.00	0.00	0.00	0.00
7.00	6.00	5.00	4.00	3.00	2.00	1.00	0.00	0.00	0.00	0.00	0.00
6.00	5.00	4.00	3.00	2.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
5.00	4.00	3.00	2.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4.00	3.00	2.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3.00	2.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SEASONS GREETINGS!



Issue no. 91 JANUARY 1983



KR NEWSLETTER

RATES
USA \$1200 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand/Robinson Engineering Inc.



Keith Campbell, 1617 14th, Boone, la., 50036, reports that he now has over 225 hrs on his KR-1. Finished in 1978 and powered by a 1600cc VW and a Great American Prop, Keith states that he gets an average cruise of 140-150mph. The aircraft is covered with Dynel and Keith admits to painting it the "wrong color". Aircraft is kept in a hangar and only flown when the temp. is less than 80°F. He reports «that he has had some minor cracks develop in the wing fillet area.

I MUST FIRST apologize for this month's Newsletter being late. I had intended to finish it over the Christmas weekend, but as you have probably seen in the news, we got hit with a storm that deposited over 3 feet of snow at my house. I have just spent 4 days trying to dig out.

It's time to welcome a new year and make all of those resolutions that we never seem to be able to keep. There is one resolution however, that I want all of you to make and to keep. Resolve that you will do the best job possible on your KR. We trust our lives and the lives of others in our aircraft and there is no excuse for a job not done perfectly on them. While most of you are doing a good job, I have seen a couple of aircraft lately

that really scared me. I want everyone to take a piece of paper and make a poster with the following on it.

IF YOU DON'T HAVE THE TIME TO DO THE JOB RIGHT THE FIRST TIME,
HOW WILL YOU FIND THE TIME TO DO IT OVER.

Now take this poster and hang it up over your workbench and look at it every time you work on your KR.

LAST MONTH'S ARTICLE on tri-gear KR's got some good replies. There are several builders currently using a tri-gear. Most builders are currently designing their own system, with a variation of the Mooney system seeming to be the most popular.

Carey Anderson of Miniature Metrics is planning to produce a good design

that has simple to install features. If you have a system that you feel is good, please contact Carey at 7801 14th St., Westminster, CA, 92683.

There are also a couple of other builders who plan to sell plans for their systems. Both aircraft are flying, but they would prefer to get some time on them to make sure the systems work well before they sell the plans. I'll let you know how they work out.

While we're on the subject of gears, Bill Rosman, R2, Box 150, Palmyra, WI, 53156, sent me some pictures of his KR-2 with a fixed gear. If you are considering a fixed gear on your KR, Bill is offering complete plans for his system for \$20.00. The plans include all drawings for gear, axles, brackets, and tail-wheel. Drawings are full-size and pro-

professionally drawn. Bill was involved in the design of the EAA Aero II and did all of the construction plans. He also has an exhaust system available for the KR. The picture at right is of Bill's KR-2.

RALPH UPSON WAS tragically lost in the crash of his KR-2 this month. Ralph and a passenger crashed shortly after takeoff from Corena Municipal Airport outside Los Angeles. An unidentified passenger was also killed in the crash. This aircraft had been flying since 1980 and the cause of the crash is not currently known. The NTSB is still investigating the accident at this time.

THE NEW PLANS from R/R should be available for delivery by the middle of this month. Price is \$95.

The new fuel tank that I told you about in November is now ready for delivery. It is a two-piece design that is assembled before installation in the aircraft. The tank is separate from the forward deck and will hold 12 U.S. gallons of fuel. You must use a polyester resin in the assembly of this tank due to the material it is constructed of. The cost is \$125.00.

R/R also has a new engine cowl built specifically for the Revmaster engine available now. The cost is \$185.

The KR Newsletter is published monthly by Forrester Aviation Supply and Technology, [F.A.S.T.] PO Box 4113, Englewood, CO. 80155. [303] 693-8239. John Forrester, Publisher. Subscription rate: \$12.00 a year, \$30.00 for 3 years. All back issues are available at the following rates: 1-12 issues: \$1.00 each, 13-24 issues: 75¢ each, 25 or more: 50¢ each. COPYRIGHT 1983, KR Newsletter.



BUY - SELL - TRADE

FOR SALE...R/R Fiberglass Parts. Upper and lower cowl, Fuel tank cover, canopy, canopy frame and turtledeck. All new. 212-658-3765 Jeff

FOR SALE...1 R/R Flap Handle, never used. \$30.00. 1 R/R Canvas Seat, never used. \$10.00. Tom Jones, 4531 Carado Pl., Orlando, FL 32806

FOR SALE...KR-1 Project. Fuselage, spars, empennage signed off. Log books, registration, wheels, spinner, canopy, foam, aluminum kits. Most material to finish airframe, newsletter collection. \$2,500 investor, Will sell for \$1,200. 817-322-9566. Arthur McGinty.

FOR SALE...1600cc VW Engine with 70 hrs in a KR-2. Has Slick Mag, supplemental oil sump, oil cooler, R/R prop hub & motor mount, shielded ignition, balanced, full exhaust, Zenith carb. \$1,200 Firm. Write to: Kenneth D. Miller, Lot "E" Green Meadows Ct, Clear Lake, IA 50428.

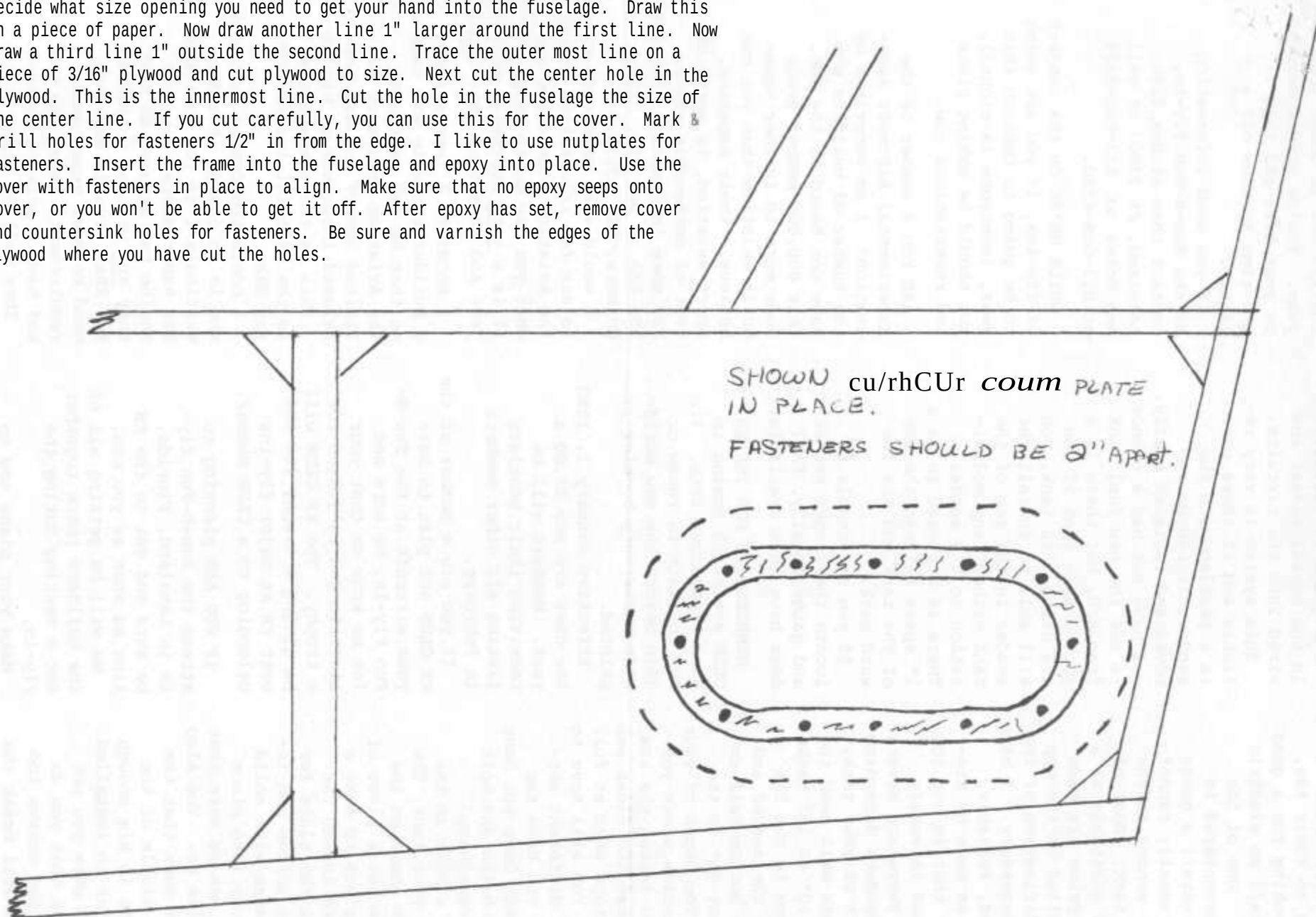
FOR SALE...R/R Spruce Kit for KR-1. One side built. \$200.00 or trade for parts. Jerry Pryce, 330 Elsinore Dr., Vacaville, CA 95688. 707-466-9740.

FOR SALE...New "0" time, professionally built, turbo-charged, 1835cc VW Aero-Conversion engine. Has Diehl Super Case, Prop hub, Posa Super-Carb, Plus many extras. Harry Hermann, 37247 51st St. East, Palmdale, CA. 93550. 805-947-0550. No Collect Calls.

WANTED...FLYING Tri-Geared KR-2. Must' be completely finished and flying. Good workmanship a must! J. Friedman, 170-09 Gothic Dr., Jamaica Estates, NY 11432.

WANTED...Lower cowling or lower cowling mold for KR-2 using Continental A-65 engine. K.W. Asbury, 9922 Caminito Bolsa, San Diego, CA 92129.

Decide what size opening you need to get your hand into the fuselage. Draw this on a piece of paper. Now draw another line 1" larger around the first line. Now draw a third line 1" outside the second line. Trace the outer most line on a piece of 3/16" plywood and cut plywood to size. Next cut the center hole in the plywood. This is the innermost line. Cut the hole in the fuselage the size of the center line. If you cut carefully, you can use this for the cover. Mark & drill holes for fasteners 1/2" in from the edge. I like to use nutplates for fasteners. Insert the frame into the fuselage and epoxy into place. Use the cover with fasteners in place to align. Make sure that no epoxy seeps onto cover, or you won't be able to get it off. After epoxy has set, remove cover and countersink holes for fasteners. Be sure and varnish the edges of the plywood where you have cut the holes.



DRAWING NOT TO SCALE AND DOES NOT SHOW ALL FUSELAGE CONSTRUCTION DETAILS.

WITH MORE BUILDERS adding full panels to their KRs, many are looking for a good way to install an electric fuel gauge. One of the problems encountered in trying to install a gauge is that we usually cannot install the sender in the top of the tank. Most of the senders available at a reasonable price are made to be installed in the top so some modification of the sender is necessary. I have found a good, reliable gauge that is made by Stewart-Warner that is not too expensive and is easily modified. There are several different senders depending on the depth of your tank. Most builders will need the sender for 10" to 15" tanks. You will have to cut the main arm of the sender and remount the bottom half so that it is at 90° to the main arm. The depth of your tank will decide where you will need to fasten the arm. Make sure that the float arm is at the stops when at full and empty. You will have to try several different settings before you have the correct spot. Once you have it, drill 2 holes and bolt the 2 arms together.

Now drill a hole in the aft side of your tank. The size will be shown on the gasket. Now cut a piece of scrap fiberglass to make a back-up plate inside the tank. Drill the plate for the mounting screws and install nutplates with solid rivets. Epoxy into place in the tank making sure that all holes line up. You also need to make sure that the hole in the middle of the back-up plate is big enough for the sender to be installed.

Be careful when you put the sender in that you do not tighten the screws too tight or you will break the cork gasket.

The gauge is installed in the normal manner and wired into the circuits.

This system is very reliable and if there ever is a problem with the sender, it can be removed and replaced easily.

I have not had a chance to see the new fuel tank from R/R, but there is a good chance that if you are using this tank, you will be able to install the sender in the top of the tank without any modification to the sender. There is supposed to be a 1" space between the top of the tank and the forward deck.

If you are unable to locate the proper sender and gauge locally, FAST does have them available.

MEMBERSHIPS FOR THE KR CLUB are still coming in at a tremendous rate. Its not too late to renew or join before the new worldwide membership booklet is printed.

Effective January 1, 1983 the dues are now \$5.00 a year. Members will be receiving their booklets listing all other members in February.

If you are a member of the KR CLUB and plan to have your aircraft at the Sun-N-Fun Fly-In, be sure and let me know so that your aircraft can be judged for a trophy. The KR CLUB will be giving a trophy for the best KR at major fly-ins belonging to a CLUB member.

IF YOU ARE planning to attend the Sun-N-Fun fly-in in Lakeland, Florida, be sure and get to the KR line as soon as you can.

We will be getting all of the builders there together for a meeting during the fly-in.

Make your plans now to attend. Lets really get

the KRs out in force this year. You've worked hard on your bird and this is the time to show off a little.

If you need information on the Sun-N-Fun fly-in, contact them at Box 2246, Lakeland, FL 33803 or call Ann McKee at 813-688-8214 or 813-688-6280.

WHILE WE'RE ON the subject of fly-ins, if you are going to be going to Oshkosh this year, (everyone is-right?), you should be making plans and reservations now.

ARE YOU A member of the Experimental Aircraft Association? I am surprised by the number of builders who have not heard of the EAA. This 800,000 member group does more to further home-built aviation than you can believe. Their magazine, Sport Aviation, is worth the cost of membership alone. For more information, contact the EAA at Box 229, Hales Corners, WI 53130.

I would also encourage you to ask for information about the Aviation Foundation and what you can do to help. It is a very worthwhile project and they need your help.

I RECEIVED A letter from a builder recently who told me that he had contacted the Aviation Insurance Unlimited Agency and had been refused insurance on his KR.

This is the company that is the official insurer for the EAA.

I contacted Connie Sullivan, who is in charge of underwriting all of the policies for experimental aircraft and he has assured me that they are writing policies for KRs. You do however, need to meet experience requirement, about 100 hrs., and have a private license.

They will be happy to insure your KR and the cost is reasonable. Call them at 1-800-334-0061.

Forrester Aviation Supply & Technology

"THE STING" EXHAUST SYSTEM. A Performance Tuned Header System for VW Powered Aircraft. Increase Horsepower up to 15% Over Straight Pipes! Built to Accepted Aircraft Standards. Will Fit 1600cc to 2200cc VW Conversions Installed in KRs. Will Also Fit Most Other VW Powered Aircraft. System Comes Complete And Ready to Install. \$195.00

DIEHL SUPERCASE. This Accessory Case Will Allow You-To Use Either Of The R/R Engine Mounts. Provides Electric Starting And Has A 20 Amp Alternator Built Inside The Case. Will Fit All VW Engines From 1200cc To 2200cc. Will Also Fit Engines Fitted With Turbos. Entire Weight Of The Case And All Accessories Is 24 Lbs. Accessory Case \$125.00 [Also Available With Starter On Top For Tri-Gear]
Flywheel 85.00 [Specify When Ordering Whether Using Stock Crank]
Mag Drive 40.00 [With 4 Dowels Or Stroker Crank With 8 Dowels]
20 A Alternator 100.00
Starter 65.00

KROMATE LIGHT. A Light-Weight Filler That Can Be Used During Finishing Of Aircraft Surface Prior to Painting. Similar To "Bondo", But Much Lighter And Made Specifically For Fiberglass. 7 Lbs. Per Gallon. \$14.00 @ Gallon

KR T-SHIRTS. Cotton/Polyester Blend. State Size. X-L, L, M, S. \$6.50 each or 3 for \$18.00

FUEL TANK SENDER AND GAUGE. Allows Installation Of Electric Gauge In Fuel Tanks. Some Modification Necessary To Sender. Sender: \$25.00 Gauge: \$ 31.00



FAST P- O. Box 4113 Englewood, CO 80155 (303) 693-8239



CLASSIFIED AD RATES

Classified ad rates for newsletter subscribers with less than 25 words are free. If you have over 25 words, the cost is \$5.00 an issue.

Non-subscribers may place ads at the rate of \$5.00 an issue.

DISPLAY AD RATES

SIZE	1 time	3 times	6 times	12 times
1/8 pg.	\$15.00	\$14.25	\$13.50	\$12.75
1/4 pg.	20.00	19.00	18.00	17.00
1/2 pg.	40.00	38.00	36.00	34.00
full pg	80.00	76.00	72.00	68.00

All display ads should be "Photo Ready", or an additional \$20.00 lay-out fee should be enclosed.



THRILL THE FLIER
IN YOUR FAMILY
with an

11x14" framed stained glass picture featuring an in-flight KR-II

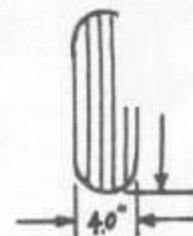
Handcrafted, using genuine leaded stained glass in 8 brilliant colors. Send check or money order for \$89.95 to B&B Products, 345 Simpson Road, El Dorado, KS. 67042. We pay postage and insurance in the continental U.S. Allow 6 weeks for delivery.



INFLATED

NEM! 11.400X5 6 PLY. HATED

TIRE yr. 3 LBS. TUBE HT. s IB.
LOAD RANGE C - 70 P.S.I. MAX.



This tire fills the silt gap btwctn the 500x5 aircraft tire and the 3.40-3.00*5 go-kart trlt. Looks like • scaled-down 500x5. Fits Kft-1 I 2's and is recommended by Burt Rutan for the varfEZC and longEZE. Also fits most other eiper«ntau using 5 inch rim's.

TIRE 6 PLY RAT. 25.00 TUBE 6.50 * SHIP I HAND.
MIKE LAMB P.O. BOX 3324. QUARTZ HILL. CA. 93534

Phone (714)894-4875
Amos, Anita and
Carey Anderson

Minature Metrics has several services and products. Send a S.A.S.E. for more info.

QUALITY...all material is aircraft aluminum/steel as specified in your **plans**, milled with precision then deburred, bead blasted, final finish reamed by standard aircraft production procedures all in the interest of safety.

Left and right aileron
pulleys, mounted on bracket,
\$30.00 pair, postpaid

Aileron horns, and bellcranks
w/support brackets, hinge
bolts and spool spacers pro-
vided (assembled) 24 pieces.
187.00 postpaid

Rudder, elevator, tailwheel
horns and hinges...11 pieces
plus 10 back-up plates H. & H.
pilot drilled for mount bolts,
~~\$60.00~~ post paid...now clear-
ance milled for full throw.

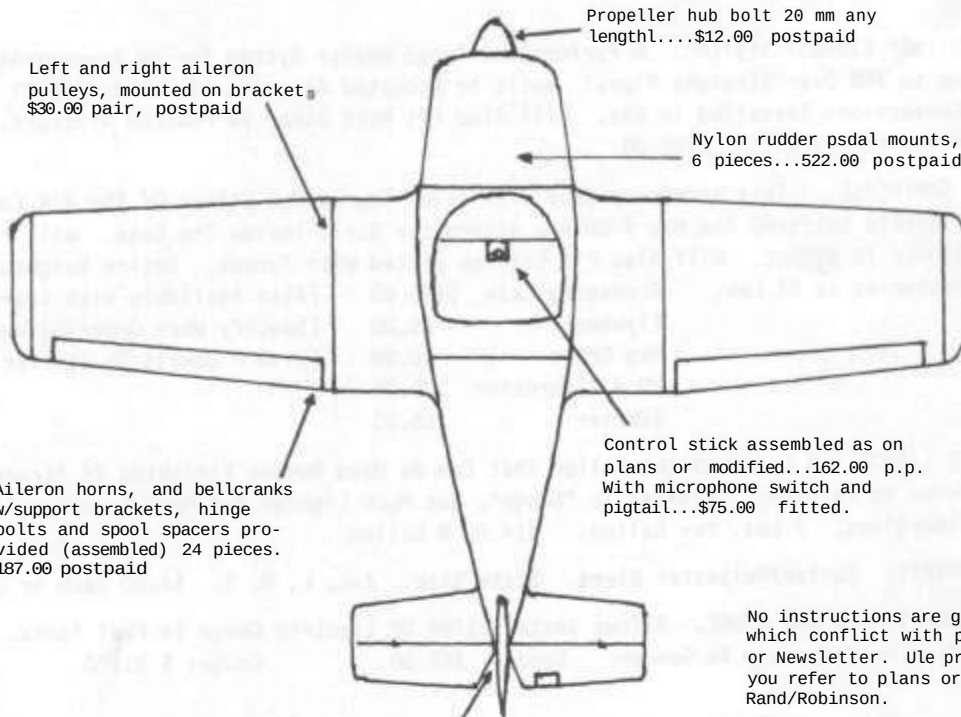
Propeller hub bolt 20 mm any
lengthl...\$12.00 postpaid

Nylon rudder psdal mounts,
6 pieces...522.00 postpaid

Control stick assembled as on
plans or modified...162.00 p.p.
With microphone switch and
pigtail...\$75.00 fitted.

No instructions are given which conflict with plans or Newsletter. Ule prefer you refer to plans or consult Rand/Robinson.

Make check payable to
MINIATURE METRICS
7801 14th STREET
WESTMINSTER, CA 92683



KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, CO. 80155
ISSUE #91 JANUARY 1983

issue no. 92 February 1983

1980 KR NEWSLETTER



KR NEWSLETTER

RATES
USA \$12.00 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion* Not affiliated with Rand/Robinson Engineering Inc.



I'VE JUST RETURNED from a visit to Rand/Robinson in California. I really enjoyed meeting many of the Southern California builders and seeing their KR's. Unfortunately, the weather didn't cooperate, so we didn't get to fly while I was there.

The crew at R/R has been busy again and there are some nice new parts available. In addition to the new fuel tank I mentioned last month, R/R now has rudder pedals with toe-brakes built in, a really nice control stick assembly that uses a torque tube thru the cockpit area and connects to a bellcrank located behind the seat, [more on these in upcoming issues], and there are now 3 different engine cowls available. Now you can get an engine cowl

specifically made to fit your engine, Basic VW, Revmaster, and HAPI are available. If you don't have a current price list, write to R/R or me, and we'll see that you get one.

JEANETTE AND I will both be at the Sun 'n Fun Fly In in Lakeland, Florida, March 12th thru 19th. The traditional KR dinner will be held Wednesday, the 16th, at 7:30 pm, at Vito's Italian Restaurant, 1021 S. Florida Ave. Sign up at the Wicks Aircraft Supply booth by Tuesday, the 15th so that we can get a count. Plan to bring your spouse, friends, pictures and a notepad. Should be lots of fun.

This will be my first trip to the Sun 'n Fun and I'm looking forward to it. Those that go every year really rave about it, so try and plan on attending.

This beautiful KR-2 belongs to Rod Ferguson of Brisbane, Australia. The picture was sent to me by another builder, so I do not have any other information on it except that it has flown and is flying nicely.

ONE OF THE new developments of my trip to California was that my aircraft supply co., (F.A.S.T.), is now an authorized dealer for all of Rand/Robinson's parts and kits. We are now stocking all of the kits and have them ready for immediate delivery. Prices are the same as on the R/R price sheet. We also can accept M/C and Visa.

THE FEBRUARY ISSUE of HOMEBUILT AIRCRAFT contains a report that is generating a lot of telephone calls to me. They reported that Rand/Robinson had a tri-gear system installed on their KR-2 and that R/R had it available. Jeanette informs me that while they discussed the gear with the company, (Aero Trading Co.) and are interested, they do not have it for sale and have never received a system for their KR-2.

FROM STEVE BENNETT, KR
DESIGNEE: "I would like to share with you a few thoughts on a 1000+ hour KR-1.

My KR-1, N31123, has 1057 hours on it. I started building it in 1973 and first flew in July of 1977. Several mods have been made and most out of necessity.

The original gear hold-down latches failed to keep the gear down on take-off one day, resulting in the firewall being torn from the plane. A new 1" firewall was installed and a positive pin lock gear system was put in place. Neither has bothered me since.

The original 1/8" tail-wheel spring broke in 1978 and was replaced with one 1" thick and it has never given any more trouble.

The aluminum tailwheel bracket folded up in 1978 and was replaced with one made from .090 4130. No more problems.

The engine lord mounts have one inch spacers behind them. The reason for this is two-fold. It helps correct an aft CG problem and it enables me to run my intake manifold behind the aluminum channels, where my intake manifold can be made of 90° bent tubing, thus eliminating any welding or cutting.

I also installed a wing tank in the right center wing section.

As you can see, 4 out of the 5 mods were somewhat necessary.

N31123 weighs 463 lbs. empty. It has been flown at a gross weight of 793 lbs. Performance at that high of a gross weight on a 1700cc engine is marginal. It normally carries 12 gal. gas and will cruise at an honest 140 at sea level. It will burn from 2.9 to 4 gal. per hour, depending how hard one pushes. Normal cruise for it is 3200 to 3400 rpm.

Since the airplane has been built it has not had any major work done on the fiberglass structure (wings, tail, etc...). This winter though, it is getting all the necessary patch work done and a repaint. The wings, tail and fuselage are all covered with Dynel. Don't let an expert tell you that Dynel won't work. The Dynel has cracked however, almost always where the Dynel meets the wood.

The engine will also have work done on it this winter. During the course of the flying season past, it lost about 200 rpm. So it will receive another valve job-its third, and new rings, (second set), new bearings, and any other parts that are out of tolerance. The airplane is on its second magneto, second timing belt, fourth prop, one broke and the others were tried in the interest of performance. It is using the original exhaust system, the original POSA carb, (works flawlessly), and its 14th set of Bosch spark plugs. The ignition harness, (automotive type), has been replaced once and the oil has been changed 43 times, (Valvoline 10-40).

The wood structure has been superb. The only piece other than the firewall, remember the gear latch incident, has been the horizontal brace across the top of the fuselage just behind the pilot. The elevator, rudder, and aileron hinges are all original and do not show excessive wear. The rudder pedals have also been replaced once. The originals were built out of aluminum and they bent. All the cables and pulleys are original and none have needed tightened or replaced.

As a KR Designee, I've had the opportunity to inspect and fly quite a few different KR's. I've noticed 3

problems that keep showing up.

1. Builder lack of knowledge about composite construction.

2. Weight-most often directly attributed to the above.

3. Improper engine installation.

How many of us would attempt to do major surgery without first getting a good education in that field. Apparently, lot's of us. We want to build a simple, safe and inexpensive aircraft that's lots of fun to fly. Yet some builders do not take the time to educate themselves in the area of composite and wood construction. In the KR line, part of this may be attributed to the lack of composite procedures in the KR plans. But none the less, it's the builders time, money and responsibility. It's surprising to see how many builders still use automotive bondo instead of micro. Many builders still think that resin must be poured on the cloth in order to make it strong, resulting in an overweight and expensive aircraft.

Weight-The above covers a lot on this subject, but there is more. Why do some of us want to put a dual nav/com, ILS, ADF, DME and the list goes on, in their aircraft? Others think that a KR-2 with 84 sq. ft. of wing will carry two 200 lb. people, 30 gals. of fuel and 40+ lbs. of baggage, when they have an empty weight of 650 lbs. Think in terms of ounces and grams, not pounds. Remember, if you're not really going to use it, don't put it in your plane.

Engine Installations--2 problems here: When using a POSA or any other gravity feed carb, remember that 45° fittings and 90° fittings

roally slow down the gas flow. Try to use gentle bends in the tubing and straight fittings to connect the outlets. i" tubing is fine, but I prefer 3/8" O.D. tubing. Be sure to check your fuel flow, it should be in the 10 to 12 gal. per hour range. I've tinkered with some engines that won't run on the top end unless the number 4 needle on the POSA is turned out at least 15 turns. This really makes them run good at idle!!! Sput, Sput, Sput. I use a 29MM POSA and run the #3 needle turned out 3 turns.

Baffling—Some aircraft that we've preflighted haven't even had any on the engine. Yet another had the engine right out of the car and mounted in the aircraft complete with all the tin and squirrel cage, blower, etc. that is on the car! Some have thought that cowling will do the job for them. The engine must be properly baffled and cowled. As I have seen it, heat has been the main cause of VW engine failure. For a reference, on cowling inlets and outlets, use an 8i x 11" sheet of paper. The outlet should be approximately 90 sq. inches, (8i" x 11"), and the inlets should be roughly 15 sq. in. per side, or a piece of paper 8i" long by 2" high. Allow additional outlet area if you are using air to cool the bottom of your case, (oil cooler effect).

The one other comment that I would like to pass along is the use of auto gas. In my aircraft, the exhaust from each head runs together and exits through two tubes via the bottom rear of the cowling. It produces a lot of extra heat that must exit the cowling exhaust air area. During the summer,

or any time when the air temp, is 75° or above, the engine acts as if it wants to vapor lock. It had two bad occasions, one in Tulas, OK. and the other in Fort Dodge, IA. Mike Howard, (KR-1), on the other hand, uses the shorty stacks, (exits the cowling in 4 places, approx. 6" long each), and uses regular gas year round. We've compared our installations and the only difference that we can find is that of the exhaust system.

Please use this information as you see fit. I by no means am a self-proclaimed expert and I'm sure that for every comment I have made, someone else has had a different experience."

The KR Newsletter is published monthly by Forrester Aviation Supply and Technology, [F.A.S.T.] PO Box 4113, Englewood, CO. 80155. [303] 693-8239. John Forrester, Publisher. Subscription rate: \$12.00 a year, \$30.00 for 3 years. All back issues are available at the following rates: 1-12 issues: \$1.00 each, 13-24 issues: 75¢ each, 25 or more: 50¢ each. COPYRIGHT 1983, KR Newsletter.

THE DRAWING ON the next page for a dual stick control installation was sent to me by Pat Russo, Star Route, East Haven, VT. 05837.

Pat is a frequent contributor to the newsletter and has several other ideas we will be showing you in upcoming issues.

BUY - SELL - TRADE

FOR SALE...KR-2 Fixed Gear Plans. Gear, axle, attach brackets and tailwheel drawings. Professionally designed. See KR Newsletter No. 91 for photo. Conversion plans..\$20.00. Bill Rosman, Rt. 2, Box 150, Palmyra, WI. 53156. 414-495-4370.

FOR SALE...R/R prefab wingtips for KR-2, aircraft lights already installed: \$60.00. R/R KR-2 canopy, unused. Will throw in cut up canopy frame. (My idea didn't work) \$50.00 904-243-0367 No collect calls please.

FOR SALE...1 new heliarc welded engine mount. Complete with rubber bushings. Fits VW case or Diehl Super-case. Bead blasted and Zinc plated: \$100.00 Clyde Wetherbee, 817 Evans, Waupace, WI. 54981 715-258-5191 after 5:00 pm.

FOR SALE...KR-2, 90% complete. VW 1834cc engine. \$4,500.00. KR-1, 75% complete, 1700cc engine: \$4,200.00 or \$3,995.00 less radio. Has many extras. Gera Warstler, 311 Oak, Georgetown, IL. 61846 217-662-8509.

WANTED....Quality Constructed KR-2, preferably completed, flying even better. Immediate cash for right plane. Otto Blavier, 1328 Caledonia Dr., Warminster, PA. 18974 215-672-6598.

WANTED....15 yards of Dynel. Also a samll communications radio for KR-2. Jim Burns, PO Box 602, Kihei, Hawaii, 96753 808-879-9313.

FOR SALE...Carve your own propeller. Don't risk expensive prop during early tests. Flight tested, new method, ridiculously easy. \$6.95 USA, \$8.95 Overseas. G. Hess, 881 Emory Ct. Upland, CA 91786

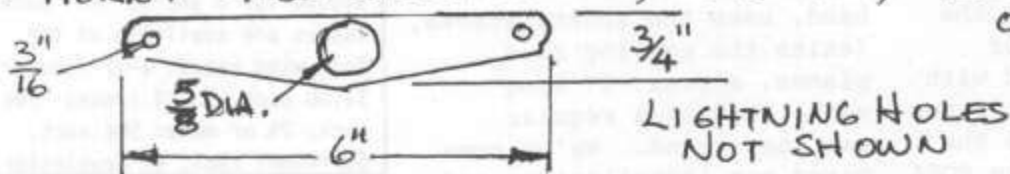
DUAL CONTROL

MATERIAL

A-BRACKETS: AS SUPPLIED BY R/R

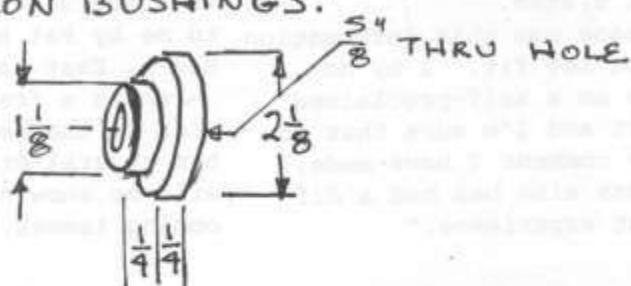
B-CONTROL STICKS: 2 PCS. 4130 TUBE, 14" LONG $\frac{7}{8}$ OD, .058 WALL

C- HORN: 4130 SHEET STEEL, .090 THK, WELD TO CENTER OF SHAFT



D- SHAFT: 4130 TUBE, $\frac{5}{8}$ DIA, .035 WALL X 18" LONG

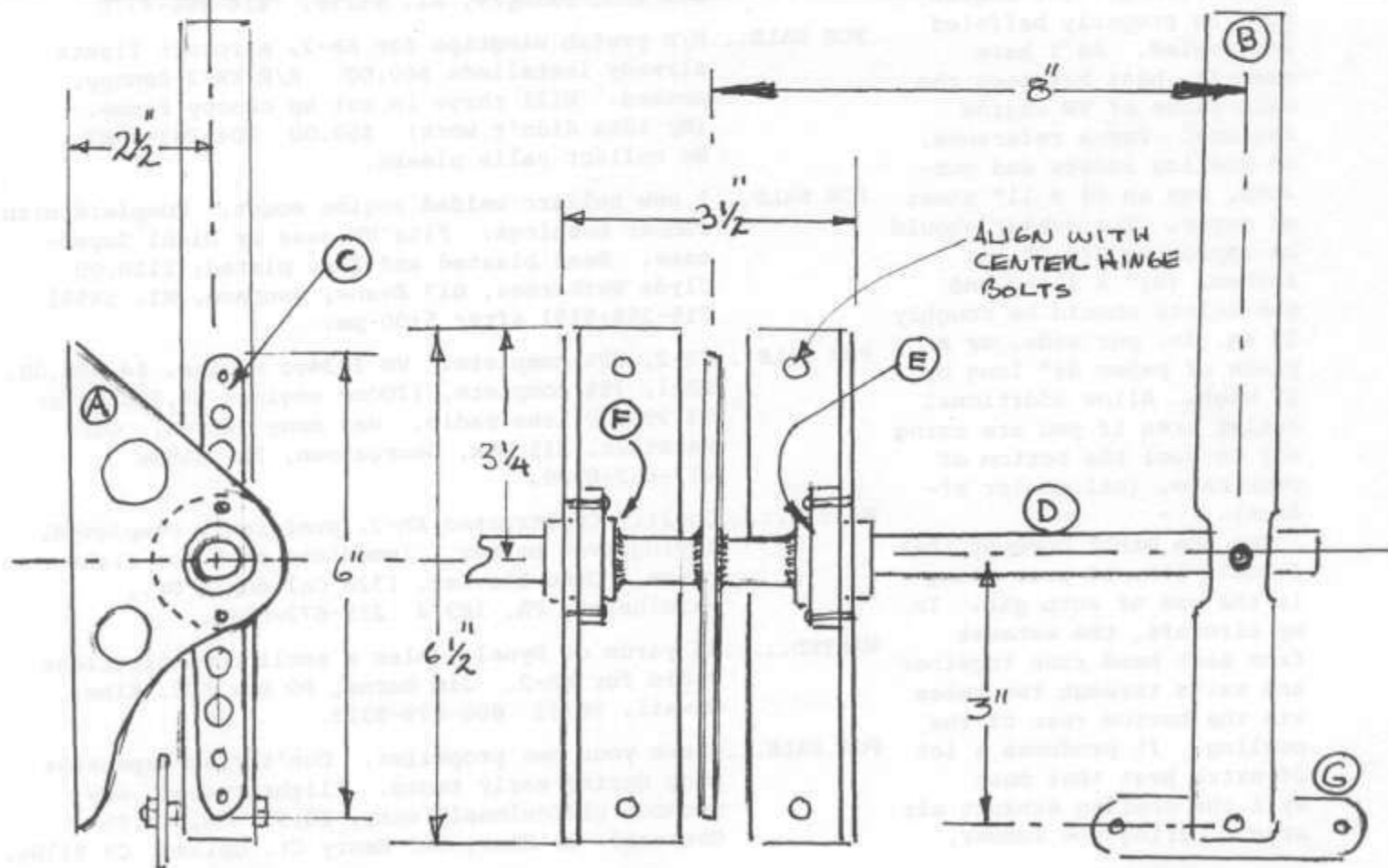
E- NYLON BUSHINGS:



RIVET OR SCREW TO BRACKETS

F- 2 WASHERS: 4130, $\frac{5}{8}$ ID, $\frac{1}{8}$ TO $\frac{1}{4}$ OD. WELD TO SHAFT

G- AS PER PLANS, R/R



Forrester Aviation Supply & Technology

"THE STING" EXHAUST SYSTEM. A Performance Tuned Header System for VW Powered Aircraft. Increase Horsepower up to 15% Over Straight Pipes! Built to Accepted Aircraft Standards. Will Fit 1600cc to 2200cc VW Conversions Installed in KR's. Will Also Fit Most Other VW Powered Aircraft. System Comes Complete And Ready to Install. \$195.00

DIEHL SUPERCASE. This Accessory Case Will Allow You To Use Either Of The R/R Engine Mounts. Provides Electric Starting And Has A 20 Amp Alternator Built Inside The Case. Will Fit All VW Engines From 1200cc To 2200cc. Will Also Fit Engines Fitted With Turbos. Entire Weight Of The Case And All Accessories Is 24 Lbs. Accessory Case \$125.00 [Also Available With Starter On Top For Tri-Gear]
Flywheel 85.00 [Specify When Ordering Whether Using Stock Crank]
Mag Drive 40.00 [With 4 Dowels Or Stroker Crank With 8 Dowels]
20 A Alternator 100.00
Starter 65.00

KROMATE LIGHT. A Light-Weight Filler That Can Be Used During Finishing Of Aircraft Surface Prior to Painting. Similar To "Bondo", But Much Lighter And Made Specifically For Fiberglass. 7 Lbs. Per Gallon. \$14.00 @ Gallon

RAND/ROBINSON KR KITS!!! F.A.S.T. is now an authorized dealer for all of the R/R kits. We are stocking all of the kits and can ship immediately or you can call ahead and drive in and pick up your kit here. We can now supply everything you need, from the engines and props to instruments, to go with your KR kit. Prices for the R/R KR kits are the same as on the R/R price sheets. TRY US! WE'RE F.A.S.T.!



F A S T, PO Box 4113

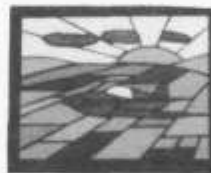
Englewood, CO 80155

(303) 693-8239



QUESTIONS AND ANSWERS

- Q. Would there be any advantage in covering the wings from the main spar aft with 1/16" ply-wood instead of foam? This would seem to simplify construction quite a bit.
- A. This would require an entirely different wing rib structure, probably wood ribs on 12" centers. I don't recommend it.
- Q. Would a T-tail be a feasible modification to a KR-2?
- A. The entire fuselage structure would have to be redesigned. The stress loads on it would be entirely different.
- Q. Can I build a set of long wings similar to the KR-IB motor glider for my KR-2?
- A. At the present time there has not been any stress engineering tests done on the wing spars and attach fittings for the additional load that would be placed on them. This is on the list of new projects to be done at R/R, so we should be able to look for some development of a long wing, motor-glider version of the KR-2 in the future. I must stress that builders should not blindly go ahead and build a set of long wings due to the lack of stress data at this time.



THRILL THE FLIER
IN YOUR FAMILY
with an

11x14" framed stained
glass picture featuring
an in-flight KR-II

Handcrafted, using genuine leaded stained glass in 8 brilliant colors. Send check or money order for \$89.95 to B&B Products, 345 Simpson Road, El Dorado, KS. 67042. We pay postage and insurance in the continental U.S. Allow 6 weeks for delivery.



INFLATED

C

NCW! 11.400X5 6 PLY. RATED

TIRE WT. 3 LBS. TUBE WT. 5 LB.
LOAD RANGE C - 70 P.S.I. MAX.



This tire fills the silt gap between the 500*5 aircraft tire and the 3.40-3.00x5 go-kart tire. Looks like a scaled-down 500x5. Fits Kft-1 i 2's and is recommended by Burt for the variEZE and longEZE. Also fits most other experimental using 5 inch rims.

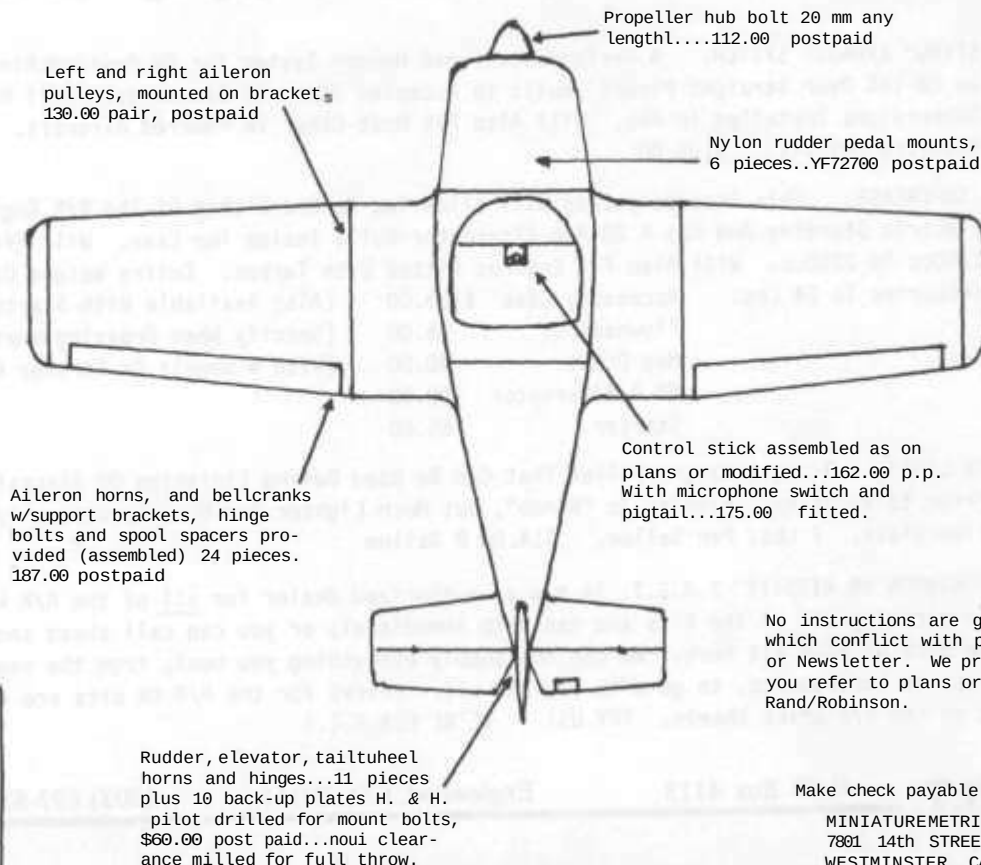
TIRE 6 PLY RAT. 25.00 TUBE 6.50 * SHIP i HAND.
MIKE LANB P.O. BOX 3324. QUARTZ MILL. CA. 93534

MINIATURE METRICS
LITEPLITE HAHDWAJK
7801 14th STREET
WESTMINSTER, CAUF. 92683

Phona (714)894-4875
Amos, Anita and
Carey Anderson

Minature Metrics has several
services and products. Send
a S.A.S.E. for more info.

QUALITY...all material is air-
craft aluminum/steel as
specified in your plans.
Milled with precision then
debarred, bead blasted, final
finish reamed by standard air-
craft production procedurea
all in the interest of safety.



Make check payable tot
MINIATUREMETRICS
7801 14th STREET
WESTMINSTER, CA 92683

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLO. 80155
ISSUE #92, FEBRUARY 1983



Issue no. 93

March
1983

KR NEWSLETTER

RATES
 USA \$12.00 Yr
 CANADA \$15.00 Yr U.S.
 OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand Robinson Engineering, Inc.



IT'S ALMOST TIME to be off to the Sun 'n Fun fly-in at Lakeland, Florida. This fly-in will kick off the fly-in season and is growing larger each year. Officials at the Sun 'n Fun tell me that they are expecting over 80,000 people this year. There should be a lot of KR's this year, so plan on attending if at all possible.

Don't forget the KR dinner, Wednesday night. (Sign up at the Wick's booth). There will also be a KR Forum on Thursday, from 10:00 am to 10:45, LETS BRING THE KR'S OUT IN FORCE THIS YEAR!

TOM CRISS AT Rand Robinson has asked me to pass along the following request. If your KR is now flying, they would like to have a picture of it. Rand Robinson has a display board in their shop with pictures of KR's from all over the world and they would appreciate a photo of your KR.

CORRECTION!!! In the November '82 issue I reported that you were now required to keep a separate logbook for your propellor. This is incorrect. You are only required to make all prop change and repair entries in your logbook. The incorrect information came from a government bulletin that has now been corrected.

THE WINTER EDITION of "Sportsman Pilot" has a fantastic article on Lance Neibauer's KR-2. Lance's KR-2, "Sweet Mildred", is one of the

FROM JERRY BOGGS, Columbus, Ohio.

"This is a picture of my KR-1 on a tri-gear. I flew this airplane in 1979 with the KR-1 conventional gear. I didn't like the brakes or the visibility on the ground. I now have 5:00 x 5 wheels and Cleveland brakes on the mains, the front wheel is the same main wheel used on the conventional retractable gear.

The flight characteristics haven't changed. The ground handling is great. It is nicer than a Cessna 150. The visibility on the runway is great.

The engine is a Continental A-65, turning a McCauley steel prop, 69" x 46". Cruise at 2,500 rpm gives me an airspeed of 145 mph.

I have flown the KR-1 23 hrs. with this new gear. I would like to fly the KR-1 at least 100 hours before I talk to anybody about the gear. I have a wheel pant for the front gear, but when the picture was taken it was off for some repair. The front nose wheel steers also."

nicest KR's flying and is it ever fast!

In a recent race against a Midget Mustang, Lance and his KR stayed right with the Mustang. Lance currently has a consistent top speed of 193 mph and hopes to be even faster in the future with some other clean-ups of the aircraft.

We will be doing an in-depth report on Lance's KR-2 in an up-coming issue.

IF YOU ARE not familiar with "Sportsman Pilot" magazine, it is an excellent publication which does reports on experimental and other aircraft. It is published quarterly by Jack Cox, who is also the Editor for "Sport Aviation." You can contact Jack at PO Box 485, Hales Corners, WI., 53130. Subscription rates are \$7.50 @ Year.

I RAN SHORT of space in the last couple of issues, so I wasn't able to include a product report. It's back this month though, with a report on

another fine product from MiniatureMetrics.

This month we tested the aileron horns and bellcranks, with support brackets.

These, like the previous products of Miniature Metrics we have tested, are excellent. Carey Anderson takes a lot of pride in what he makes and it shows. The bellcranks are made from 6061 T6 and are heat treated after bending. All parts are exact in measurements, so they fit!

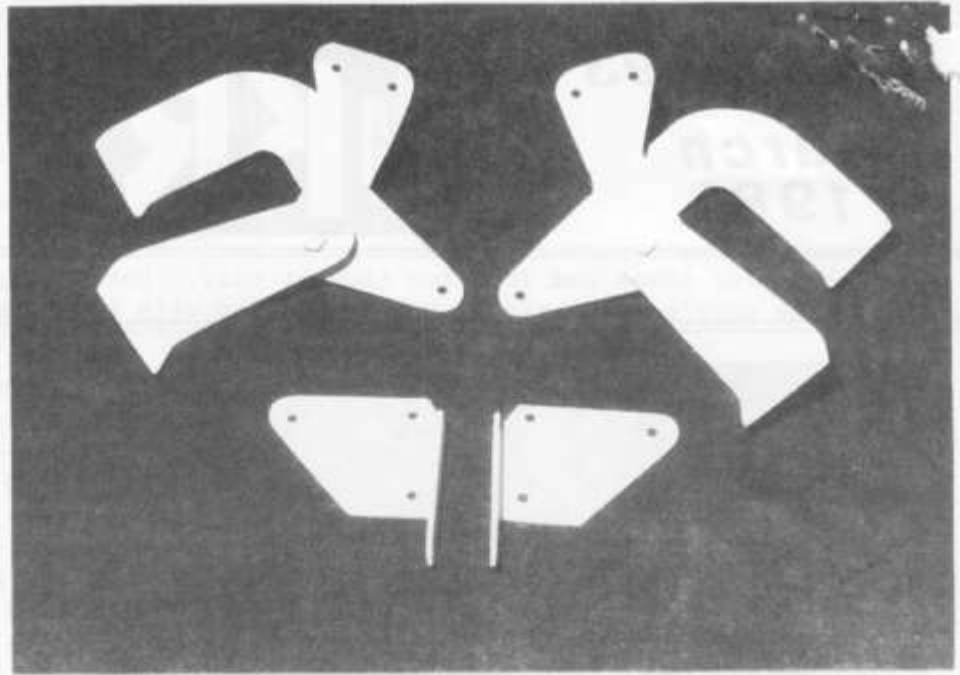
The kit contains the Aileron horns, bellcranks with support brackets, hinge bolts and spool spacers and comes completely assembled and ready for installation.

PRICES HAVE NOW been set for the new rudder pedals with toe-brakes and the new control stick from Rand.

The rudder pedals have toe-brakes mounted on the top of the pedal and they operate cables which run out to the standard brakes. Height from the floor to the top of the toe-brake pedal is 10 i", so you will have no problem fitting them in your KR-2. They come with the cables, hinges, brake attaching arms, and all bolts, nuts, washers, pins, and clips. Price is \$195.

The new control stick uses a torque tube from the stick which runs to a bellcrank located behind the rear spar. You then run cables from the bellcrank behind the spar to the elevator. This eliminates the cables between the seats and gives a more solid feel to the elevator. Price on the new stick is \$170. This also comes with all of the hardware needed for installation.

I WAS TALKING to Dan Diehl the other night and he informed me that they are getting ready to make molds for outer wing panels for the KR-2. These panels will be



Aileron Horns, Bellcranks with support brackets, hinge bolts and Spool Spacers. 24 pieces. Comes fully assembled and zinc chromated. Total kit weight: 16 i oz.

vacumn-formed in precession molds for perfect contour. They will be similar to the wings used on the Glassair, with a top and bottom skin that you glue together.

They will also have the turned up tips on them already formed. These tips were used on Bob Passmore's KR-2 and resulted in a great climb rate.

Cost is estimated at about \$600 a set. I'll keep you informed as they progress.

FOR THOSE OF you who are interested in how Dan Diehl and Ernest Koppe's XTC Hydro-light is coming, Dan reports that they are now building an XTC from the production molds to check fit and should have it at the Sun 'n Fun.

ALSO SCHEDULED TO make an appearance at the Sun 'n Fun is the KR-3 prototype.

Gilbert Duty has had the KR-3 at his shop in North Carolina and is planning to bring it down for the Fly-in.

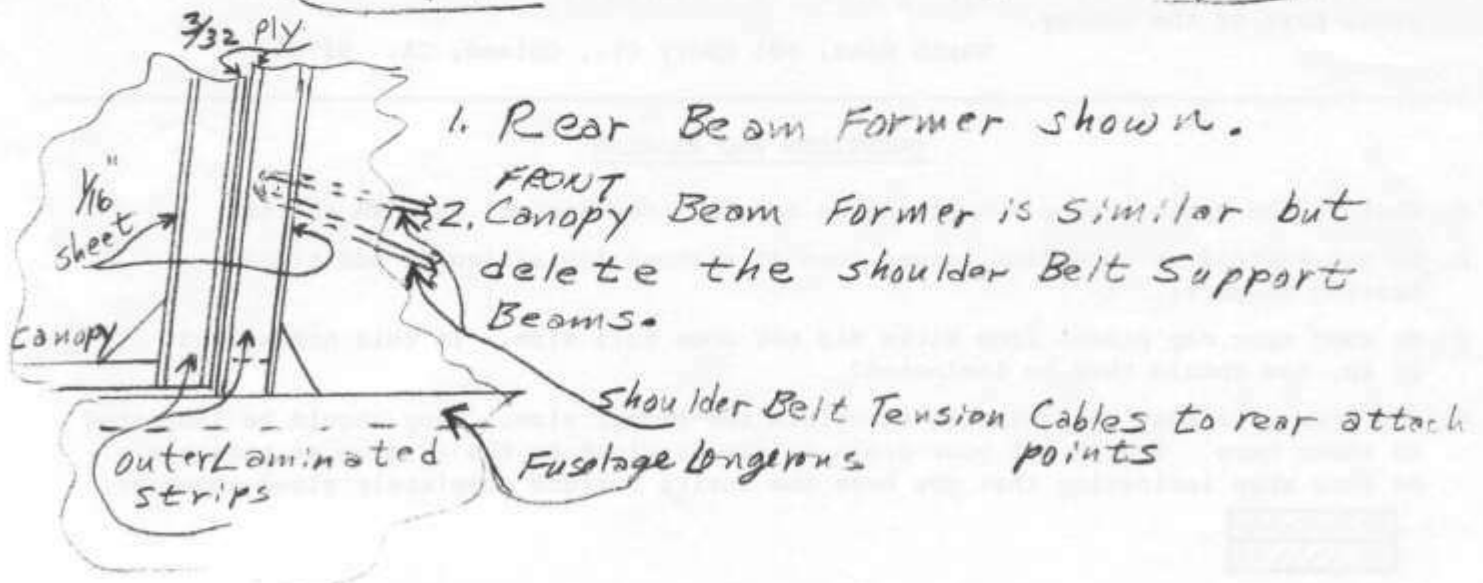
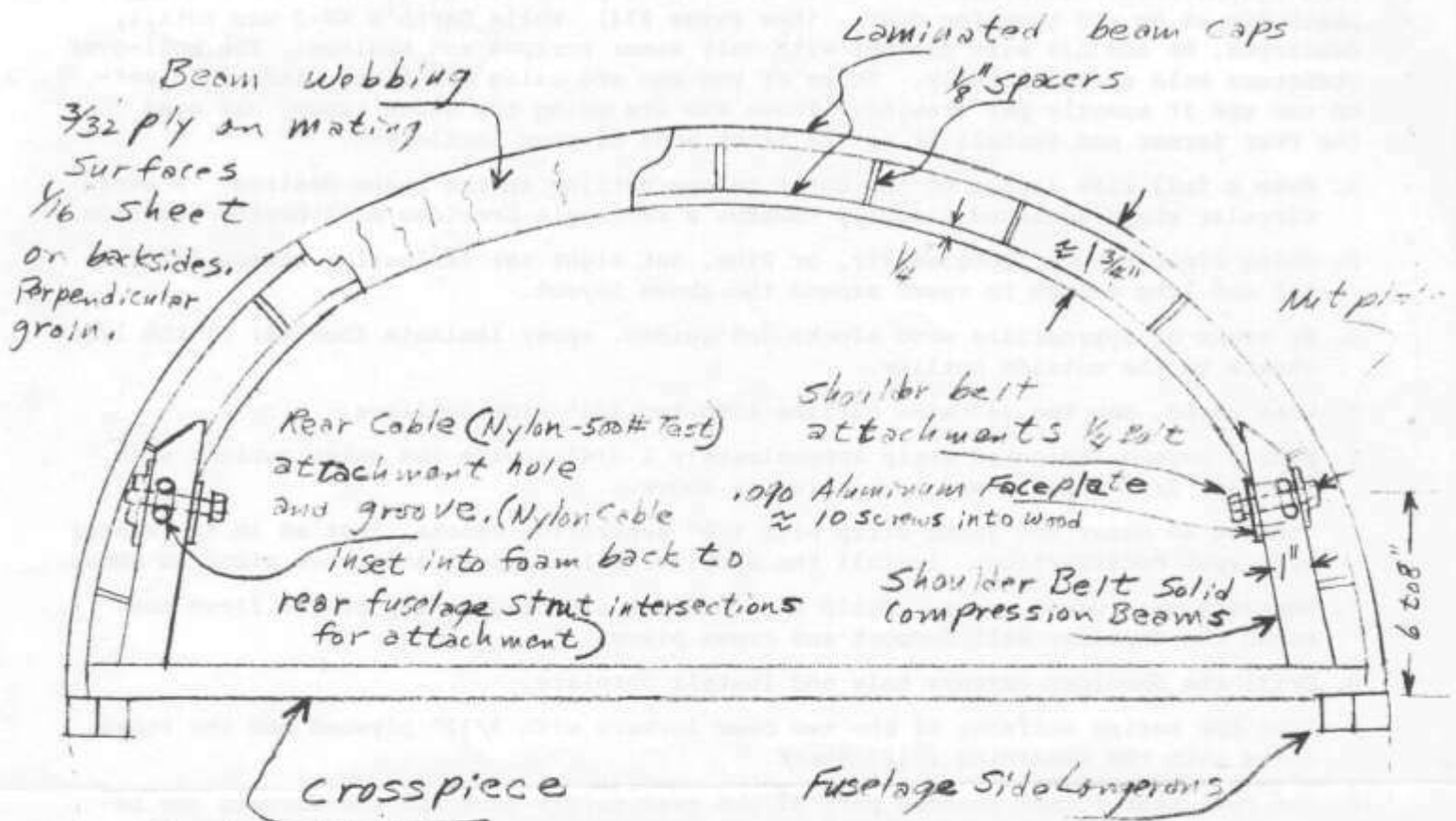
LOOKING FOR A good squeegee for getting that excess epoxy out of your lay-ups? Try cutting them out of the lids that are used on coffee cans. Be sure that the edge you plan on using for the squeegee is cut straight so you won't leave ridges in the epoxy.

Another excellent squeegee for use on small lay-ups is a playing card. Use brand new cards, (they are stiffer and have a nice slick surface). They make a nice, disposable squeegee for small areas.

WHILE WE'RE ON the subject of lay-ups, that is the time to get that smooth surface and keep it light. Be very sure that the foam surface is absolutely smooth and at the perfect contour before you do your lay-up. Be careful with the fiberglass as you lay it on. Don't leave ridges or distort the weave of the cloth. If you do, you'll end up sanding thru it later and having to patch it.

Be sure and squeegee all of the excess epoxy out of the cloth. Use a light pressure and you'll be amazed at the excess epoxy that comes out.

KR ROLL-OVER SUPPORT STRUCTURE



REA/PCAW?/AMD DECK FORMER

1. Rigid, Non-Warping, Light weight,
Perfect Fitting, Nose Over Protection
2. Shoulder Belt Support Built In

SEVERAL BUILDERS HAVE asked from time to time about some sort of roll-over protection for their KR's. Garth Hess came up with this excellent system which not only provides protection in case of roll-over, but also gives you a very good place to attach your shoulder harness. Garth had the unfortunate experience of having to actually try this system on his aircraft when another aircraft pulled out onto the runway underneath him as he was touching down. (See issue #74) While Garth's KR-2 was totally destroyed, he and his wife got out with only minor scrapes and bruises. The roll-over structure held up excellently. Those of you who are using the fixed windshield set-up can use it exactly per drawing. Those who are using the stock canopy can make the rear former and install it at the front edge of your turtledeck.

1. Make a full size layout of the outer canopy outline in the shape desired. A semi-circular shape squashed slightly towards a rectangle provides much better headroom.
2. Using clear-Spruce, Douglas Fir, or Pine, cut eight (8) laminating sheets 1/16" by 11" and long enough to reach around the above layout.
3. By means of appropriate wood blocks and guides, epoxy laminate four (4) of the 1/16" sheets to the outside outline.
4. When cured, saw the 11" wide outline into two 3/4" wide outlines.
5. Make a second laminated strip approximately 1 3/4" inside the outer outline with four (4) 1/16" sheets and saw in two as above.
6. Connect an outer and inner strip with 1/8" separation blocks, just as in the center wing spar construction. Install the Shoulder Belt Support and cross piece as shown.
7. Separate with waxed paper. Build a second one directly on top of the first one, minus the Shoulder Belt Support and cross piece.
8. Drill the Shoulder Harness hole and install nutplate.
9. Face the mating surfaces of the two beam formers with 3/32" plywood and the other faces with the remaining 1/16" sheet.
10. The rear beam former becomes part of the rear turtle deck and the forward one becomes part of the canopy.

Garth Hess, 881 Emory Ct., Upland, CA. 91786

QUESTIONS AND ANSWERS

Q. What is the maximum prop hub extension length I can install on a VW engine?

A. Do not install an extension longer than 3" without installing an additional bearing support.

Q. My wood spar cap pieces from Wicks did not come full size. Is this normal and if so, how should they be laminated?

A. The spar caps must be laminated to obtain the proper size. They should be laminated as shown here. Try to get your grain to run as close to the diagram as possible. Be sure when laminating that you have the entire surface completely glued together.



Q. I have read of several KR's that developed engine problems due to poor fuel feed. How can I make sure that this doesn't happen to me?

A. First make sure that your fuel tank is properly vented. The vent tube should extend at least 1" above the tank and face forward. Your fuel tank should have a sump sanded into the lowest part of the tank and towards the rear. (Those who use the premolded tank will already have this done). Be sure to use a fuel strainer in the tank and make all of the fuel line bends smooth. Use a gascolator at the lowest part of the system. Keep all fuel lines away from the exhaust to prevent vapor lock. To check your system to make sure that it will feed in a climb, set the tail into a hole so that you can simulate a 45% climb. (You can also set the wheels onto stands) Run the engine at full power for at least 3 minutes to make sure that it will feed. Do this test with only about 2 - 3 gallons in the tank and secure the aircraft first.

Forrester Aviation Supply & Technology

MARCH SALE SPECIALS

Prices good thru March 31



!! NEW !!! NEW !!!

Now you can have a new, reliable airspeed indicator for the price of many used or rebuilt instruments. Read knots on inner scale and mph on outer scale. 40 - 300 mph scale.

MARCH SALE PRICE \$75.00



! PROTECT YOUR WOOD !
All inner wood surfaces must be protected from moisture. This high quality spar varnish is excellent for use on the spars and inner fuselage.

MARCH SALE PRICE

1-Quart \$ 6.00
1-Gallon...\$18.00

RAND ROBINSON KR KITS !!! F.A.S.T. is an authorized dealer for a_n of the R/R KR Kits. We are stocking all of the kits and can ship immediately or you can call ahead and drive in and pick up your kit here. We are also a full service aircraft parts supplier and can supply you with anything you need for your KR, from spinner to the light on the tail. Check with us on instruments and radios also. Catalog available soon. !!! TRY US !!! WE'RE F.A.S.T. !!!



F A S T , P-Q. Box 4113

Englewood, CO 80155

(303) 693-8239



BUY - SELL - TRADE

WANTED....KR-2 Project. Good construction a must! 70 - 100% complete. Bill Rankin, 7151 Parkview Lane, Eden Prairie, MN. 55344. 612-937-8666.

WANTED....Finished and Flying KR-2. Top Quality! At least as good as Lance Neibauer's KR-2. Richard Taylor. 213-654-1820 or 1-800-421-0894 or in Cal. 1-800-252-0070.

FOR SALE..KR-2. Complete. 2100 VW Engine, Narco 8 radio, custom trailer. \$8,500. D.W. Rohn, 213-691-3963.

WANTED....Quality constructed KR-2. Preferably completed, flying even better. Immediate cash for right plane. Otto Blavier, 1328 Caledonia Dr., Warminster, PA. 18974 215-672-6598/

FOR SALE..Write off construction and flying your KR airplane on your income tax return! Information: \$2.50. Consultax Clinic, 3808 Rosecrans, Swt. #467, San Diego, CA. 92110. (KR Builder with 25 years tax experience)

FOR SALE..KR-2 Fixed Gear Plans. Gear, axle, attach brackets and tailwheel drawings. Professionally designed. See KR Newsletter No. 91 for photo. Conversion plans..\$20.00. Bill Rosman, Rt. 2, Box 150, Palmyra, WI. 53156. 414-495-4370.

FOR SALE..Carve your own propeller. Don't risk expensive prop during early tests. Flight tested, new method, ridiculously easy. \$6.95 USA, \$8.95 Overseas. G. Hess, 881 Emory Ct., Upland, CA. 91786

Classified ads are free for KR newsletter subscribers selling, buying, trading or wanting KR parts. Maximum 25 words free, 25 to 50 words: \$5.00 @ issue. Those selling plans must furnish KR NEWSLETTER with copy of plans prior to ad. Non-subscribers and commercial ads please contact us for rates.

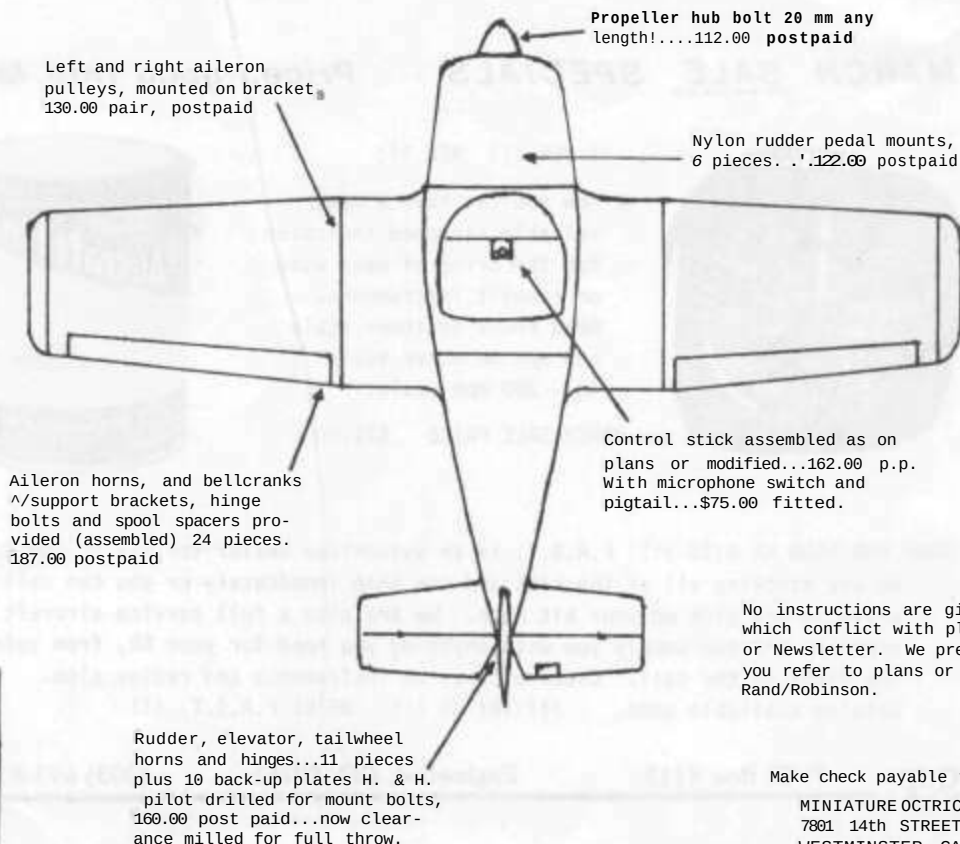
The KR Newsletter is published monthly by Forrester Aviation Supply and Technology, [F.A.S.T.] PO Box 4113, Englewood, CO. 80155. [303] 693-8239. John Forrester, Publisher. Subscription rate: \$12.00 a year, \$30.00 for 3 years. All back issues are available at the following rates: 1-12 issues: \$1.00 each, 13-24 issues: 75¢ each, 25 or more: 50¢ each. COPYRIGHT 1983. KR Newsletter.

MINIATURE METRICS
LITCFITC HAHOWARC
7801 14th STREET
WESTMINSTER, CAUF. 92613

Phone (714)894-4875
Amos, Anita and
Carey Anderson

Winature Metrics has several
services and products. Send
a S.A.S.E. for more info.

QUALITY...all material ia air-
craft aluminum/steel as
specified in your plans.
Willed with precision then
deburred, bead blasted, final
finish reamed by standard air-
craft production proceedurea
all in the interest of safety.



Make check payable tot

MINIATURE OCTRICS
7801 14th STREET
WESTMINSTER, CA 92683

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, CO. 80155
ISSUE #93, MARCH 1983



April 1983



KR NEWSLETTER

RATES
USA \$1200 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand Robinson Engineering, Inc.



WE DIDN'T GET very much sun at this year's Sun 'n Fun, but we did manage to have a lot of fun anyway.

Mother Nature didn't co-operate with us this year and decided to see just how much water could be dumped on Lakeland in one week.

Even this didn't stop us though, as we pushed on thru the mud and water to attend the forums and look at the aircraft that did make it in during the week.

Despite the weather, there were over 100 home-builts and 500 ultra-lights in attendance.

4 KR-2s managed to make it in and were well appreciated by all.

Brian Henneman's KR-2 was joined mid-week by Pete Peter's recently finished KR-2. Pete had just finished painting his KR on Sunday and promptly

put it on a trailer and drove in from Alabama.

Brain Benjamin, N25134, Spartanburg, SC. and Bill Plunk, N299KP, Satellite Beach, FL. were also able to fly in on Saturday.

THE NEW KR-2 PLANS ARE READY AND ARE CURRENTLY BEING SHIPPED.

The new KR-2 plans are much improved and now rate right up there with the best of them. Much of the minor detail instruction that was not in the original plans has been included, along with a totally new text, more pictures and drawings.

They also now come in a three-ring binder so that they are easier to use and make it simple to add any updates. The cost of the new plans is \$95.00.

Rand Robinson has also agreed to let builders

THIS MONTH'S COVER KR-2 belongs to Brian Henneman of Clarinda, Iowa.

This outstanding aircraft won the BEST LOW-WING HOMEBUILT and BEST INTERIOR at the Sun 'n Fun last March and was back this year as the winner of the KR NEWSLETTER AWARD this year.

Brian's canopy is a cut down Sidewinder canopy and before everyone gets excited, yes Brian has agreed to do an article for an upcoming issue on how to it.

N4263Q is powered by a HAPI 1835 cc engine and a 52" x 47" Great American Prop. Brian indicates 150 mph at 3200 rpm and tops out at 165 at 3600 rpm. He burns 4 gph at 150 mph and has a still air range of 1050 miles.

WHO ARE THE ORIGINAL PURCHASERS of their KR-2 plans to trade in their old set for a \$50.00 difference for a set of the new plans. If you still have a ways to go on your KR, you may find the new plans a great help.

This offer is only good until MAY 30, 1983!

THOSE OF YOU who are already members of the EAA, (Experimental Aircraft Association), are probably aware of the EAA Aviation Foundation Capital Campaign.

The EAA Aviation Foundation funds go for the construction of the new EAA museum being built at Oshkosh and for



preservation of aircraft and educational purposes.

Jeanette Rand has announced that if the KR builders would like to make a donation to the EAA Aviation Foundation, she will match it up to a total group sum of \$500.00.

If you wish to receive more information concerning the Foundation and their goals, you may contact them at Box 229, Hales Corners, Wisconsin, 53130.

We would like to make the donation as a group, so if you decide you would like to be included, please send your donation to me at the newsletter. We will be keeping it in a separate fund and will be making a group donation in July.

DURING THE KR FORUM at the Sun 'n Fun, it was discovered that there are still several of the old Rand Robinson 3 blade, ground-adjustable props in use.

If you are using one of these props, you should inspect the blades before each flight for hairline cracks at the base and you MUST pull the spinner and check for cracks in the bolt holes in the case each 10 hours.



The KR Newsletter is published monthly by Forrester Aviation Supply and Technology, [F.A.S.T.] PO Box 4113, Englewood, CO. 80155. [303] 693-8239. John Forrester, Publisher. Subscription rate: \$12.00 a year, \$30.00 for 3 years. All back issues are available at the following rates: 1-12 issues: \$1.00 each, 13-24 issues: 75¢ each, 25 or more: 50¢ each. COPYRIGHT 1983. KR Newsletter.

ONE OF THE largest stumbling blocks for new KR builders is the point when you have finished the fuselage woodwork and its time to begin glassing. Many builders slow way down or quit for long periods of time because they are unfamiliar with the methods used for proper glassing. It is really nothing to be afraid of and once you try it you will find the it is actually pretty enjoyable.

The first and one of the most important steps is to have as near perfect a foam base to glass on as possible. First, cut your foam blocks as close as possible to the correct size and glue them securely in place. If the foam is not secure, it will move or sag when begin glassing. The best way I have found to secure foam is to use the two-part, liquid poly-urethane foam and pour it in the gaps between the foam panels and the wood. It can also be used to fill in low spots in foam and to secure foam blocks to each other. Mix the two parts and pour into the gaps. Now stand back because this stuff expands in a hurry! You won't have much time once you mix it. It will begin to expand in about 15 to 20 seconds. It will also stick to anything, (hair, glasses, dogs, etc), so be careful. After it has set, you can cut and sand it just like the other foam.

Now that we have the foam blocks securely in place, we can begin to rough shape them. Take a saw blade and cut them to a closer shape. Be careful not to get below contour. Once you are within about 1/4" of the final contour, you are ready to begin sanding. Use a straight board that is longer than the part you are sanding. Glue some 80 grit sandpaper to one side to make a sanding block. Sand the foam gently to shape by using the wooden ribs as guides. Be very careful not to gouge the foam core and don't get heavy-handed on one side and sand the wood ribs down. (It's easier to do than you think). Be EXTREMELY careful during this phase, because any mistakes here are going to show up in the glass.

Now that we have a perfectly shaped foam core we are ready to prepare to glass it. Carefully clean the core of any loose foam chips and dust. Now stop and look around your shop. If its like ours its probably now got foam dust everywhere. Before you start glassing, clean up the shop. If you get the dust on the cloth it will weaken the layup and will leave

small rough spots in the layup.

Carefully measure the core to determine the shape and size of the cloth needed. Your cloth should be kept somewhere where it will not get dirt on it. Mark your cloth with a thin tip felt marker. (The small amount of ink won't hurt it). Whenever possible, try to cut the pieces needed on a 45° bias to the cloth weave. This will not only give the layup more torsional strength, but will not let the end fibers where you cut it unravel. If you cut it with the weave, when you squeegee the layup you will begin to pull strands of cloth out of the layup and make a mess.

Mix a batch of epoxv and stir in some micro-ballons. This mixture should be fairly runny and is called "wet-micro". Pour some on the foam and lightly squeegee it over the surface. What we are doing is to fill in the rough surface of the foam so that the layup will be smoother and lighter.

Now lay on your piece of cut cloth, making sure that you are aligned properly and there are no wrinkles, folds, or stretched strands in the cloth. The weave of the cloth should run in perfectly straight lines. If you pull the strands out of alignment, you will lose the strength of the layup.

After the cloth is on straight, pour some pure epoxy, (no micro), on the cloth and lightly squeegee it over the surface. We are just spreading the epoxy over the entire surface at this time. Once you have it over the entire surface, you can begin to "stiple"¹ it. This can be done several ways. I like to use the special wheels that are made for this purpose or you can use a brush or a squeegee. You want to work the epoxy into the cloth so that there are no dry spots left in it. Dry spots will show up as white areas and are easy to spot. You may have to add more epoxy to get a good coverage. If the part calls for a second layer of glass to be added, it is better to leave some excess epoxy on the surface of the first layer to be worked up into the second layer later. If a second layer is to be added, lay it on now and repeat the above steps.

After all the layers of cloth are on, let the part set for about 5 minutes and check for any dry spots again. Now take a squeegee and lightly squeegee the entire surface to remove excess epoxy. We want to remove excess only. You should have just enough epoxy left on the cloth to cover the weave of the cloth. If you have multiple layers on the part, don't squeegee very hard or you can starve the lower layers by sucking the epoxy up thru the top layer.

Contrary to what many people think, excess epoxy does not add to the strength of the layup. Actually, once you have filled the weave of the cloth, any more epoxy actually weaken the layup. If you have 10% excess epoxy, the layup is weakened 10% and so on. Don't let this frighten you into making your layup too dry however. It is virtually impossible to get less than 50% excess epoxy on a layup unless you can use exotic industry machinery and this has been taken into consideration when the aircraft was designed.

Now that you have a beautiful layup done, don't put anything on it to try to make a smooth surface. (ie, waxed paper, mylar, etc). Just leave it uncovered and let it cure. If you cover it with something, it will only make ridges, waves and will require a lot of work later.

There is one exception to this, and that is peel-ply. Peel-ply is a Dacron cloth treated with a release agent and is laid up just like another layer of cloth on your layup. After the layup has cured, the peel-ply can be peeled off, leaving a surface that is ready for another part to be glassed to it without much sanding. Some builders also like to use it on large layups to help cut down on excess epoxy, but this is fairly expensive to do. Peel-ply should be used anywhere you know that you will later have to epoxy another part on that area. When it is peeled off, it will usually leave some small fuzzy threads that should be sanded off.

Be sure and let the layup cure for at least 12 hours and parts such as wings should not be moved for at least 36 hours.

You should now have a quality layup that is both light and will require very little finishing to get ready for paint.

Next month we'll cover the finishing, preping and painting the fiberglass.

Now grab your squeegee and get after that "canoe" in your workshop!



For those of you who haven't seen the new Rand Robinson logo for the KR-2. Here it is. It is available on T-shirts, catps and decals. Contact Rand Robinson or F.A.S.T. for ordering information

QUESTIONS AND ANSWERS, CON'T.

- A. I don't know of anyone who is planning on installing the Cuyuna. The Cuyuna 430 is rated for a maximum horsepower of 40 hp. Ultralight engine manufacturers are not known to be exactly honest about their horsepower ratings. A 40 hp KR-1 would be a very marginal performer and would have to be very light to fly at all. You are much better off with the VW engine.
- Q. Does Dan Diehl still sell the tailwheels? I haven't seen his ads for some time.
- A. The Diehl Tailwheel is still available. It is available now from either Rand Robinson or F.A.S.T. Cost is \$30.00.
- Q. Can I safely drill my wing attach fittings to size or should they be reamed?
- A. The bolt holes in the wing attach fittings should be reamed to final size with a straight reamer. A drill bit will tend to wander a slight amount and will let the hole become oblong and slightly oversize.

QUESTIONS & ANSWERS

- Q. What is the correct tension for the control cables?
- A. I don't have the exact tension setting for the cables. Most builders tighten them until there is a small amount of tension. Perhaps someone could send in the exact setting if they know it.
- Q. Has anyone tried the Cuyuna 430 engine in a KR-1? It only weighs about 80 lbs with reduction unit.

!! THE KR-3 IS COMING !!

EVERY MONTH I get several requests for information on the KR-3 Amphibian. There have been several changes made to the KR-3 since it was originally designed by Ken Rand.

I am happy to report that plans and kits should be ready within the next year. I am now going to be doing the development and testing for the KR-3 here at F.A.S.T.

Look for the prototype at Oshkosh this year. We'll be there for sure!

Forrester Aviation Supply & Technology

APRIL SPECIALS



NEW ALTIMETER - 20,000 FT.

Brand New! Tripointer, Sensitive Certified to 20,000 Ft. 7 o'clock setting, TSO'd, IFR.

\$ 145.00



DAVID CLARK HEADSETS

H10-40 Headset. Features foam filled ear cushions and M3 electret noise cancelling microphone. Affords superior noise cancelling and transmission quality.

\$ 185.00

RAND ROBINSON KR KITS !!! F.A.S.T. is an authorized dealer for aVL of the R/R KR Kits. We are stocking all of the kits and can ship immediately or you can call ahead and drive in and pick up your kit here. We are also a full service aircraft parts supplier and can supply you with anything you need for your KR, from spinner to the light on the tail. Check with us on instruments and radios also. Catalog available soon. !!! TRY US !!! WE'RE F.A.S.T. !!!



F.A.S.T.

P. O. Box 4113

Englewood, CO 80155

(303) 693-8239



BUY - SELL - TRADE

FOR SALE.....KR-2 gear legs, aluminum spring bar and hinges. \$175.00. Going to install fixed gear. Alan Coon, 803-272-6324 after 5:00 pm.

FOR SALE.....1 New R/R-motor mount for KR-1 or KR-2. Complete with rubber bushings. Will fit CrfsJ or Diehl SuperCase. Heliarc welded, Zinc Plated. Clyde W. Wierbee, 817 Evans, Waupaca, WI 54981, 715-258-5191 after 5:00.

FOR SALE.....New KR-2 aluminum extrusion kit, wing attach metal, tailwheel and spring. Save half \$245.00 THE PROP SHOP, St. Ansgar, Ia. 50472.

FOR SALE.....New "0" time, professionally built, turbocharged, 1835cc VW Aero-Conversion engine. Has Dan Diehl SuperCase, prop hub, POSA Super Carb, plus many extras. Make offer. Harry Hermann, 37247 51st Street East, Palmdale, CA. 93550. 805-947-0550. No collect calls please.

FOR SALE.....KR-1 project, Fuselage resting on gear, 1835 engine on fuselage, but will need rebuilding before flying. Upper half of fuselage not completed, stablizer and rudder complete and attached to fuselage. Project built by person the good lord called before he could finish his KR. All newsletters, plans, etc. \$1350.00 Contact Tommy Tompkins, 3808 Rosecrans St., #467, San Diego, CA. 92110 619-276-0276.

WANTED.....Magneto for a VW engine. LeRoy Barnes, 3042 Waterman Ct., El Dorado Hills, CA 95630 916-933-0564.

Classified ads are free for KR newsletter subscribers selling, buying, trading or wanting KR parts. Maximum 25 words free, 25 to 50 words: \$5.00 @ issue. Those selling plans must furnish KR NEWSLETTER with copy of plans prior to ad. Non-subscribers and commercial ads please contact us for rates.



BON AERO

**BASIC AN/MS
AIRCRAFT
HARDWARE**

FREE CATALOG

7W8 SUMMIT HO. D*pt.I/ BOH AERO PARKER, CO 80134 3MM1-3M2

MINIATURE METRICS
LITE-LITE HARDWARE
7801 14th STREET
WESTMINSTER, CALIF. 92683

Phone (714)894-4875
Amos, Anita, and
Carey Anderson

Minature Metrics has several
services and products. Send
a S.A.S.E. for more info.

We also totally machine the
Rand Robinson extrusion kit,
which includes the landing gear.
Machining only: \$280.00
Machining + assemblies with added
parts finished: \$320.00
Contact Rand Robinson & advise
them you want the service. They
will advise us. State shortened
landing gear bar or full length.

QUALITY... All material is aircraft
cluminum/steel as specified
in your plans. Milled
with precision, then deburred,
bead blasted, final finish reamed
by standard aircraft production
procedures. All in the interest
of safety.

Left and right aileron
pulley, mounted on brackets
\$30.00 pair, postpaid.

Aileron horns and bellcranks
w/support brackets, hinge
bolts and spool spacer provided
(assembled) 24 pieces.
\$87.00 postpaid

Rudder, elevator, tailwheel -
horns and hinges... 11 pieces
plus 10 back-up plates H. & H.
pilot drilled for mount bolts.
\$60.00 postpaid. .Now clear-
ance milled for full throw.

Propeller hub bolt. 20mm - An\
length! \$12.00 Postpaid

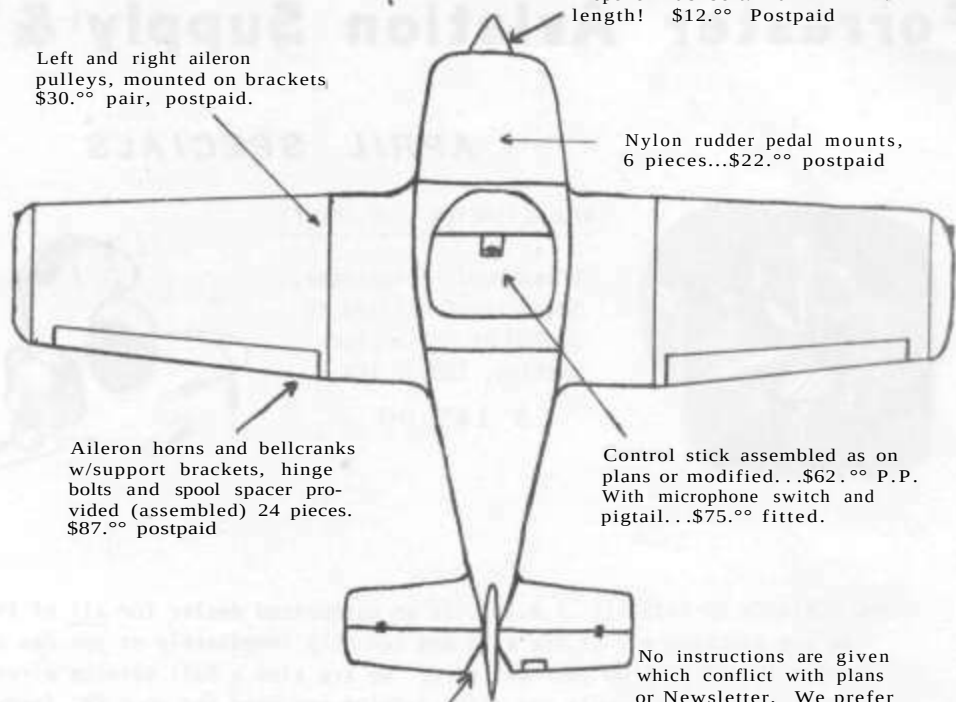
Nylon rudder pedal mounts,
6 pieces...\$22.00 postpaid

Control stick assembled as on
plans or modified...\$62.00 P.P.
With microphone switch and
pigtail...\$75.00 fitted.

No instructions are given
which conflict with plans
or Newsletter. We prefer
you refer to plans or consult
Kand Robinson.

Make check payable to:

MINIATURE METRICS
7801 14th STREET
WESTMINSTER, CA. 92683



KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, CO. 80155
ISSUE #94, APRIL 1983



Issue no. 95 MAY 1983



KR NEWSLETTER

RATES
USA \$1200 Yr
CANADA \$15.00 Yr US.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand Robinson Engineering, Inc.



RAY ELLIS, 2416 E. Douglas, Des Moines, Iowa 50317 sent in this picture of his KR-1.

Ray is one of the original KR Designees and is always willing to answer your questions. You can call Ray at 515-265-3007.

Here are the other KR Designees.

Steve Bennett, Omaha, Ne.
402-496-0366

Bill DeFreeze, Dublin, Ca.
415-828-2111

Ed Nelson, Pinehurst, Id.
208-682-3375

Jere Rosser, Marietta, Ga.
404-977-0843

Dan Diehl, Tulsa, Ok.

Ernest Koppe, Tulsa, Ok.
918-299-4444

ONE LAST WORD concerning the Sun 'n Fun Fly In. We got the official numbers from the EAA on the forums and the KR Forum was the 7th most popular forum. Even though the bad weather kept large numbers of aircraft from getting in, builders turned out in force.

THE KR FORUM for OSHKOSH has now been finalized. It will be given by Jeanette Rand and myself on Wednesday, August 3rd, from noon to 1:15 pm. OSHKOSH always brings out record numbers of KR's and builders so plan on attending.

RAND ROBINSON NOW has a new tailwheel assembly. It uses a stronger wheel and comes with the tailwheel fork and center pin. Cost is \$36.00.

Rand has also now approved using Safe-T-Poxy for the

wing surfaces. The Safe-T-Poxy will hold it's strength to a higher temperature and is a little thinner, resulting in some weight savings. DO NOT TRY TO COMBINE RAND EPOXY WITH SAFE-T-POXY! Also, don't put a layer done with Safe-T-Poxy over or under Rand epoxy. They won't stick to each other. While you may get an initial bond, at some point in time they will come apart.

It is now available from Rand Robinson or FAST for \$48.00 for a 1-gallon kit.

MIKE LAMB OF Lamb Tire has informed me that he now has a completed retractable tri-gear set-up perfected and is currently installing it in his KR-2. He reports that he will have his KR-2 at OSHKOSH this year and will also have a working display model of the gear. (See ad

in back of newsletter for Mike's address).

FOR THOSE BUILDERS in So. Africa, the KR Designee is Leon Coetzee, 10 Lark Str. Meredale 2091, Johannesburg, Rep, of So. Africa.

AS I MENTIONED in the last newsletter, the KR-3 has moved. I drove to North Carolina this month and picked up the KR-3. We are going over it now and I'll keep you informed as it progresses.

THANKS TO TED MEDIN, Poway, California for his generous donation of \$100.00 for the KR Group Donation to the EAA Aviation Foundation. Remember, Rand Robinson will match the group donation up to \$500.00.

I realize that many of us need all the spare dollars we can get for building of our KR's, but please remember

that if it wasn't for the efforts of the EAA we would probably not enjoy the freedoms we do have concerning our aircraft. We tend to take these freedoms for granted in the U.S. I get several letters each month from builders in other countries and they have a lot harder time constructing experimental aircraft than we do. In some countries it can take over a year just to get permission to begin construction!

A COUPLE OF SAFETY items I have to pass on to you.

First, there have now been several reports of crankshafts breaking in Revmaster engines. Examination showed them to be cast cranks and not forged. Some of these engines were "supposed" to have the forged cranks. Unless you are absolutely positive that your engine has a forged crank, you should ground it until you can check it and make sure. Do not take anyones word for it, check it!

If you are using the POSA carb on you engine, HAPI has reported that in two instances the metering needle has turned in flight, causing fuel starvation. The plastic insert around the needle which keeps the needle from moving may harden and shrink with age or if subjected to high temperature.

Before your next flight, remove the dust cap and check the torque required to turn the needle. It should take approximately 4 inch lbs. to turn the needle. If not, remove from service and replace the needle lock bushing with POSA part no. LS18-008. This part should then be replaced every 2 years.

You should also check the needle as above every 25 hours of flight and at each annual.

If you have any further questions on this, contact HAPI Engines, PO Box 1000V, Eloy, Az. 85231.

BUY - SELL - TRADE

- FOR SALE....KR-2 Project. All wood and metal to complete except wheels and mount. Bottom half fuselage done, spars signed off and closed. Excellent craftsmanship. All newsletters and plans. \$1,200.00. Reason for selling, wife expecting and need larger plane. Anaheim, California. 714-956-8508.
- FOR SALE....KR-2 Plans, landing gear with brakes, tailwheel, tail spring, spring bar, aluminum kit, all newsletters, KR pictures and magazine articles. \$200.00 + shipping. 303-353-8490.
- FOR SALE....KR-1 Project. All wood work done, center section glued in, all hardware done, landing gear finished and installed. Silent Wings gear with 500/5 tires, R/R canopy and lots of foam. \$1,000.00. Karl Schaarschmidt 414-252-9992.
- FOR SALE....KR-2, nearly complete. Revmaster 2100, Warnke prop, wing tanks, custom trailer. 919-436-5081.
- FOR SALE....R/R moulded fiberglass wing tips for KR-2. \$80.00 full price. Never used. I will pay freight. Walter Melton, PO Box 8176 CRB, Tucson, Ar., 86738 602-825-9730 No collect.
- FOR SALE....3-blade R/R prop and spinner. Ground adjustable. Want a 2 blade & spinner. \$270.00 Jim Nalley 912-435-0259 after 5:30 pm.
- FOR SALE....New "0" time, professionally built, turbocharged 1835cc VW Aero-conversion engine. Has Diehl Supercase, prop hub, POSA Supercarb, plus many extras. Make offer. Harry Hermann, 3724751st. Street East, Palmdale, Ca. 93550 805-947-0550 No collect calls please.

Classified ads are free for KR newsletter subscribers selling, buying, trading or wanting KR parts. Maximum 25 words free, 25 to 50 words: \$5.00 @ issue. Those selling plans must furnish KR NEWSLETTER with copy of plans prior to ad. Non-subscribers and commercial ads please contact us for rates.

QUESTIONS AND ANSWERS

- Q. I have heard that if you miss the grip length on your bolts, that the FAA will not allow you to hand thread them. Is this true?
- A. Yes. There are several reasons. First, aircraft bolts are heat treated after cutting. When you cut new threads you can change the strength of the bolt. Second, most tap & die sets will not cut perfect threads. They will be slightly flat which can damage the locking ring on the nut. Also, the transition area between the threads makes the bolt weaker. While we're on the subject of bolts, don't try to drill an aircraft bolt for a lock pin or safety wire. The lock ring on the bolts locks by being squeezed tight against the bolt and inside of the nut. When you drill a hole in the bolt, the ring will be cut when installing, rendering the lock nut useless. Bolts that come drilled will have had a special cut done to them to prevent this.
- Q. Can I use nicopress fittings on the elevator cable ends?
- A. Nicopress fittings may be used on all control systems if properly installed. You should use a gauge on them to make sure they are cinched enough.

FIBERGLASS PREP AND PAINTING

Last month we left off with our fiberglass pride and joy curing. If you have followed the steps in the previous stages, you should now have part that will need very little work to finish and prepare for painting.

Many builders think that this is where the actual "finishing" of the part take place. It is not. You should begin to "finish" the part as soon as you start to cut foam. If you have to add lots of filler at this stage, you did not do a proper job during the first steps and your aircraft will end up heavy and probably not extremelly smooth.

There are several differant products that can be used for smoothing and filling. The most common are micro, Bondo, Feather Fill, lacquer putty and primer/surfacer.

Start by sanding the fiberglass surface to remove the wax layer that is left from the epoxy curing. (Wax is a by-product of •cured epoxy) Several methods can be used here. Most common is to use 40 grit sandpaper although several builders report good results using a sanding disc with the tough metal teeth. Whichever you use, be VERY CAREFUL not to cut into the actual weave of the cloth. We just want to remove the wax and some of the excess epoxy on the surface.

If you do accidentally get into the weave, you will have to patch the area. If you do have to patch, be sure and extend the patch several inches out from the repaired spot.

Always use a sanding block when sanding your aircraft. If not, you will end up with very smooth waves in the surface of your parts.

Now its time to see where we need to add filler. Take a straight-edge about 2 feet long, (longer for the wings), and lay it on the surface. This will allow your to easily identify low spots. Forget about high spots, its too late to do anything about them now. Using a pencil, move the straight-edge over the surface, marking the low areas. I also like to make a light notation as to how deep the low spot is.

When this step is done, you should have small circles all over the surface of the part. This is where you will be able to see just how good a job you did laying it up.

Now look at each low spot. Check how deep it is and where it is located. This will help you decide what filler to use on each spot. Deep or large low spots should be filled with micro. Micro is made by mixing a batch of epoxy and then adding "micro-ballons". If you only add

a small amount of micro-ballons, you will have a runny mixture. This is called "wet micro". The more micro-ballons you add, the drier the mixture will become. For surface filling we want to use "dry" micro. While dry micro is harder to use, it is much lighter and can even be used on vertical surfaces. The micro should break up and roll into tiny balls when you try to apply it. While this is a real pain to apply, it will pay off when you try to sand it later.

Using another straight-edge, apply the dry micro to the low spots. Work it into the depression to get as smooth a surface as possible and try not to leave ridges or excess epoxy. Again, the smoother job you do now, the more it pays off later.

Now let the micro cure for at least 12 and preferably 24 hours before continuing. This stage will take anwhere from 2 to 4 fillings to get the finished shape needed. Don't get impatient now. During this time it will seem like you're not getting anything accomplished, but the results are worth it.

After the micro has all been applied and cured, sand it again with 40 grit paper. Again be careful not to cut the cloth or get below contour.

Now for small spots you can use Bondo. DO NOT USE REGULAR AUTOMOTIVE BONDO! It is very heavy, (14-15 lbs. a gallon). I like to use a light-weight type such as Ultra-light or Kromate-Light. These have micro-ballons in them and only weigh about 7 lbs. a gallon. Kromate-Light was developed for use on fiberglass, so it really works nicely. Do not give into temptation and use this on large fills. While it can be used, it will get heavy and every ounce affects the climb rate and performance of our KRs.

Once you have all of the low areas filled and have achieved the contours you want, it is time for Feather Fill. While it can be brushed on, you should spray it or you will spend forever sanding it off to get the proper surface. Feather Fill is used to fill in the weave of the cloth only. It should not be used to correct surface low areas. It is not called Feather Fill because it is light, but because it will feather-edge easily.

After the Feather Fill has dried, sand it with 100 grit paper. You want to sand it off until it is only in the open areas of the cloth weave. Some parts may require a second coat of Feather Fill. After sanding with 100, finish up with 150 grit paper.

con't.

Now go back over the surface and inspect every inch for pinholes. An air compressor works very well for this. Any small pinholes should be filled with lacquer putty. If you discover any large holes, sand off all of the Feather Fill and patch with micro. Let the lacquer putty dry for a few hours and then check the holes again. Sometimes it will shrink and require another fill to finish.

You should by now have decided on what type of paint you are going to use. It may make a difference what type of primer you have to use. I like to use Dupont Centari with gloss hardener added. This is acrylic enamel, but is not that hard to apply. I use Dupont "Hi-Speed Primer Surfacer" underneath. Whatever type you use, follow the directions. This is not the time to start experimenting.

It will probably take 2 or 3 coats of primer/surfacer to adequately prepare the surface for final paint. Be sure and use a good mask for painting also. Don't use the cheap paper or foam masks. They won't protect you from paint vapor.

Spray a uniform coat of primer/surfacer and let it dry thoroughly. Sand the first coat with 220 grit wet or dry paper. I use it wet. Be sure and use your sanding block. Now check for pinholes again and fill any you find.

Shoot a second primer/surfacer coat and sand again with 220. Now look at the aircraft in "good" light and look very carefully at it. Is the surface smooth? Are all of the pinholes filled? Is there anything else that needs to be done? If so, do them now. If not, sand the surface with 320 dry or 380 wet. Again, I like to use wet. It will give you a much smoother surface.

If you are going to use a non-sanding primer/sealer, now is the time to apply it.

Now its time for the really big final step. Get all of the materials needed together and ready. Your paint area should be VERY CLEAN and make sure that you have some way to ventilate the fumes away. (Not on your neighbors roses however). If you are afraid that you cannot or do not want to tackle this step, you should be able to find a paint shop to do it for a reasonable price.

Clean all of the dust from the surface with a "tac-rag". If you have used any silicone products near your aircraft, you should also wipe it with a silicone remover.

Follow the directions for the type of paint you are using and you should have no problems.

NOW LET'S GO FLYING!

QUESTIONS AND ANSWERS, CON'T.

- Q. I have found that I am getting blisters or pockets of air appearing between the layers of Dynel on my turtledeck. They seem to get worse when the part gets hot.
- A. This is caused by a poor bond between the epoxy and the Dynel. While it can occur with fiberglass, it is not as common. Cloths are coated with a material when they are being readied for weaving into cloth which allows them to go thru the weaving machine without damage. In the case of Dynel, starch and oil was used and sometimes the weavers did not scour all of it off good. This results in a cloth that is very hard to "wet out" and tends to trap air in itself. When laid up over foam, it compounds the problem. Great care must be taken to make sure that there is no air left in the lay-up. When the part gets hot, the epoxy softens some and allows trapped air to form pockets between the layers. As long as it is confined to not structural areas such as the turtledeck and are very small, maximum 1" diameter, you should have no problem. If this occurs on any other part or in larger areas, you will have to patch the area or do the part over.
- Q. Doesn't applying micro to the foam before glassing weaken the skin? Expecially if it gets between layer?
- A. No. Micro is only used to seal the foam before laying on the first layer of glass. There is not enough left to affect the strength of the skin even if it does get into the upper layers. Don't however, use micro between layups of layers.
- Q. Is the fuselage and firewall strong enough for a Type IV engine?
- A. Yes. Several builders are using this engine, expecially in Australia due to the lack of Type III engines there.
- Q. Are the HAPI and DIEHL accessory cases strong enough for the Type IV?
- A. Yes. Both cases are very strong.
- Q. What size prop spinner is used for the KR?
- A. Diameter: 9-3/4", Length: 12".
- Q. Can you stick parts together with the liquid foam after it expands?
- A. No. Once it has expanded, it should not be used for structure and it won't stick by itself to anything.

PROP'S INC. PROPELLERS

WE ARE NOW AN AUTHORIZED DISTRIBUTOR FOR THE EXCELLANT PROPS FROM PROP'S INC. SEVERAL KR PILOTS ARE NOW FLYING WITH THESE PROPS AND THEY REPORT THAT THEIR CLIMB AND TOP SPEEDS HAVE GONE UP CONSIDERABLY.

THEY ARE AVAILABLE IN BIRCH, MAPLE AND MAHOGANY AND HAVE LEADING EDGE PROTECTION AND ARE FIBERGLASS COVERED FOR EXCEPTIONAL DURABILITY.

WE FEEL THAT THESE ARE THE BEST PROPS AVAILABLE TODAY. THEY ARE AVAILABLE IN A WIDE RANGE OF DIAMETERS AND PITCHS.

LIST PRICE: \$215.00

INTRODUCTORY SPECIAL FOR THIS MONTH ONLY!!!

____\$200.00____



"WE'RE F.A.S.T."

WE STOCK ALL OF THE RAND ROBINSON KR KITS FOR IMMEDIATE DELIVERY. WE ARE ALSO A FULL LINE AIRCRAFT PARTS SUPPLY COMPANY AND CAN SUPPLY ANY PART YOU NEED FOR YOUR KR, FROM THE SPINNER TO THE RUDDER LIGHT. CHECK US FOR RADIOS AND INSTRUMENTS ALSO. CATALOG AVAILABLE SOON.

P.O. BOX 4113/ ENGLEWOOD, CO 801 55

WESTACH INSTRUMENTS



TACHOMETER

3-1/8" 3500 RPM or 5000 RPM
weight: 9 oz.

2-1/4" 3500 RPM or 5000 RPM
weight: 5 oz.

LIST PRICE: 65.60

MAY SPECIAL PRICE: \$59.00

WE ALSO HAVE A FULL LINE OF ALL WESTACH INSTRUMENTS. WRITE US FOR A LISTING.



(303)693-8239

NEW! 11.400x5 6 PLY. RATED
TIRE SPECIFICATIONS INFLATED:
 HEIGHT 11.5 INCH WIDTH 4.0 INCH
 TIRE WT. 3 LBS. TUBE WT. 1/2 LB.
 LOAD RANGE C -70 P.S.I. MAX.

This tire fills the size gap between the 500x5 aircraft tire and the 3.40-3.00x5 gokart tire. Looks like a scaled-down 500x5. Fits KR-1 & 2's and is recommended by Burt Rutan for the VariEze and Long-EZ. Also fits most other experimental using 5 inch rims.

TIRE 6 PLY RAT. 25.00 TUBE 6.50+ SHIP & HAND.
MIKE LAMB, P.O. BOX 3324, QUARTZ HILL, CA 93534

BON AERO

**BASIC AN/MS
AIRCRAFT
HARDWARE** FREE CATALOG

7888 SUMMIT RD. PARKER, CO 80134
 Dept. K 303/841-3902

PH. 402-496-0366

GREAT PLAINS

AIRCRAFT SUPPLY CO.
 BOYSTOWN, NE 68010
 P.O. BOX 9

NUTS

AN365-1032	\$5.00 per 100	CATALOG \$1.00
AN365-428	\$3.00 per 100	

U-BUILD STROBE LIGHT \$24.95

TIRES 3.40 X 3.00 X 5 SLICKS \$13.50 ea

KR TAIL WHEEL (4" dia. 1/2" width) \$11.50 ea

LEADING & TRAILING EDGE FOAM KIT-
 CONSISTS OF «ea 8" X 1' X 8' 21b. Urethane
 Foan. Ends Messy sanding. \$138.19

MICRO BALLOONS \$5.60 per Lbs.

ROTARY CABLE SWAGING SERVICE- For MS type fittings
 Does not include cable or fittings ^
 \$3.00 per Swage

KR Motor Mount \$109.95

MODEL 18C VW ENGINE CONVERSION \$2695.00

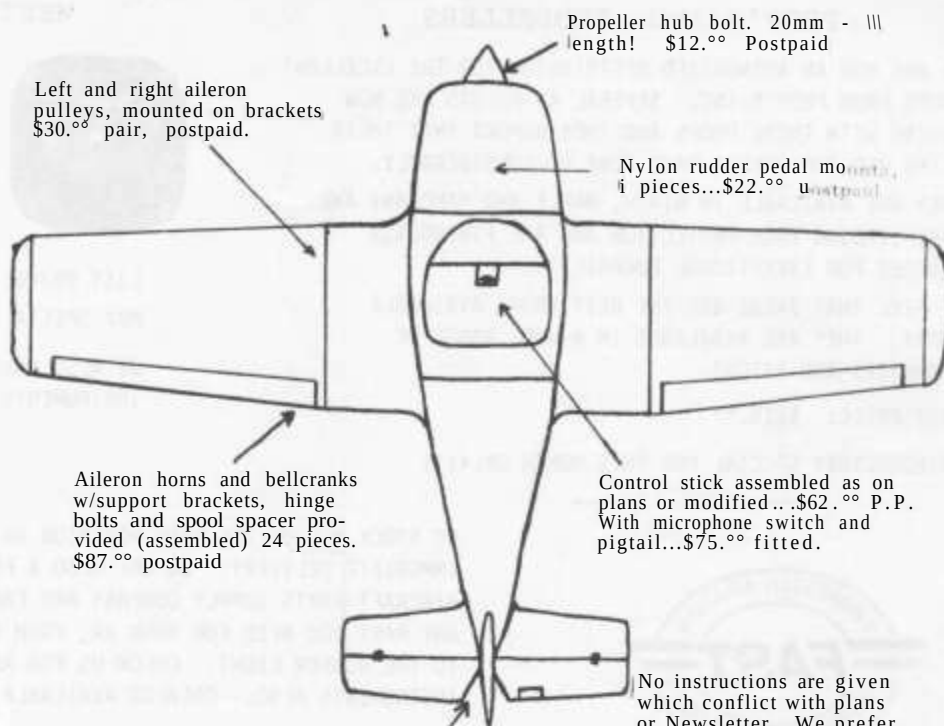
MINIATURE METRICS
LITEFLITE HARDWARE
7801 14th STREET
WESTMINSTER, CALIF. 92683

Phone (714)894-4875
Amos, Anita, and
Cary Anderson

Minature Metirics has several
services and products. Send
a S.A.S.E. for more info.

We also totally machine the
Rand Robinson extrusion kit,
which includes the landing gear.
Machining only: \$280.00
Machining + assemblies with added
parts finished: \$320.00
Contact Rand Robinson & advise
them you want the service. They
will advise us. State shortened
landing gear bar or full length.

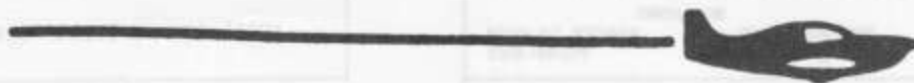
QUALITY...All material is air-
craft cluminum/steel as speci-
fied in your plans. Milled
with precision, then deburred,
bead blasted, final finish reamed
by standard aircraft production
procedures. All in the interest
of safety.



No instructions are given
which conflict with plans
or Newsletter. We prefer
you refer to plans or consult
Rand Robinson.

Make check payable to:
MINIATURE METRICS
7801 14th STREET
WESTMINSTER, CA. 92683

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, CO. 80155
ISSUE #95 MAY 1983



June 1983

^1980 KR NEWSLETTER



KR NEWSLETTER

RATES
USA \$1200 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand Robinson Engineering, Inc.



BOB HILLIARD, P.O. Box 115,
Crosby, Texas, 77532,
recently completed this
nice KR-2.

Bob now has 3 hours on
his bird and reports that
it will climb at more than
1,000 fpm and cruise at
over 150 mph.

N1352A is powered by a
HAPI 60-E engine and empty
weight came out at 520 lbs.

ALTHOUGH THE CALENDER says
it is now springtime here in
the rockies, you sure can't
tell it by the weather. The
cold and wet weather has
slowed progress on my own
KR-2. I fully intended to
have it flying by now but
thanks to Mother Nature, I
still haven't been able to
tie up some loose ends on it.

Several of you have in-
quired as to the progress of
my KR and hopefully I'll be
able to give a good flight
report in the next newsletter.

WE'VE BEEN VERY busy here
lately getting the new dis-
play trailer ready for OSHKOSH.

This will be the first time
for a large-scale display
for KR's there. We have a
1,000 sq. ft. display in
the Aircraft Display area.

If you're planning on at-
tending this year, be sure
and stop by and see us.

Jeanette Rand will also be
there during the first part
of the week.

Plan on attending if at
all possible and bring your
KR!

WES EVANS HAS NOW installed
a Cont. 0-200 in his KR-2.
The pictures I saw of the
installation looked like it
was done very nicely. Wes
reports that the 0-200 with
electrical system and starter
only weighed 8 lbs. more
than his Revmaster 2100 turbo.

No performance figures are
available yet, but should be
pretty good.

FLIGHT REPORT

"Having just completed and
flown my KR-1 - N8029J -
after 41 years happy labor,
I thought I should send along
some thoughts.

First, I would like to
thank all the people who have
sent in flight reports and
accident reports for pub-
lication in the newsletter.
I think the information is
invaluable. Like anything
else, you have to apply the

information as needed.

I have about 450 total
hours, probably 400 in tail-
draggers. I had my first
dual in 1939 in a J-3 Cub,
got a private license in 1946
and flew until 1956 when I
stopped to raise a family of
6 children. Four years ago
I started flying again after
starting the KR-1 project.

My first flight was so
much easier than I anticipated
I was surprised. We have
5,000 ft. runways to operate
from and of course I didn't
need much to get airborne.
About the time I made my
first turn I noticed that a
headache I had, (caused by
some sinus problems), had
intensified. I decided then
to alter my plans which had
called for a 20 to 30 minute
flight and just fly the
pattern, which I did.

I landed and turned off at
the first intersection, no
more than 600 feet. I could
hardly believe it! That same

evening, I flew about half an hour, retracted the gear and had a good flight.

I now need to fly off my hours and finish paint the craft - it is still only primed.

I have a 1700cc VW a friend and I built and a 50 x 40 prop carved by a former Jodel II builder. I don't have an oil cooler, but do have an extra oil pan that increases the oil capacity by 11 qts. The CHT run 410° on climb and 390° level so far. Oil temp runs 205° and oil pressure at 45 lbs.

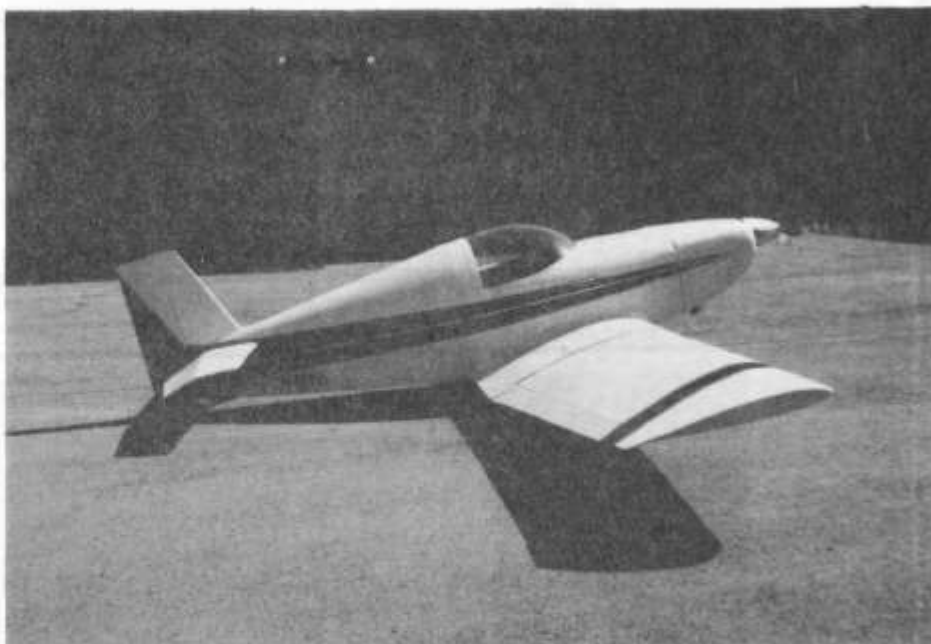
I don't have any performance figures yet. I have a couple of things I did that I think help and would like to pass their, along. First, I have a right hand stick and I built an arm rest - this seems to really help stabilize that right arm and help prevent overcontrolling. I had about 20 minutes dual in a Vari-Eze and it seemed like a good idea. I have heel brakes and can hold the plane at 3400 rpm. I added a control horn to the bottom of my rudder and connected this

to the tailwheel with springs, like a Cub, and it makes for very good ground handling. I made a modified HAPI gear retraction latch that seems to work very well. I'll try to send some kind of drawings later.

Lest I forget, I should also thank my wife and family. I built this plane in our 11 car, attached garage. Keep up the good work and all you people building, keep at it, the rewards of flying your own plane can't adequately be put into words.

Homer Sanders
1926 Roberta Dr.
Decatur, II. 62521

Mount to firewall with small brass screws about every 6". Be sure a dimple the plate on the belly of the aircraft and install with flush screws.

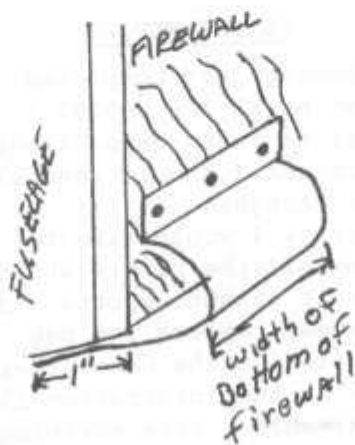


This really sharp KR-2 was built by Rom Garverick, 210 Margo Trail, Rome, Ga., 30161. It was constructed with most of the Rand kits, including all of the preformed fuselage parts. It was first flown on October 31, 1982 after 21 months construction time. Powered by an ISO0cc VW engine and a 52 x 48 Warnke prop, it will cruise at 135 mph at 3200 rpm. Stall, power off, is at 45 mph. Empty weight is 455 lbs.

A GOOD WAY to help your engine to cool better is to help smooth the airflow thru the engine cowl.

To reduce turbulence at the bottom of the firewall, a round curve works very well.

It can be made from .020 aluminum and rolled over a 11" wooden dowel to form roll. It only needs to be about 11" tall and should run all the way across the bottom of the fuselage where the cowl outlet is.

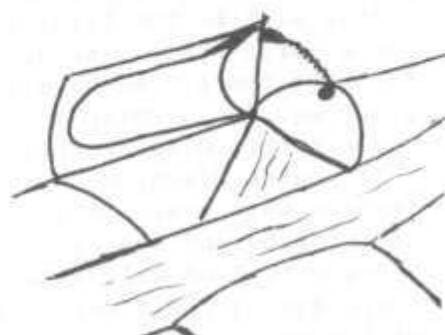


IF YOU'RE LOOKING for a good way to support your canopy frame when open to keep it from going over too far you may want to try this idea.

Get one of the automatic key chain holders that hook on your belt and have about a 2' chain on them.

Mount the holder at the top of the turtleneck and cut the chain to length desired.

Chain will hold weight of canopy and will retract into its holder when you close the canopy.



ANOTHER KR HAS JOINED THE FLEET! After 3-years of frustrating effort and a great deal of anticipation, N3382F has finally earned its wings.

On Sunday, March 20th, at 4:00 pm, 82F lifted off Runway 20 at Hillsboro Airport in what might be described as a very anticlimatic finish to 3? years of effort.

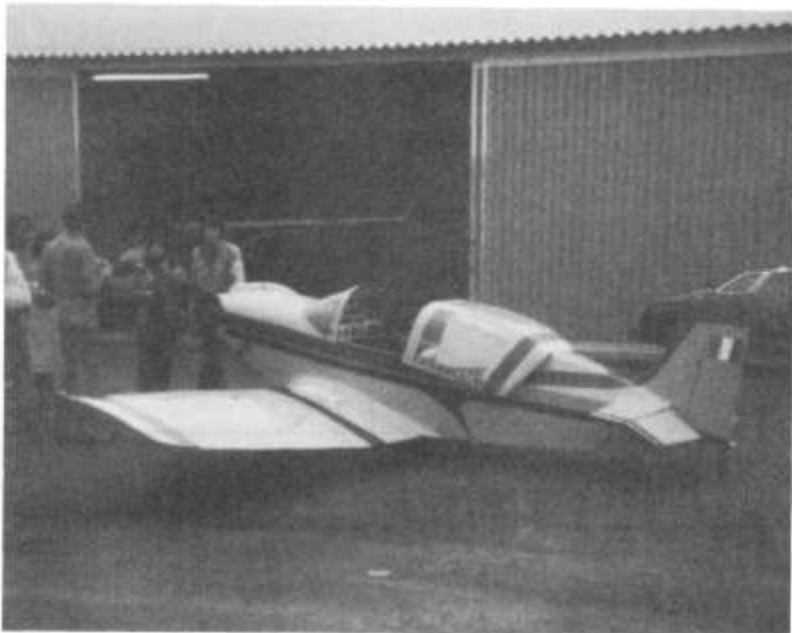
Everything went extremely well, thanks to the help and advice of several people, specifically Dan Diehl, who put up with all my phone calls asking absurd little questions, and Don Pearsall of Cornelius, Or., a former KR-1 owner/pilot, without whose help and tolerance of my insecurities, my KR would undoubtedly still be in my garage.

The only malfunction was a low oil pressure reading due to the use of a stock oil pump. The KR engines must have a high volume pump and a high pressure relief valve spring.

Also, my vacuum system was inoperative because I overlooked a plug in my gyro-horizon indicator which should have been removed.

The craft flies and climbs like a fighter pilots dream. Airspeed was approximately 140 ind. at 2200 rpm. Gear stayed down, mainly because I was too busy trying to master those sensitive elevators to retract it.

Oil pressure ran around 30-35 psi, CHT at 275° and oil temp at 170-180°. I expect much better speeds on the second flight. I flew it onto the runway at about 70 mph approach and 60 touchdown speeds. I tried for a wheel landing and ended up making one of the prettiest 3-point "greasers" you've ever seen. These little planes are hard to judge.



Changes to my aircraft are as follows:

1. Stronger tailwheel setup
2. Retained distributor ignition- no mag.
3. One handed gear retract mechanism
4. Sliding type canopy
5. 8 gallon wing and 9 gallon removeable fuel tank
6. lighting system
7. Removeable instrument panel
8. Starter & alternator - Diehl Supercase

Again, my thanks to Dan Diehl and Don Pearsall, they're great guys with lots of patience. Be seeing you all at this years Oshkosh. And to all you future KR pilots out there - get busy!! You'll never regret one minute of the blood, sweat and tears it takes to get you little hot rod into the skies.

Gene Finamore
847 S.W. Baseline #9
Hillsboro, Or. 97123

QUESTIONS AND ANSWERS

Q. I've mistakenly drilled some of the mounting holes in my gear hinges in the incorrect place. Can I save them?

A. Take them to a good machine shop and have them filled with heliarc. You may then redrill them correctly.

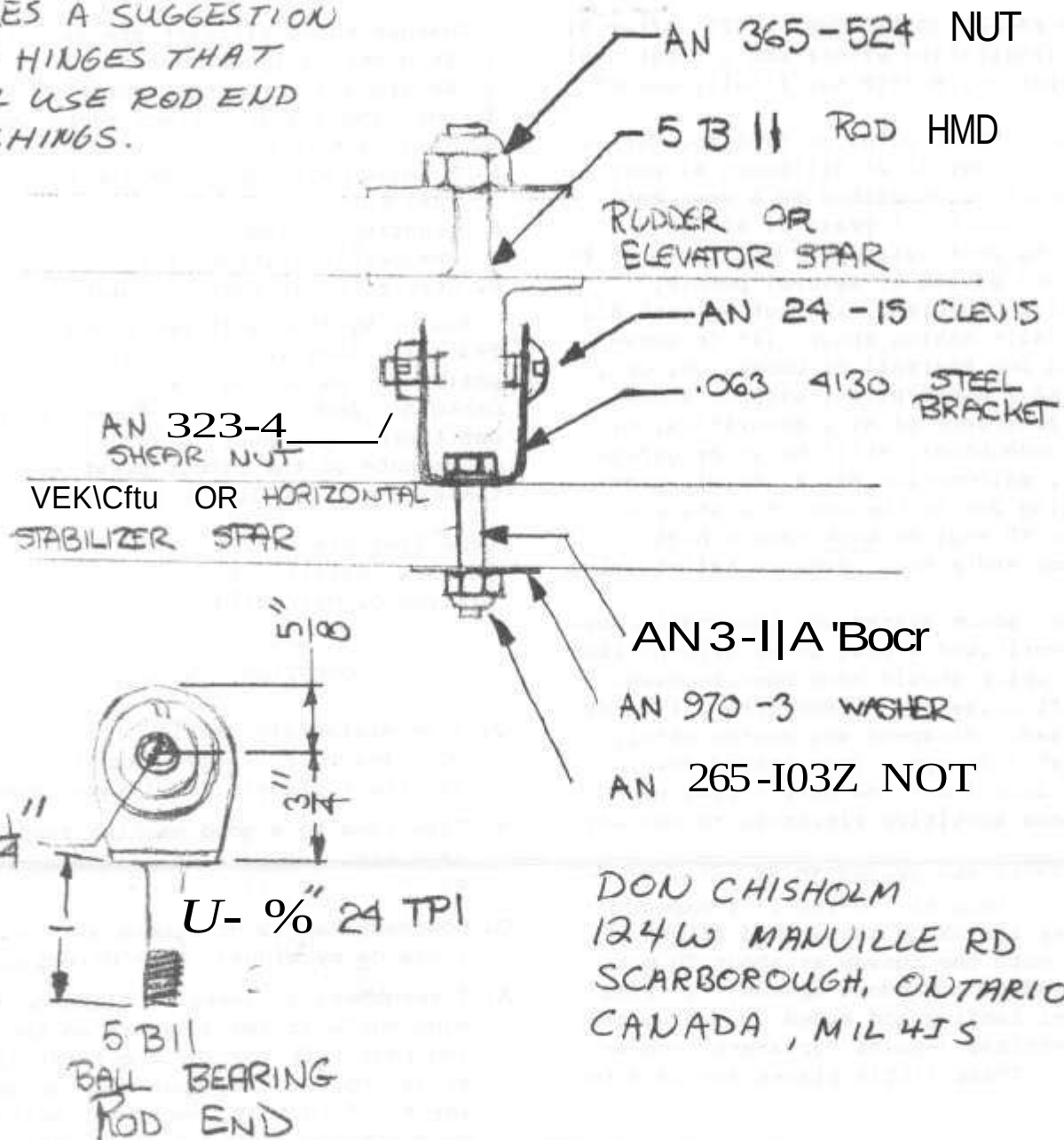
Q. How many layers of fiberglass should I use on my wings? What direction?

A. I recommend 2 layers of glass on the wing surfaces and 3 layers on the leading edge. If you lay the first layer at 45° to the wing span and the second layer 90° to that, your wing will be much stronger. If you don't want to run the second layer like this, (it will take at least 3 strips of glass and will take more fill to get a smooth surface where the strips join), lay the first layer at 45° as above and then lay the second layer as one strip the length of the wing. While as not as strong as the method above, it will be stronger than both layers running straight on the span.

Q. Does it make any difference which side the hinges are mounted on the tail?

A. Mount the smaller part of the hinge on the stationary spar and you'll find it will look much nicer when finished. Be sure and get a good, tight fair between the stabilizers and the rudder & elevator. This is a large source of drag if a gap is left between them.

HERES A SUGGESTION
FOR HINGES THAT
WILL USE ROD END
BUSHINGS.



Clamping those pesky gusset blocks for gluing in the fuselage frame is a lot easier if you modify a couple of spring clamps as shown below. M.C. Anderson, 406 33rd Ave., S.W., Vero Beach, Florida. 32960.



MARKETPLACE

GREAT PLAINS

AIRCRAFT SUPPLY CO.
BOYSTOWN, NE 68010
P.O. BOX 9

PH. 402-496-0366

GREAT PLAINS MODEL 185C (1850 cc)

Why go 1850? The 1850 uses a 76 mm crankshaft and 88 mm pistons & cylinders. This means that there is no machining of the case or heads. The end result is a stronger engine. Some minor case (internal) clearancing may be necessary on 1968 and later cases. Uses forged crankshaft.

PRICE! \$2995.95 from GPASC

4216 SLICK MAGNETO (NEW)	\$299.95
M2266 SLICK HARNESS	\$61.38
12 VOLT U-BUILD STROBE	\$24.95
DAVID CLARK H10-30 HEADSET	\$149.95
TELEX D950 HEADSET	\$119.95
JEPPESEN AVSTAR COMPUTER	\$59.95
prices good through August 10, 1984	



BON AERO

**BASIC AN/MS
AIRCRAFT
HARDWARE** FREE CATALOG

ON AERO
THE SUMMIT RD. PARKER, CO 10134
D*ptSA 303/M1-3802



NEW! 11.400x5 6 PLY. RATED
TIRE SPECIFICATIONS INFLATED:
HEIGHT 11.5 INCH WIDTH 4.0 INCH
TIRE WT. 3 LBS. TUBE WT. 1/2 LB.
LOAD RANGE C -70 P.S.I. MAX.

This tire fills the size gap between the 500x5 aircraft tire and the 3.40-3.00x5 go-kart tire. Looks like a scaled-down 500x5. Fits KR-1 & 2's and is recommended by Burt Rutan for the VariEze and Long-EZ. Also fits most other experimentals using 5 inch rims.

TIRE 6 PLY RAT. 25.00 TUBE 6.50+ SHIP & HAND.
MIKE LAMB, P.O. BOX 3324, QUARTZ HILL, CA 93534

FOR SALE...."0" time Revmaster R2100D engine. Includes Revmaster exhaust system, Great American Prop, spinner, engine mount, baffles, starter, dual magneto, alternator, oil filter, oil cooler, Posa carb with mixture control and regulator. \$3,061.00. Kenneth Heidger, 703 Jo Anne Lane, Roseville, Ca. 95678. 916-783-7294.

FOR SALE....Continental A65, "0" SMOH by A & P, new parts used, 2 slick mags & carb overhauled. includes engine mount. \$1,995.00 Nick Tsales, 1404-2 SW 80 St., Miami, Fl. 33183. 305-385-5987 after 7:00 pm.

FOR SALE....KR-2, nearly flying. Revmaster 2100, excellent workmanship. Trailer and extras, \$5,000.00 or best offer. 919-436-5081.

FOR SALE....Complete retractable KR-2 landing gear - wheels, castings, etc. Tailwheel & spring. Rex Taylor's modification plans and all required material. 504-892-9639.

FOR SALE....KR-2 on wheels with main spars installed, outer spars completed, stabilizer, rudder almost completed, all signed off by FAA. Instruments, controls, hinges, fittings, hardware, Rand^t"»qfjlbs. canopy, tank, cowl, fibe^SI|^JB f^epoxy, foam and most everythingc^l^eeded to complete except engine. \$2,500 invested. Will sell for \$1,100.00. Reason for selling. Moving into condo. Gerald Lonas, 615-794-1603.

WANTED.....KR-2, immediate cash. Must be good quality, reliable and flying. Call or write D. Hjelmstad, 4437-46 th Ave. So., Minneapolis, Minn. 55406. 612-722-6373.

FOR SALE....New "0" time, professionally built, turbocharged 1835cc VW Aero-conversion engine. Has Diehl Supercase, prop hub, POSA supercarb, plus many extras. Make offer. Harry Hermann, 37247 51st Street East, Palmdale, Ca. 93550 805-947-0550. No collect calls please.

ATTENTION BUILDERS

If you have recently completed your KR and flown it, how about sharing that experience with other builders thru a flight report. A lot of valuable experience can be passed on this way and for those who are still building it really helps keep the excitement going.

Also, if you have discovered a plans error or a better way to do something, let me know so that I can let other builders know.

THE DIEHL **SUPERCASE**—Provides electric starting & a 20 amp alternator. Will fit 1200cc to 2200cc VW conversions. The only case that will fit both of the R/R engine mounts for KR's. Also available with starter on top for tri-gears.

Complete system: \$415.00

THE STING TUNED EXHAUST HEADER SYSTEM—A fully tune, 4 into 1 aircraft exhaust system for 1200cc thru 2200cc VW engines. Mig welded and jig built for a perfect fit. \$195.00

KR BRAKE CABLE & HOUSING—\$2.00 @ foot
SAFE-T-POXY -- 1% gallon kits -- \$48.00
SAFETY GLOVES WITH COTTON LINERS -- \$10.00
SAFETY MASKS -- \$20.00
TAIL HINGE BUSHING KIT (nylon bushings for use
with stock R/R hinges) \$15.00
FLUSH MOUNT GAS CAP (all metal) \$60.00
ELECTRIC TRIM KIT \$75.00

PROP'S INC. PROPELLERS \$215.00
TERRA TX-720 RADIOS \$795.00
NEW ALTIMETERS 20,000' \$145.00
SOUNDPROOFING INSULATION 48"x60" \$ 92.50
KROMATE LIGHT - 1 gallon \$ 14.00
KR HATS \$ 7.00
!!!WE ARE NOW OFFERING SEVERAL PRE-FABRICATED
KR SUBASSEMBLIES. CONTACT US FOR PRICES!!!



"WE'RE F.A.S.T."

WE STOCK ALL OF THE RAND ROBINSON KR KITS FOR IMMEDIATE DELIVERY. WE ARE ALSO A FULL LINE AIRCRAFT PARTS SUPPLY COMPANY AND CAN SUPPLY ANY PART YOU NEED FOR YOUR KR, FROM THE SPINNER TO THE RUDDER LIGHT. CHECK US FOR RADIOS AND INSTRUMENTS ALSO. CATALOG AVAILABLE SOON.



P.O. BOX 41137 ENGLEWOOD, CO 80155

(303) 693-8239

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, CO. 80155
ISSUE #96 JUNE 1983



ISSUE No. 97

JULY 1983



KR NEWSLETTER

RATES
 USA \$1200 Yr
 CANADA \$1500 Yr US
 OVERSEAS \$2000 Yr Funds

A basis for ideas and tood for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand Robinson Engineering, Inc.

SOMEONE ONCE SAID something about the best laid plans... Well everything seems to be running late this month, this newsletter included.

Things are very hectic around here trying to get everything ready for OSHKOSH! It'll be close, but everything should be ready in time.

Last month I reported that my KR-2 should be flying this month. Well that is behind schedule also. It's all painted and the upholstery is ready, but some detail work is still left. We will have it ready for OSHKOSH for sure!

The display and trailer are nearing completion and the audio-visual set-up is ready. This will be the first time for a major display set-up for the KR's and it should be a good one.

For those of you who are planning on attending OSHKOSH (everyone is, right!), and want to pick-up some parts for your bird, we will have many of the parts at OSHKOSH available for purchase and delivery at the airshow. We will also have plans for the KR-1, KR-IB, and the KR-2, along with T-shirts, caps, decals, etc.

There will be a KR Forum held jointly by Jeanette Rand and myself at OSHKOSH this year and it looks like there will be quite a crowd.

One last time I would like to encourage all of you to attend this year! If your KR is flying, BRING IT TO OSHKOSH!!! We want to make this the biggest year ever for KR's so come out in force!

K.P. RICE OF PROP'S, INC. has informed me that they are now going to manufacture replacement blades for the old Rand 3-blade, ground adjustable propellers.

They did a custom set for a KR pilot and were so pleased with the results that they have gone into production.

They are a lot of the old hubs still out there and a lot more pilots who want to use this prop so this is good news.

No price available yet, 'but should be very reasonable. Props will be available from FAST when manufacturing is completed.

FROM LANCE NEIBAUER...."Fellow KR Jockeys:

I've been asked by Jeannette Rand to make note via this newsletter of a necessary KR-2 inspection. As you know, the KR-2 engine mount was taken directly from the existing KR-1 and thus is quite a bit narrower than the 34" (KR-2) firewall top. The purpose of an engine mount, as you probably know, is to transfer the thrust and weight of the engine to, (primarily), the sides of the fuselage. With regards to the top engine mounts, this is achieved via the 5/8" solid spruce cross member to the 1/4" plywood shear plates to the top longerons.

Ideally the engine mounts would attach as close as possible to the top longerons. With the narrow KR-2 mount, there is created a moment arm of about 10" on each side which can cause some torquing problems to the 5/8" solid spruce cross member. Needless to say, this is a very difficult part to inspect but a sincere effort should be made to do so.

If you find any cracking or fatiquing to the 5/8" spruce cross member, then repairs are manditory. If you are in the construction phase of your KR-2, it is recommended that you install a piece of extruded aluminum, (available from Rand/Robinson), across the entire back of the 5/8" spruce and under the top 1/4" plywood shear plate.

This will also double as a backup plate for the engine mount bolts. This extrusion should also be bolted, (8/32's are sufficient), to the top shear plate. This will help to eliminate any torque on the 5/8" cross member and improve the transfer of forces to the top longerons.

With "Sweet Mildred" I backed the 5/8" spruce cross emmber, (which by the way had shown signs of fatigue), with 5/8", 12 ply A.C. type plywood and 3 plys of #7781 glass cloth to the sides and shear plates.

This glass has a tensile strength of over 120,000 psi. The work was a good deal of back breaking labor, (done from underneath and laying over the FWD spar for hours at a time), but she is rock solid now.

It should be noted that we've never, to my knowledge, had a firewall failure and

hopefully with thorough inspections we never will have one. Also, bear in mind that builders are continually adding more and more iron up front which translates to weight and torque.

While I had "Sweet Mildred" in the shop, I replaced the old original gear locking system with a positive lock system of my own design, (similar to the of MAPI's).

The system works fantastically smooth and has absolutely no slop. I strongly recommend such a system change as the original Rand/Robinson system is really not much simpler and is quite likely to fail eventually from either torque or vibration.

Many a KR jockey has landed on his belly with the old system, it's just too delicate.

I've also converted "Mildred's" ailerons into flaperons. The retro fit was all accomplished from the wing stub ends and consequently did not involve any exterior patch work. The flap mode is limited by the total available down travel of the original ailerons, (-12 1/2°). I now use 7° flap on final which translates into about an 8 mph slower approach speed with having the same "over the nose" visibility as with the no-flap higher speed. This really does pay off in much shorter landings. The sink rate was not measurably increased since 7° flaps adds little drag, but does pitch the nose down considerably.

I will be drawing up the modifications for use in a future article. Also, I would strongly recommend installing flaperons to anyone in the construction phase as they are very simple and effective. (I'd like to thank a fellow KR-1 pilot, Richard Shirley, for helping machine out the necessary parts).

Having performed all these little things on "Mildred" to make her even nicer to fly, it is with a slight lump in my throat that I say - she is for sale.

She really is a great plane, but I have another project in the works that is taking nearly all my time, not to mention money. I've also just gotten married and must practice frugality!!! So "Mildred" is for sale to a good home only. Happy Flying."

The KR NEWSLETTER is published monthly by Forrester Aviation Supply and Technology, Inc., (FAST), PO Box 4113, Englewood, Colorado, 80115. (303) 693-8239. John Forrester, Publisher. Subscription rates: \$12.00 a year, \$30.00 for 3 years. All back issues are available at the following rates: 1-12 issues: \$1.00 each, 13-24 issues: 75¢ each, 25 or more: 50¢ each. COPYRIGHT 1983, KR NEWSLETTER.

FOR SALE...KR-2, N382L "Sweet Mildred"

You'll not find a better KR-2 and she'll outrun the pack. 175 hours, 360 nav/com, very complete VFR panel, wing tanks, positive gear lock system, Rev-master 2100, flaperons. See Winter edition of Sportsman Pilot Magazine for story on her. Can probably deliver. Lance Neibauer. (213) 374-8467

RAND ROBINSON now has a new upholstery kit that will be available this month for the KR-2. It is supposed to be even nicer than the original kits and the best news is that it will be quite a bit less in cost. (We should have some at the display at OSHKOSH).

FAST, INC. now has a 60 page catalog available. The catalog has 7 pages of parts specifically for KR's! Cost is \$3.00, which is refundable on first purchase of \$25.00 or more.

FROM CAREY ANDERSON - "MINIATURE METRICS"

"A recent order for a complete landing gear machining plus fitting and testing brings the following tips.

The brake drums do not fit the wheels by 1/16" and this means that the wheels which are aluminum castings should be shaved on a lathe on the inner surface of one half of the hub.

I had bolted the hubs and tires together with the drums and discovered that they were cocked slightly and the drums were not fitting against the wheel evenly.

During the past three years I have received numerous phone calls and letters asking if I turned the wheel hubs and I didn't understand the problem. The answer now will be yes, I do turn the wheel hubs concentrically with the brake drums. This service is \$12.00 and customer pays the shipping both ways. Only two hub halves need to be sent as they are all alike and only their position determines their use.

Also, the hubs should have their outer faces sanded on a face plate sander to remove 1/16" from the inner and outer ridge rings.

Also, the brake band holders can be machined off by us for \$5.00 for the pair. We saw off the excess metal and sand smooth. The drums should be sanded on the outer lip because they find invariably when rotated on the casting of the gear legs.

The gear legs should have their brake lever actuating arm clearance milled into the proper clearance to avoid interference. This amounts to about 3/32", but it means that the lever can be properly mounted. I will do this machine end milling for \$8.00 for the pair of legs.

A builder recently requested a part I had been requested to make before but had never seen it and it was not illustrated in the old Builders Manual. In fact, only a sentence was stated and no description shown, (elevator cable pulley bracket on rear spar and on horizontal stabilizer spar), so I called Jeanette Rand and she offered the pages 70 - 71 from the new Builders Manual.

I immediately made a master pattern and shipped one set to the builder. I drilled all the holes and charge \$18.00 for the brackets less pulleys.

Please tell the builders that I will now perform these machining services quickly and would prefer to save them money by picking up the parts from Rand before they are to be shipped to the customer.

Because of the critical nature of the landing gear problems, I will share the how-to information free of charge with builders first to save them trouble and accidents."

SEVERAL BUILDERS HAVE requested information concerning the construction of molds for fiberglass parts. We do quite a bit of mold work at FAST so I am listing the steps necessary for making a fiberglass mold. By using molds for many of your parts, (tailwheel fairings, vents, etc.), your parts will be both lighter and smoother.

While ideally you should use a vacuum bag on most molded parts, you can do a great deal of them without one and still achieve parts that are better than ones that are laid-up by hand.

THE PATTERN

The pattern for a new mold can be made from a refinished item of wood, plaster or a combination of these materials. The surface should be polished to the best possible finish because the mold surface will be no better than the surface of the pattern used.

When a lacquer, paint or other type finish is used which would be attacked by the styrene of the resin, the pattern should always be coated with a heavy coat of PVA, (Polyvinyl Alcohol), after applying several coats of wax. The PVA will make a high glass surface while forming a barrier film to protect the pattern buildup.

GEL COAT

When the PVA is completely dry, the pattern is ready for laminating.

Tooling gel coat should be used to make the mold surface. The gel coat should be catalyzed using about 10cc catalyst per quart. Best results are achieved by spraying on a least a 10 mil thickness. The gel coat may be thinned up to ten percent for spraying with a 50/50 mixture of acetone and styrene.

If the gel coat cannot be sprayed, it can be applied with a brush. Flow on a heavy coat with a soft brush, flow out all brush marks, as then spots may cause the gel coat to wrinkle during lamination.

CURING

The gel coat must cure thoroughly before starting the fiberglass lamination. Poorly cured gel coat may cause alligatoring or wrinkling of the surface as it is attacked by the styrene in the resin. The gel coat will completely cure at room temperature in an hour or two. The surface is air inhibited and will remain tacky to bond chemically to the fiberglass laminate.

Where the gel coat is brushed on small items and there is a possibility of thin spots causing wrinkles, it may be advisable to brush on a second coat of gel coat after the first coat has cured. This coat may be allowed to cure or it may be used to start the laminating process. The gel coat is less apt to cause problems or wrinkling than the resin. A mold with a wrinkled surface is usually a complete loss and must be remade from scratch all over again.

LAMINATING THE MOLD

The first coats of fiberglass should be of fine weave so the pattern of the weave is less apt to show up on the completed surface. Most molds in production are made with two layers of fine cloth, a layer of mat, (3/4 oz), and then a buildup of heavier cloth. If the finished layup is to have a backup of woven roving, the first laminations should be made with a normal catalyst ratio using laminating resin. After these laminations have cured and cooled, the surface will remain tacky, similar to the gel coat surface. The woven roving can then be laminated on using a general purpose resin such as surfacing resin. (Laminating resin may also be used here) The resin should be catalyzed low enough to keep the curing temperature below that of the first

laminations. This is to prevent telegraphing of the woven roving pattern through the first laminate and to the gel coat surface.

REMOVING THE MOLD

When the temperature of the mold laminate has lowered to warm, the mold may be pulled loose from the pattern. Do not remove, just break loose while the wax is still soft. When a cold laminate has had chance to set firm and shrink tight on the mold, it is sometimes very hard to remove without damage to the new mold surface. When the mold has been pulled loose, it should be pressed back into place to complete the cure while continuing to be held in shape by the pattern. This will greatly lessen the chance for mold warpage.

BRACING

Wood braces, leg systems and holding devices should be laminated to the mold while it is still on the pattern. A very low catalyst rate should be used on any resin used between wood and the new mold to keep the cure temperature very low. The strips of fiberglass should be laminated to the braces with a normal catalyst ratio.

If possible, the mold should be used as is when it has cured and has been removed. However, it can be sanded with wet or dry paper, (500 or 600 grit), and then polished to a mirror finish with buffing compounds. A mold with a high gloss surface will release easier, last longer and make more parts. Also, your part will be no better than the mold in which it is made. Any imperfection in the mold surface, (even a small scratch), will be reproduced in the finished part, so do a good job.

WAXING A NEW MOLD

The new mold surface is very delicate and should cure a least 24 hours or more at 70 to 75°F before being used. The first five parts laminated in the new mold will soften the gel coat almost to the destruction point as the curing, exotherm and heating takes place, (check one of your layouts some time and you'll be surprised at the amount of heat generated curing the cure cycle). The wax and PVA preparation for these first five laminations must be the best possible to prevent a bond between the mold surface and the part lamination at the peak of the exotherm.

Wax the mold surface with at least three generous coats of ResoPart wax mold release,

with a good rubdown polishing of each coat as it dries to a tacky state. The waxed surface should then be coated with a generous coat of PVA, sprayed on to a high gloss. When this film coat has dried, the mold is ready for part lamination.

The above steps for construction of a mold are done with polyester resins because they are much cheaper and faster to use than epoxy based systems. They work fine for use on small non-precision parts. They will shrink slightly as the mold cures, so they are not used for precision molds. If the parts you want to make must be very exact, then use epoxy to make your mold instead of polyester resin.

GOOD NEWS FOR REVMASER ENGINE OWNERS

If you have a Revmaster 2100cc engine and have found that it has a cast crankshaft or are not sure that it is a forged crankshaft and are having problems getting the proper crank for it, take note.

Tex Taylor at HAPI Engines has just informed me that they are now stocking these crankshafts for the Revmaster engines.

These are very high quality FORGED shafts so you will be assured of having the correct type crankshaft in your engine.

Cost is \$500.00. Contact Rex for further information at Eloy Municipal Airport, R.R. # 1, Box 1000, Eloy, Arizona, 85231.

QUESTIONS AND ANSWERS

- Q. On the new KR-2 plans drawing No. 1, it does not show the location for the cross-member with the dimension 29.75 on the top drawing. Where exactly does it go?
- A. This is the top support for the seat back. Its position is adjustable depending on how far back you want to lean. The further back, the more headroom you will have, but less shoulder room. Most builders install it 6 to 8" behind the rear spar.
- Q. Do the spruce wedges that are installed above the FWD spar on the fuselage sides have to be tapered or can they be straight? I don't seem to have enough wood in the kit to make them tapered.
- A. They should be tapered. This allows the upward load on the spar to be transmitted along the entire length of the upright member. If it is made straight the load is not evenly distributed. I made mine by laminating 5/8" x 5/8" spruce.

THE DIEHL SUPERCASE—Provides electric starting & a 20 amp alternator. Will fit 1200cc to 2200cc VW conversions. The only case that will fit both of the R/R engine mounts for KR's. Also available with starter on top for tri-gears.

Complete system: \$415.00

THE STING TUNED EXHAUST HEADER SYSTEM--A fully tune, 4 into 1 aircraft exhaust system for 1200cc thru 2200cc VW engines. Mig welded and jig built for a perfect fit. \$195.00

KR BRAKE CABLE & HOUSING—\$2.00 @ foot
SAFE-T-POXY - 1% gallon kits -- \$48.00
SAFETY GLOVES WITH COTTON LINERS -- \$10.00
SAFETY MASKS - \$20.00
TAIL HINGE BUSHING KIT (nylon bushings for use with stock R/R hinges) \$15.00
FLUSH MOUNT GAS CAP (all metal) \$60.00
ELECTRIC TRIM KIT \$75.00

PROP'S INC. PROPELLERS \$215.00
TERRA TX-720 RADIOS \$795.00
NEW ALTIMETERS 20,000' \$145.00
SOUNDPROOFING INSULATION 48"x60" \$ 92.50
KROMATE LIGHT - 1 gallon \$ 14.00
KR HATS \$ 7.00
!!!WE ARE NOW OFFERING SEVERAL PRE-FABRICATED KR SUBASSEMBLIES. CONTACT US FOR PRICES!!!



"WE'RE F.A.S.T."

WE STOCK ALL OF THE RAND ROBINSON KR KITS FOR IMMEDIATE DELIVERY. WE ARE ALSO A FULL LINE AIRCRAFT PARTS SUPPLY COMPANY AND CAN SUPPLY ANY PART YOU NEED FOR YOUR KR, FROM THE SPINNER & ENGINE TO THE RUDDER LIGHT!

!!! 60 PAGE CATALOG NOW AVAILABLE !!!
\$3.00 (refundable on \$25.00 purchase)

P.O. BOX 4113 / ENGLEWOOD, CO 80155

(303) 693-823\$



KR
Designer
Bill DeFreze
7830 Hawthorne Dr.
Shasta, CA 95568
(415) 829-2115

CONVERSION OF THE RAND KR I
FROM CONVENTIONAL TO
RETRACTABLE TRICYCLE
LANDING GEAR

A Modification by BUI D. Fras*

Plans!
USA-25.00
FOR-30.00

**BON
AERO**

**BASIC AINI/MS
AIRCRAFT
HARDWARE** FREE CATALOG
-ON AMD
TIM SUMMIT RO. PARKER, CO M134
D*pt SA 303/841-3802

NEW! 11.400x5 6 PLY. RATED
TIRE SPECIFICATIONS INFLATED:
HEIGHT 11.5 INCH WIDTH 4.0 INCH
TIRE WT. 3 LBS. TUBE WT. 1/2 LB.
LOAD RANGE C -70 P.S.I. MAX.

This tire fills the size gap between the 500x5 aircraft tire and the 3.40-3.00x5 go-kart tire. Looks like a scaled-down 500x5. Fits KR-1 & 2s and is recommended by Burt Rutan for the VariEze and Long-EZ. Also fits most other experimentals using 5 inch rims.

TIRE 6 PLY RAT. 25.00 TUBE 6.50+ SHIP & HAND.
MIKE LAMB, P.O. BOX 3324, QUARTZ HILL, CA 93534

BUY SELL TRADE

FOR SALE—KR-2 - Woodwork complete, gear in, controls & cables installed, hardware, foam kit, quality work, FAA signed off to complete. \$1,500 invested. \$750. OB0, Garden Grove, Calif. Call Scott 714-893-3688 or 213-594-2747.

FOR SALE—KR-2 - 1835 Turbo with starter & Diehl Supercase, aluminum cylinders, Great American prop, KX-145 with antenna & headset, trailer. Flown 40 hours with rough finish, stripped foam & glass, got married and lost interest. \$4,000. Jim Kimkema, 904-438-8867.

MINIATURE METRICS
utmrnt HMMW
7801 14th STREET
WESTMINSTER, CALIF. 92693

Phone (714)894-4R7.j
Amos, Anita, unt
C>roy Anriorion

Minature Metrics IMS several
services and products. Send
.1 S.A.S.E. for more info.

We also totally machine the
Rand Robinson extrusion kit,
which includes the landing gear.
Machinip only: \$280.°°
Machining + assemblies with added
parts finished: \$320.°°
Contact Rand Robinson & advise
them you want the service. They
will advise us. State shortened
landing gear bar or full length.

QUALITY...All material is air-
craft clumnum/steel as speci-
fied in your plans. Milled
with precision, then deburred,
bead blasted, final finish reamed
by standard aircraft production
procedures. All in the interest
of safety.

Left and right aileron
pulleys, mounted on brackets
\$30.°° pair, postpaid.

Aileron horns and bellcranks
w/support brackets, hinge
bolts and spool spacer pro-
vided (assembled) 24 pieces.
\$87.°° postpaid

Rudder, elevator, tailwheel
horns and hinges... 11 pieces
plus 10 back-up plates H. & H.
pilot drilled for mount bolts.
\$60.°° postpaid...Now clear-
ance milled for full throw.

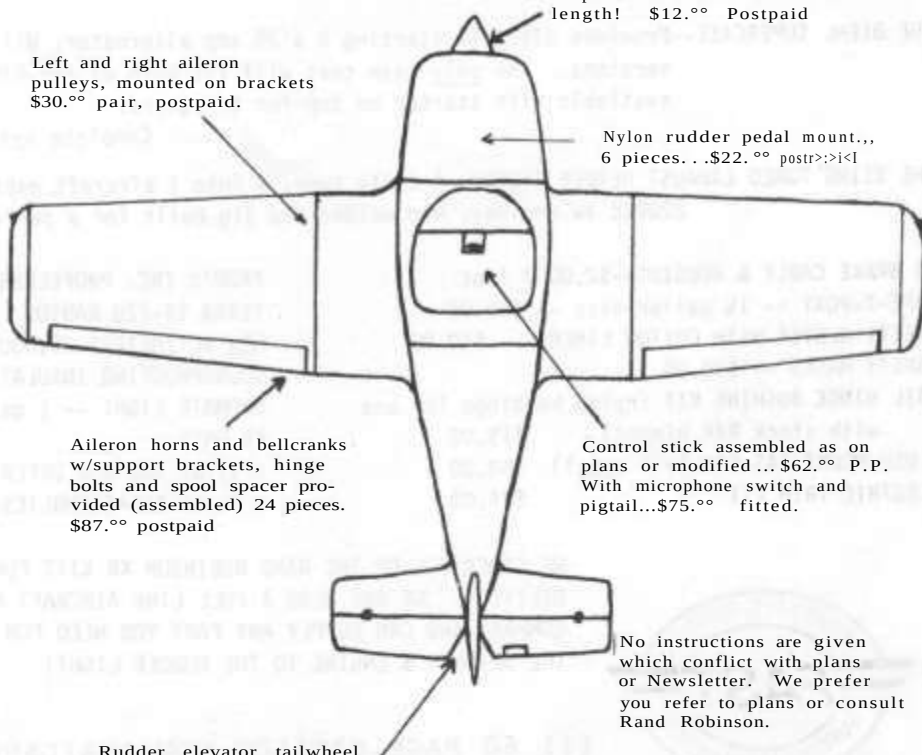
Propeller hub bolt. 20mm - Anv
length! \$12.°° Postpaid

Nylon rudder pedal mount.,
6 pieces... \$22.°° postpaid

Control stick assembled as on
plans or modified... \$62.°° P.P.
With microphone switch and
pigtail...\$75.°° fitted.

No instructions are given
which conflict with plans
or Newsletter. We prefer
you refer to plans or consult
Rand Robinson.

Make check payable to:
MINIATURE METRICS
7801 14th STREET
WESTMINSTER, CA. 92683



KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, CO. 80155
ISSUE #97 JULY 1983



ISSUE No. 98

AUGUST 1983



KR NEWSLETTER

RATES
 USA \$1200 Yr
 CANADA \$1500 Yr US
 OVERSEAS \$2000 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand Robinson Engineering, Inc.

LAST MONTHS LETTER from Lance brought a large response from builders concerning their firewalls. Many were afraid that the problem mentioned affected all KR's and was a serious problem. It is not!

I must apologize for the mix-up. I had been told by R/R to expect a letter from Lance describing a modification to beef-up the firewall on KR's which were using large engines. When the letter arrived, I assumed that it had been cleared by R/R. Turns out that it wasn't.

As far as R/R knows, Lance's KR-2 is the only aircraft that has suffered from this problem and their engineer feels that it was caused by the aircraft being flown with a vibration in the engine after the aircraft was dropped off a trailer.

For those of you who want to make your firewall stronger, (some of you are using very large engines now), R/R has promised to send the Newsletter a drawing of the recommended modification.

Let me repeat however that there has not been any failure of the firewall reported and R/R is not redesigning it.

WELL OSHKOSH IS over for another year. I'm not sure why, but KR's in attendance were down from last year. This year we had 10 flying KR's and I had my KR-2 in the aircraft display area with the FAST exhibit.

Although the aircraft didn't turn out in force this year, KR builders sure did! The KR Forum was one of the most popular forums held this year and KR builders filled our exhibit all week. There were many informal "bull sessions" at the exhibit and a formal session at the University Dorm which drew about 50 builders. If everyone who came in with a picture of their KR flew it in we could have more aircraft on the field than any other type! Maybe next year.

Jack Fyfe made the "fantastic voyage" this year by flying his recently completed KR-2 down from Anchorage, Alaska.

Jack has promised us a flight report shortly on his trip.

Wes Evans flew in his 0-200 powered KR-II Special. In addition to the new engine, Wes spent the winter stripping the paint off his already beautiful aircraft and going over the entire plane and filling any more imperfections he could find. It was then repainted and the results are incredible.

Mike Lamb of "Lamb Tire Co." had a working model of his new tri-gear for the KR-2 at Oshkosh this year. This is the finest gear I have ever seen for a KR. It is a complete, bolt-in system that can be installed in a new KR or easily retro-fitted to an existing aircraft. A lot of builders have said that want a good tri-gear so here is your chance.

The tooling for the production version is expensive however so Mike must have 30 people send a deposit on the gear by Sept. 30. He reports that it will take this many gear sets to pay for the tooling. If there aren't enough orders by Sept. 30, deposits will be refunded and the gear will not go into production and that would be a shame because this is a great system.

Even if you aren't to the stage where it is time to install your gear, if you think you want the tri-gear you should contact Mike now, don't wait until its too late.

Cost of the complete system, including gear housings, gear doors, tires, wheels, brakes and controls is \$1,795.00. Deposit required is \$897.00.

Unfortunately we lost a KR-1 pilot this year at Oshkosh. Patrick Black of Spartanburg, South Carolina was killed in the crash of his KR-1 in Franklin, Wisconsin while returning home from the convention.

Patrick was trying his second approach to land downwind and tried to slow too much and stalled the aircraft.

1984 OSHKOSH

Stay at the Univ. of Wisconsin Dorm. The 9th floor of Gruenhagen Hall is reserved for KR builders, (main dorm with elevators).

In 1984 we will have a meeting room reserved on the 9th floor. Room, (double),

is \$15.50 per night. Meals are served across the street, breakfast is \$2.95, lunch is \$2.95 and dinner is \$5.50, all you can eat and seconds.

Park your car in the dorm parking lot and ride the bus. Buses run to and from airport every 5 minutes at rush time and every 1/2 hour during the day.

Send you reservations in early. Lets all stay together so we can compare notes and help each other solve our problems.

Deadline is October 15, 1983. Send your check for \$15.50 to Linda Bennett, 2606 No. 125th Circle, Omaha, Nebraska. 68164 Phone: 402-496-1507.

OSHKOSH QUESTIONS & ANSWERS

- Q. What modification must be done to install an 0-200 engine?
- A. 1/4" firewall should be made 3/8", and should be reinforced behind firewall so as to transfer load throughout upper longerons. If you are considering this engine, be very carefull of your CG.
- Q. Disc Brakes?
- A. You can add disc brakes to your KR very easily using Cleveland 500 x 5 disc rotors and the stock KR wheels. Cut the rotor flange about .025 and it will slip into the stock brake drum. Then mount it in a lathe so that the assembly is straight and weld it to the brake drum. This assembly will then fit back into the gear leg casting and you can mount the caliper to the leg.
- Q. Can I use the new Mazda or Spitfire engines? They are supposed to be much lighter with more horsepower.
- A. These engines are about 40 to 50 Ibs. lighter than a VW conversion. This will change your CG. You will have to change your engine mount to get the engine quite a bit more forward. In most cases, you will probably not achieve the results you are after.
- Q. When will there be a new index for the KR Newsletter?
- A. I intend to publish a new index in issue #100.
- Q. How much can I widen the fuselage of a KR-2?
- A. Do not widen the cockpit at the top longeron more than 2" or it will affect the air flow over the tail.
- Q. I have heard that Revmaster is going to be building a 2500cc VW engine that will produce about 100 horsepower. When will it be available?
- A. Revmaster now has the 2500cc engine built and expects to begin deliveries sometime next spring.
- Q. What kind of hinge is used on the ailerons?
- A. Use only extruded piano hinge on ailerons.
- Q. What should the wings and tail weight?
- A. My wings were 28 Ibs. each with ailerons installed and without balance weights. Rudder was 3 Ibs., horiz. stab, was 7 Ibs. and elevator was 5 Ibs.
- Q. What can I use on my firewall instead of asbestos?
- A. Use either Fiberfrax or I've heard that the Q-2 people have a new brush-on coating that works well.
- Q. What type of prop hub is used on the Type IV VW engine?
- A. The Type IV uses the same hub as the Type III.
- Q. My fuel line seems to vapor lock and even when it cools the gas won't flow out.
- A. Run a vent line from the top of your gascolater back into the fuel tank to solve this problem.
- Q. What are the control limits for the KR?
- A. Aileron: +20° -10°
(1" up-1/2" down measured at the outer tip)
Elevator: +30° -20°
Rudder: +30° -30°
- Q. Where do the rudder cables exit the fuselage?
- A. 19" forward of the vertical stab, spar and 4" up from the bottom longeron.
- Q. How much longer can I make my wings without adding to the spar?
- A. 18" may be added to each wing without adding to the spar.
- Q. What is the maneuvering speed for a KR?
- A. 135 mph I.A.S.
- Q. Do I have to use a mask & gloves with Safe-T-Poxy?
- A. They should be used with all epoxies.

STARTING ALL OVER AGAIN

It was a hot, sultry Bid summer afternoon in southern California* I sat at a table under a pavilion, anxiously awaiting the arrival of my flight instructor* The sky was clear, a great day for flying I thought. I prayed that I wouldn't have to sit and listen to one of his all too familiar lectures on safety. Don't do this. don't do that. It was a common occurrence and I was growing weary of his sermons. I just wanted to get up there and fly.

I passed the time away watching a Tomahawk practicing "Touch & Go's". There was a young lady in the left seat and to her right sat a gentleman in a shirt and tie, her instructor, no doubt. Each approach looked better than the last. She's doing a fine job up there. On her next approach, which looked perfect, her instructor told her to go around. The engine roared to full RIM and in an instant, the Tomahawk fell out of the sky, tail first, and shattered itself for several hundred feet along the runway. The student, nor the instructor, survived. What happened? Everything looked perfect. I did not understand. Later it was revealed, she applied full power, and immediately pulled the flaps up before the instructor had a chance to react. Is that what happens if you pull flaps up too soon on a go around, I asked? Yes, replied my instructor, and pointing an accusing finger, he continued, "If you were listening last week when I explained all that, you would have known immediately what happened out there". An hour later we were airborne. My entire outlook on flying had changed. It felt as though I was starting all over again.

A few months later, I passed my private check ride. The FAA examiner complimented me on the safe and sane manner that I displayed in the cockpit. Two days later I began instruction in a Bonanza. It was like starting all over again. I had great difficulty in handling the increased work load. I thought I knew how to fly. That Bonanza taught me my second most important lesson. But, thank God, no one had to die to prove it to me.

In May of 1982, it was my good fortune to receive an invitation to fly with Tom Criss, of Hand Robinson Engineering in the right seat of his KB-II. I assumed the stick and rudders, with his gracious permission. It took much more time than I would have imagined to get that aircraft stabilized. Once I did, I found it an absolute joy to fly. I purchased a kit the next day and I joined the ranks of KR builders, but for a few moments on a Saturday afternoon, it was like starting all over again.

Saturday afternoon, July 22, 1983* A KR-1 crashed off the coast of Southern California, killing the occupant instantly. I knew the airplane well. I had inspected it carefully on several occasions. It was an excellent job of construction, a very fine airplane. What happened? Why did this fine, young, intelligent man die? Is there a lesson here? Dope! Not for me. I learned it long ago. There's a lesson here for every person who is in the process of building a KR* When the facts are known, the HTSB will no doubt discover that this young man had completed countless hours in hanggliders and virtually none in powered aircraft. Actually less than ten and all of it in his KR-I. He didn't have to listen to any sermons on being a safe pilot. He didn't get his hand slapped off of the flap handle, for grabbing it too soon. He didn't know the KR-I could stall at a high rate of speed. He didn't know that his chances of recovery at 100 ft AGL were next to impossible. But he didn't die in vain.

Gentlemen, take heed. If you study the plans, and ask questions when you are in doubt, you're going to construct a magnificent airplane. If you don't have a license to fly it, get one. If you don't have any tail dragger time, get it. If you have never flown a high performance aircraft, go fly one. Do all these things with a competent instructor. When he says you're ready, go fly your KR. I'll bet your first impression is, "It's like starting all over again".

Best wishes for years of SAFE FLYING
Jim Costa Corona, Calif.

MARKETPLACE

FOR SALE...KR-2 Project. All Rand Pre-Fab parts, including windshield. All landing gear professionally drilled, all Miniature Metrics controls, custom professional built control stick and rudder pedals with toe-brakes. Boat completely built. \$1,000.00
Mel White 213-366-0940

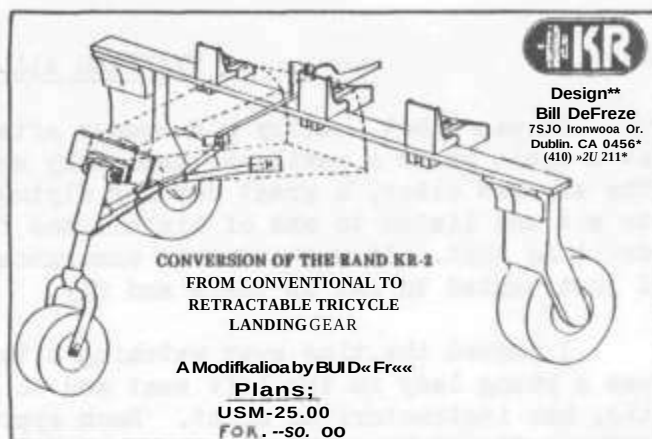
FOR SALE...New, never used Revmaster R2100D Fully opted - New Revmaster exhaust system, Great American prop and spinner. Will sell for \$3,500.00 Mel White
213-366-0940

FOR SALE...KR-2 Project. Woodwork complete, gear in, controls & cables installed, hardware, foam kit, quality work, FAA signed off to complete. \$1,500.00 Invested, will sell for \$750.00 OBO, Garden Grove, Ca. Call Scott 714-893-3688 or 213-594-2747 (work number).

FOR SALE...N2770H "Tony the Tiger" KR-1, Revmaster 2100D, tuned exhaust, Warnke prop, oil cooler, Alternator, radio, wing tanks and 7 gal front tank, electric fuel pump, landing gear faired in, my own design wing tips and hatch. I flew it 20 minutes on test hop. Reason for selling: eyes. \$5,500.00
616-963-6330 Talk terms or trade for boat. Glenn Solomon, 147 So. Woodrow, Battle Creek, Mich. 49015.

FOR SALE...KR-2, 1678 cc VW engine, 125 mph cruise, 120 hrs. TT. Asking \$6,000.00. 608-759-5701
Cuba City, Wis.

The KR NEWSLETTER is published monthly by Forrester Aviation Supply and Technology, Inc., (FAST), PO Box 4113, Englewood, Colorado, 80115. (303) 693-8239. John Forrester, Publisher. Subscription rates: \$12.00 a year, \$30.00 for 3 years. All back issues are available at the following rates: 1-12 issues: \$1.00 each, 13-24 issues: 75¢ each, 25 or more: 50¢ each. COPYRIGHT 1983, KR NEWSLETTER.




!!! NOW AVAILABLE !!!

60 PAGE AIRCRAFT PARTS CATALOG

7 PAGES OF KR PARTS

COMPOSITE SUPPLIES, VW ACCESSORY CASES, AERODUCT HOSE, AN HARDWARE, ANTENNAS, CIRCUIT BREAKERS, CONTROL CABLE AND HARDWARE, ELECTRICAL WIRE AND CABLE, ENGINES, EXHAUST SYSTEMS, FUEL SUPPLIES, HEADSETS, INSTRUMENTS, INSULATION, INTERCOMS, LIGHTS, MICROPHONES, NYLO-SEAL TUBING, PARACHUTES, PLACARDS, PROPS, RADIOS, ROD END BEARINGS, SEALS, SEAT BELTS, SWITCHES, T-SHIRTS, VERNIER CONTROLS AND MUCH MORE!!!!

WE NOW HAVE KR AIRCRAFT AVAILABLE PRE-BUILT IN STAGES OR COMPLETED & FLYING.

FORRESTER AVIATION SUPPLY & TECHNOLOGY, INC.
PO BOX 4113
ENGLEWOOD, COLORADO 80155
303-693-8239

CATALOG \$3.00 REFUNDABLE ON FIRST PURCHASE

KR-2 RETRACTABLE TRI-CYCLE LANDING GEAR

BASIC LANDING GEAR

\$ 1795. °°

OPTIONAL KITS

Complete Door Kit

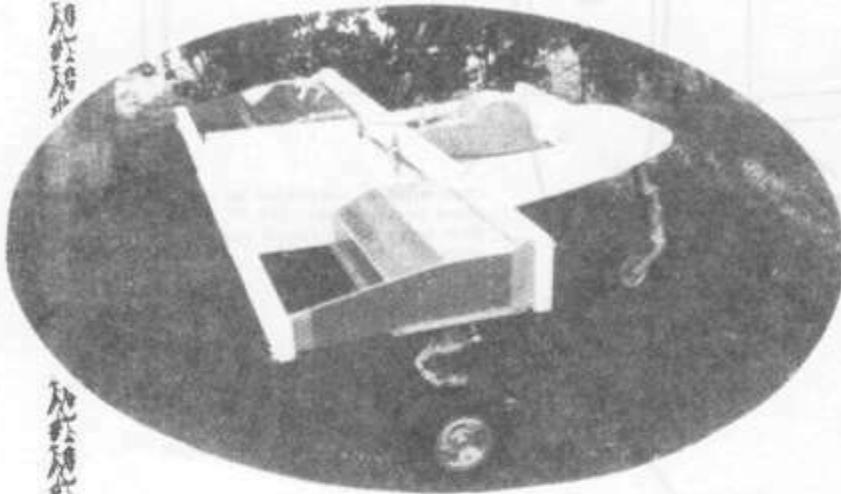
\$ 250. °°

Heel Brake Kit

\$ 25. °°

Electric Drive Kit

\$ 495. °°



- COMPLETELY SELF-CONTAINED
- RETRO-FIT ON KR-2 (AIR FRAME MOD's NOT REQ'D.)
- MANUAL RETRACTION (CRANK, 6 TURNS)
- 75 LBS. TOTAL WEIGHT INCLUDES: WHEELS, TIRES & BRAKES
- USES THE NEW LAMB TIRE
- MECHANICAL BRAKES
- CASTERING NOSE WHEEL
- FOR 1200 LBS. GROSS WEIGHT (ALSO AVAILABLE FOR 1600LBS.GROSS)
- ALSO AVAILABLE FOR THE POLLIWAGEN AIRCRAFT AND SPECIAL ORDERS (CALL FOR PRICE QUOTE) ALL ORDERS REQUIRE A 50% DEPOSIT

"THE LAMB TRI-GEAR SYSTEM"

Finellis Machining & Welding

5327 W. L-10

Quartz Hill, Calif. 93534

805-943-6595

MINIATURE METRICS
LITFUTIHADWAT
7801 14th STREET
WESTMINSTER, CALIF. 92683

Phone (7U)tm-4fl7',
Amos, Anita, und
C.irrv Anilernnn

Mm.Urn-, M.-ii u -, h.,,s -,c(i)-ral
srrvK-i'N .mil pvovhut.s. Send
a S.A.S.F. I.H more into.

VvV also totally machine the
Rand Robinson extrusion kit,
which includes the landing gear.
Machminp only: \$280.°°
Machining + assemblies with added
parts finished: \$320.°°
Contact Rand Robinson & advise
them you want the service. They
will advise us. State shortened
landing gear bar or full length.

QUALITY...All material is aircraft
clummum/steel as specified in your plans.
Milled with precision, then debarred,
bead blasted, final finish reamed
by standard aircraft production
procedures. All in the interest
of safety.

Left and right aileron
pullt-ys, mounted on brackft
\$30.°° pair, postpaid.

Aileron horns and bellcranks
w/support brackets, hinge
bolts and spool spacer pro-
vided (assembled) 24 pieces.
\$87.°° postpaid

Rudder, elevator, tailwheel
horns and hinges...11 pieces
plus 10 back-up plates H. fc H.
pilot drilled for mount bolts.
\$60.°° postpaid...Now clear-
ance milled for full throw.

Propeller hub bolt. 20mm - 4x4
length! \$12.°° Postpaid

Nylon rudder pedal mount
4 pieces...\$22.°° postpaid

Control stick assembled as on
plans or modified...\$62.°° P.P.
With microphone switch and
pigtail...\$75.°° fitted.

No instructions are given
which conflict with plans
or Newsletter. We pretrr
you refer to plans or consult
Rand Robinson.

Make check payable to:

MINIATURE METRICS
7801 14th STREET
WESTMINSTER, CA. 92683

KR NEWSLETTER

PO BOX 4113

ENGLEWOOD, COLO. 80155

ISSUE #98 AUGUST 1983



issue no. 99

Sept. 1983

1980 KR NEWSLETTER



KR NEWSLETTER

RATES
USA \$12.00 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand Robinson Engineering, Inc.



Paul Scovil completed this KR-2 earlier this year. There's a flight report from Paul in this issue.

KR CLUB

It's almost time to begin putting together a new directory of KR CLUB members.

This directory lists all members worldwide along with their projects and stages of completion. We have had a tremendous increase in membership lately so the new directory will be very helpful. Dues are \$5.00 a year. If you are not currently a member, be sure and send in your dues before December 31.

HOPEFULLY WE WILL settle the great firewall controversy this month. We've had a lot of comments and stories from all sides and I hope this clears up everything.

Lance Neibauer has written the following and it has been cleared by Rand Robinson.

"In reference to the editorial of the last newsletter concerning my previous article on firewall reinforcements: I believe another slight mix-up has occurred and perhaps a bit of misunderstanding.

My KR was not dropped off a trailer nor flown with a vibration prior to any firewall damage. The gear did collapse, as do many KR's with standard gear latch systems, (note Brian Heneman with his award-winning KR-2 at Sun & Fun last year and R/R's own Tom Criss with his KR-2 at Eloy, Az. last fall), but the mount should not go beyond ultimate design limit load from that condition. Since it did, R/R suggested the aluminum angle reinforcement to up the safety margins. The point should be made that this reinforcement is highly recommended especially since heavier engines

are now becoming the norm.

Concerning vibrations on my KR; when the firewall damage was found, the Revmaster had been purring like a kitten. About 20 hours later the vibration was noticed and was traced to two faulty harness wires on the left mag. By the nature of this problem, it should be obvious just how minor that vibration actually was.

It is quite possible for a KR to incur such firewall overload and not show any obvious signs on the surface. To not alert our KR drivers of inspecting for this would be a disservice. It would be much easier for R/R to simply disregard this whole issue as it is one isolated case, but that is not Jeanette Rand's policy and I commend her for that.

The point of my article was to encourage inspections and suggest R/R's addition of the aluminum extrusion to all KR's under construction.

The potential problem is serious, it could affect all KR's, but should not be misconstrued as dangerous. The situation addresses proper inspections and increased margins of safety

with minimal weight penalties - so why not do it.

As a final note, "Sweet Mildred" is doing well in her new home of Apple Valley, Ca. A retired Air Force jet pilot now owns her and has promised to take good care - (wipe the bugs off her wings after each flight and the oil off her belly on occasion - never could quite get that Revmaster to be completely dripless). It's only been a month, but I sure miss punchin¹ holes in the sky with her on Saturday mornings.

P.S. Last weekend my wife and I flew up to Fox Field in S. Calif, to visit Mike Lamb and see his new retractable tri-gear. For those who are unaware, it is a fabulous gear! He estimates it to be no more than a weekend retro-fit and I believe that to be quite possible. The gear retracts totally with just six easy turns, weighs only 75 pounds including wheels, tires and brakes and sells for just \$1,795 - a better deal on a good tri-gear will never exist.

The bad news is that if Mike doesn't get enough orders by Sept. 30, he will not be able to put the gear into production since there are eleven cast parts that have to be made in volume to keep the cost down.

So, if you're interested in a KR that lands easier, has excellant over the nose visibility for taxing and sits up on the ground at a respectable height - get your deposits in: it would be a disaster to loose this gear!

Lance Neibauer

CONTACT MIKE LAMB AT LAMB TIRE CO.
5327 West Ave. L-10
Quartz Hill, Ca. 93534
805-943-6595

FLIGHT REPORT

"THE ACCOMPANYING PHOTO, (see page 1), is of KR-2 #N73BP, first flown April 16, 1983 after five years of interrupted labor.

Much of the credit for completing the project must go to my wife Bonde, for her continuous help and support throughout the construction and testing. (a pilot herself, Bonde also makes great gussets and is now well versed in the art of staple removal)

We have accumulated approximately 75 hrs. of flight in 73BP as of this date and I have recorded numerous figures on performance using various power settings, carb. adjustments and propeller combinations.

The following performance figures and operating conditions were take from a

recent time run over a 220 s.m. course: (Round Trip).

Aircraft:	KR-2 N73BP
Empty Wt.:	580 Ibs.
Pilot:	160 Ibs.
Passenger:	None
Fuel:	17.8 gal. (106.8 Ibs.)
Engine:	Revmaster 2100 Turbo
Prop:	53 x 56 Warnke
Field Elevation:	4,500'
Field Temp.:	90° F
Temp @ Altitude:	? - (no O.A.T. gauge)
Takeoff Run:	700' to 800'
Landing Distance:	2,000'
Cruise Altitude:	11,500' out •• 12,500' inbound
Winds Aloft FCST:	10-12 head/tail component at altitude.
Start Up Time:	10:45 A.M.
Take Off Time:	10:55 A.M.
Return Time - Entered pattern:	12:11 P.M.
Landing Time:	12.14 P.M.
Shut-Down Time:	12.17 P.M.

Breakdown

Average Speed Lift-off to touchdown:	167.09 MPH
Average Speed Lift-off to approach:	173.68
Average Speed Start-up to shut-down:	143.50
I.A.S. @ 12,500':	160 M.P.H.
Manifold Pressure:	28"
R.P.M.	3400
Cruise Climb @ 30" M.P. at 130 - 140 m.p.h.	
I.A.S. to 11,500" averaged 600+ f.p.m.	
Fuel Consumed:	*7.9 Gal.

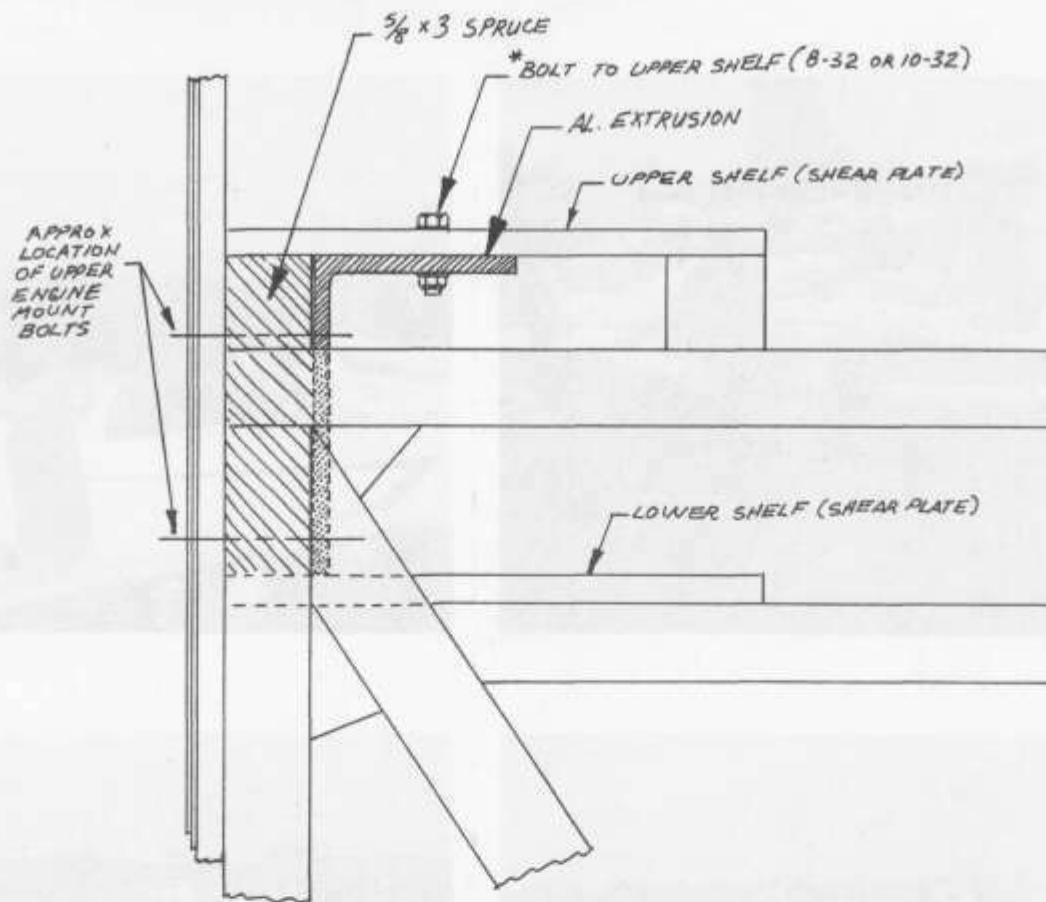
*Due to high temps, mixture was kept on the rich side to enhance cooling.

C.H.T.:	400° F
E.G.T.:	1300° F
Oil Pressure:	40 Ibs. at cruise
Oil Temp:	205° - 210° F

I might add that as a C.F.I. I have had the opportunity to fly a variety of aircraft, but nothing can compare to the thrill this responsive little aircraft gives. I know it has been said before, but there can be few things to compage with the exhilaration and joy of glying an aircraft you have created from a pile of lumber, foam and fiberglass."

Paul Scovil, P.O. Box 1487, Battle Mtn., Nevada, 89820.

!! MORE KRS AT OSHKOSH PHOTOS NEXT MONTH !!



Note: AL. extrusion should be epoxied to both 5/8 x 3 Spruce SHOULD BE EPOXIED 5/8 x 3 SPRUCE
AND BOTTOM -3/16 OF 7-0" OF SHELF IN ADDITION TO BOLTS.

Here is the firewall reinforcement drawing for increasing the strength of the firewall. Thanks to Lance Neibauer for this drawing.

QUICK BITS

The Reno Air Races this year will be held Sept. 15 thru the 18th. The Air Fair will feature General Aviation and Ultralite vendor displays at the MGM Grand Hotel in Reno, Nevada. Contact Peter Krueger, Box 2687, Reno, NV. 89505 for more information.

The 12th Annual Copperstate Fly-In will be held October 14-16 at Eloy, Arizona. This Fly-In always brings out a lot of So. Calif. KRers. Contact Ray Backstrom, 7721 N. Soledad, Tucson, AZ. 85704.

Forrester Aviation Supply & Technology, Inc. is now carrying "THE LAMB TIRE" in stock. They are also a authorized dealer for "REVMaster ENGINES" and their related parts. The recent introduction of pre-built parts and stage-built KRers has been well received. "FAST" can also now make vacuum-formed parts for any aircraft.

OSHKOSH this year saw over 400 new subscribers to the KR NEWSLETTER. Welcome to the KR Family!

Those of you who recently ordered sets of back issues to the KR NEWSLETTER - Please be patient. We were swamped after Oshkosh, and are having to have several issues reprinted. We should have all back issues sent out by the end of this month.

When using glass bubbles or Q-Cell it seems that more gets distributed into the atmosphere than gets into the mixing cup. To overcome this, obtain a large medical syringe, (about 50 or 60cc) and drill out the needle adaptor to about 1/4". Keep the bubble material in a large "Tupperware" container. The graduations on the syringe should enable you to mix fairly consistent batches. 1 ounce equals about 30cc. (a cubic centimeter and a millilitre are the same).

I have found a company in Germany that is interested in producing a cockpit adjustable, full-feathering propeller for VW engines as used on a KR. If enough builders are interested, I'll order some built. Cost will probably be about \$1,500 to \$1,800.

The KR NEWSLETTER is published monthly by Forrester Aviation Supply and Technology, Inc., (FAST), PO Box 4113, Englewood, Colorado, 80115. (303) 693-8239. John Forrester, Publisher. Subscription rates: \$12.00 a year, \$30.00 for 3 years. All back issues are available at the following rates: 1-12 issues: \$1.00 each, 13-24 issues: 75¢ each, 25 or more: 50¢ each. COPYRIGHT 1983, KR NEWSLETTER.



MARKETPLACE

FOR SALE...KR-2, Complete and ready for flight. 1834 engine. Contact Pete Peter, 2102 Berkshire Drive, Dothan, AL. 36303 205-793-0076. See Issue No. 94 for pictures and details.

FOR SALE...R/R Engine mount, new - still in box from R/R. Will ship prepaid anywhere in U.S. for \$95.00 Tom Jones, 4531 Larado PI., Orlando, FL. 32806.

FOR SALE...KR-2, Cont. A75, 110 Hrs.TT, Escort 110 Radio, Nice flying airplane, \$6,000. 919-436-5081 Thomas Zuber.

FOR SALE...Have new Slick 4016 Mag. Also a Bendix SF6LN-8 Mag. for 6 cyl. Lye. Need mags for 6 cyl. Franklin. Either Bendix S6RN-21 or Eisemann LA-6. The Prop Shop, Box 237, St. Ansgar, Ia. 50472.

FOR SALE...KR-2 Project with Revmaster 1834 Engine. About 85% completed. Most materials to complete included. Donald Fleming, 15751 Primrose Lane, Westminster, Ca. 92683 714-897-2238

FOR SALE...KR-2 Project on wheels. Inspected by FAA up to covering. Material to complete & Newsletters. \$1,200 815-434-0301 Delmar Henneke RFD #3, Ottawa, Illinois, 61350.

FOR SALE...KR-2 Canopy, still in protective film with 1/2" bonding surface sanded around perimeter. Excellent condition: no damage, no goofs, decided to adapt different canopy. Shipped F.O.B. No charge for crating. \$50.00 Tom O'Donovan, 538 Old Elm Rd., Highland Park, IL. 60035. 312-433-3497

FOR SALE...KR-2 retractable gear with wheels, tires and brakes, (new) and newsletters. Best offer F.O.B. Corvallis, Or. Key Sys. Inc., 4705 SW Dresden, Corvallis, Or. 97333.

FOR SALE...KR-2 Project. Center section complete including rudder, elevator, electric trim, firewall and engine mount, instrument panel - (7075 AL), all control systems. Not completed: Turtle deck, canopy, engine or cowling. Wings glasses including R/R wing tips and fuel tanks, (with electric gauges). Ailerons not cut out. Gear complete and faired. Toe brakes, wing root venturi, strobe lights and more. Some instruments, NASA/EAA lightweight autopilot. Must sell Raising 2 yr. old doesn't leave time to finish project. Make offer. Ron Schendel. 213-376-0963.

FOR SALE...2180 VW w/dual mags, starter, alternator, complete with swing away mount, carb heat & cabin heat boxes, fuel pump, regulator U exhaust system. \$3,000 7.5 Hrs. TT. Wayne Ristine, 312-428-4564 after 7:00 PM Central Time.

General Aviation
Parts & Supplies

Experimental
Aircraft Kits



- Composite Supplies
- AN Hardware
- Instruments and Radios
- Propellers
- DIEHL "SUPERCASE"
- "THE STING" Tuned Exhaust Systems
- FASTS™ AIRCRAFT ENGINES

AUTHORIZED DISTRIBUTOR FOR

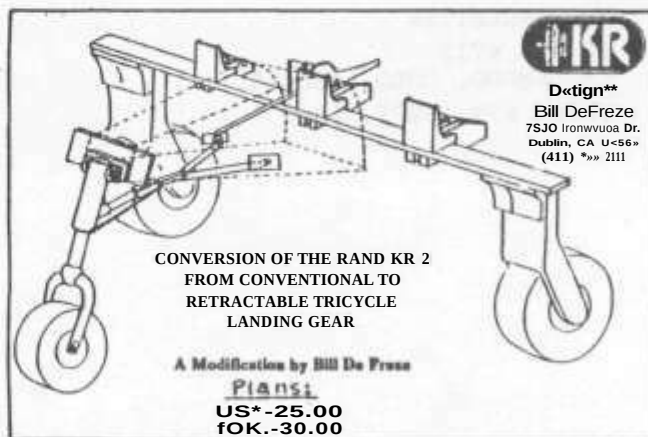


CATALOG \$3.00

P.O. BOX 4113
ENGLEWOOD, CO 80155



(303) 693-8239



NEW! 11 400x5 6 PLY. RATED
TIRE SPECIFICATIONS INFLATED:
 HEIGHT 11.5 INCH WIDTH 4.0 INCH
 TIRE WT. 3 LBS. TUBE WT. 1/2 LB
 LOAD RANGE C-70 P.S.I. MAX

This tire fills the size gap between the 500x5 aircraft tire and the 3.40-3.00x5 flo-kart tire. Looks like a scaled-down 500x5. Fits KR 1 & 2s and is recommended by Burt Rutan for the VanEze and Long-EZ. Also fits most other experimentals using 5 inch rims.

TIRE 6 PLY RAT. 25.00 TUBE 6.50+ SHIP & HAND
MIKE LAMB, P.O. BOX 3324, QUARTZ HILL, CA 93534

MINIATURE METRICS
LIGHTNING HARDWARE
7801 14th STREET
WESTMINSTER, CALIF. 92613

Phone (714) 844-4871,
Anns, AniUi, und
C.ri-y Andwrsn

Miniature Metrics has several
service* .III products. Send
A S.A.S.K. for more info.

We also totally machine the
Rand Robinson extrusion kit,
which includes the landing gear.
Machining only: \$280.00
Machining + assemblies with added
parts finished: \$320.00
Contact Rand Robinson & advise
them you want the service. They
will advise us. State shortened
landing gear bar or full length.

QUALITY .. All material is air-
craft aluminum/steel as speci-
fied in your plans. Milled
with precision, then deburred.
bead blasted, final finish reamed
by standard aircraft production
procedures. All in the interest
of safety.

Left and right aileron
pulley, mounted on horizontal
\$30.00 pair, postpaid.

Aileron horns and bellcranks
w/support brackets, hinge
bolts and spool spacer pro-
vided (assembled) 24 pieces.
\$87.00 postpaid

Rudder, elevator, tailwheel
horns and hinges...11 pieces
plus 10 back-up plates H. I H.
pilot drilled for mount bolts.
\$60.00 postpaid...Now clear-
ance milled for full throw.

Propeller hub bolt .20mm
length \$12.00 Postpaid

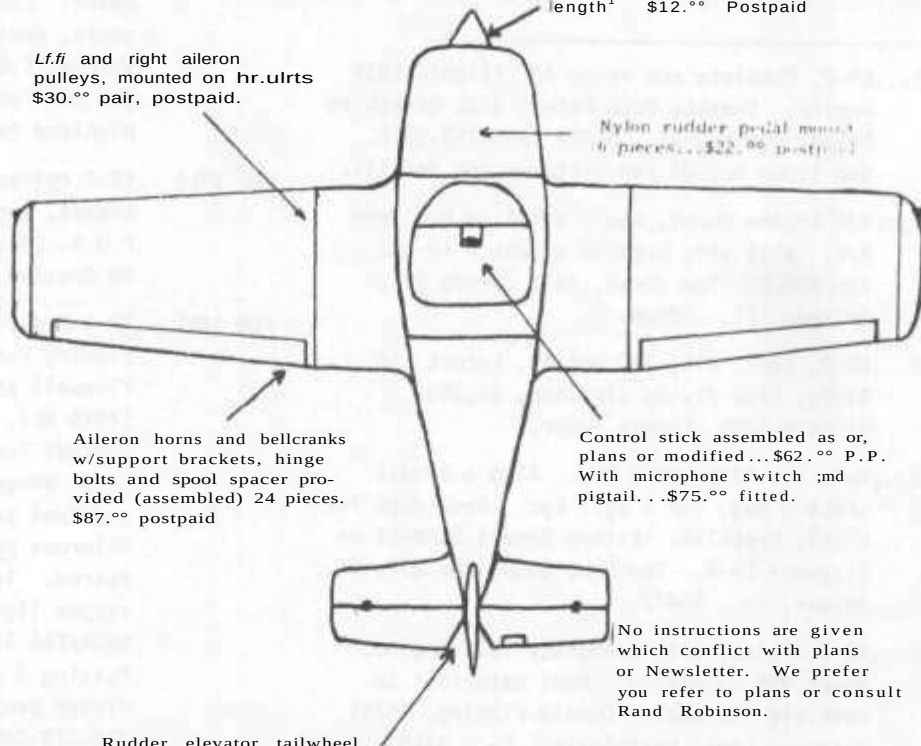
Nylon rudder pedal mount
6 pieces...\$22.00 postpaid

Control stick assembled as or,
plans or modified...\$62.00 P.P.
With microphone switch and
pigtail...\$75.00 fitted.

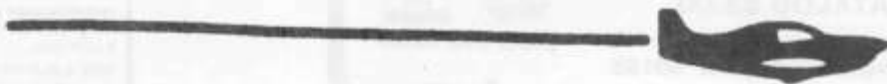
No instructions are given
which conflict with plans
or Newsletter. We prefer
you refer to plans or consult
Rand Robinson.

Make check payable to:

MINIATURE METRICS
7801 14th STREET
WESTMINSTER, CA. 92683



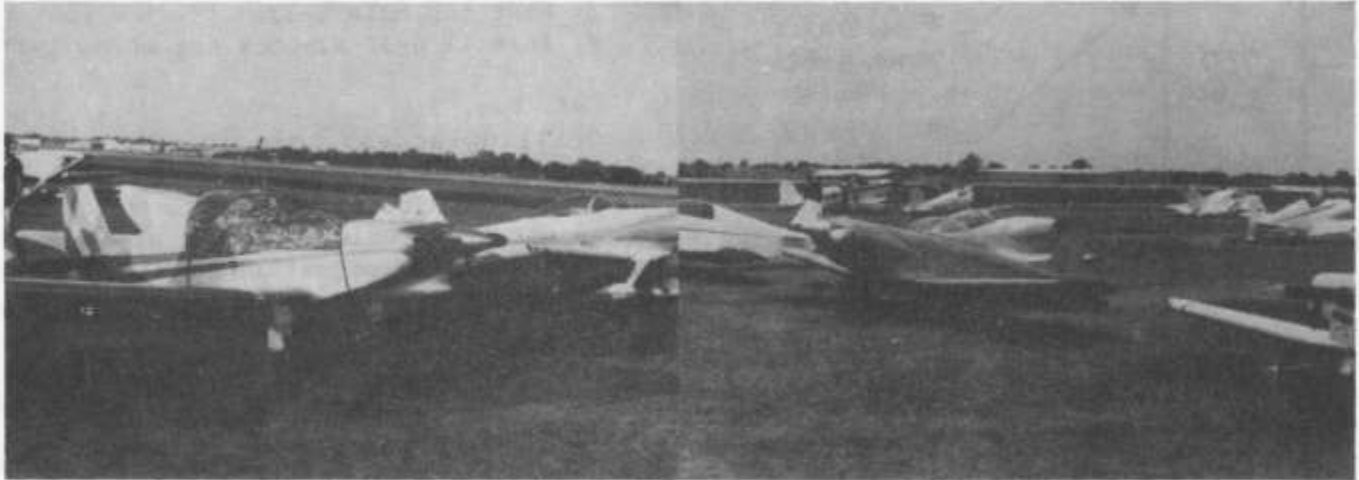
KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLO. 80155
ISSUE #99, SEPT. 1983



Issue no. 100**October
1983****KR NEWSLETTER**

RATES		
USA	\$12.00	Yr
CANADA	\$15.00	Yr
OVERSEAS	\$20.00	Yr
		U.S. Funds

A basis for ideas and food for thought only. Use of any of the idea material is at _____ the user's discretion. Not affiliated with Rand Robinson Engineering, Inc. _____

**KRs AT OSHKOSH 1983**

DO YOU HAVE 100 hours or more on your KR? If so, Rand Robinson would like to hear from you. Our fellow builders in some foreign countries are required to prove that an aircraft has flown for a substantial number of hours in another country before they are allowed to get their own aircraft licensed to fly.

Please contact Rand Robinson if you are able to help supply this information.

I'M SORRY TO report that it looks like the Lamb Tri-Gear System will not be produced. A minimum of thirty firm orders with deposits were needed to justify the expense of the tooling and jigs to produce the gear. As of the 26th of September, Mike informed me that he had only received 8 deposits on the gear. It is really a shame to lose this fine gear system. Hopefully someone will be able to get it into production at a later date.

AT THE POSA carb forum at Oshkosh this year, the question was raised concerning the needle coming loose in POSA carbs.

HAPI has provided a cure for this problem. A set screw must be added to the carb body to prevent the needle from coming loose.

HAPI will perform this modification or if you wish, you can do it yourself. Page 2 of this month's Newsletter contains the drawings for this modification for those who wish to modify their carb themselves.

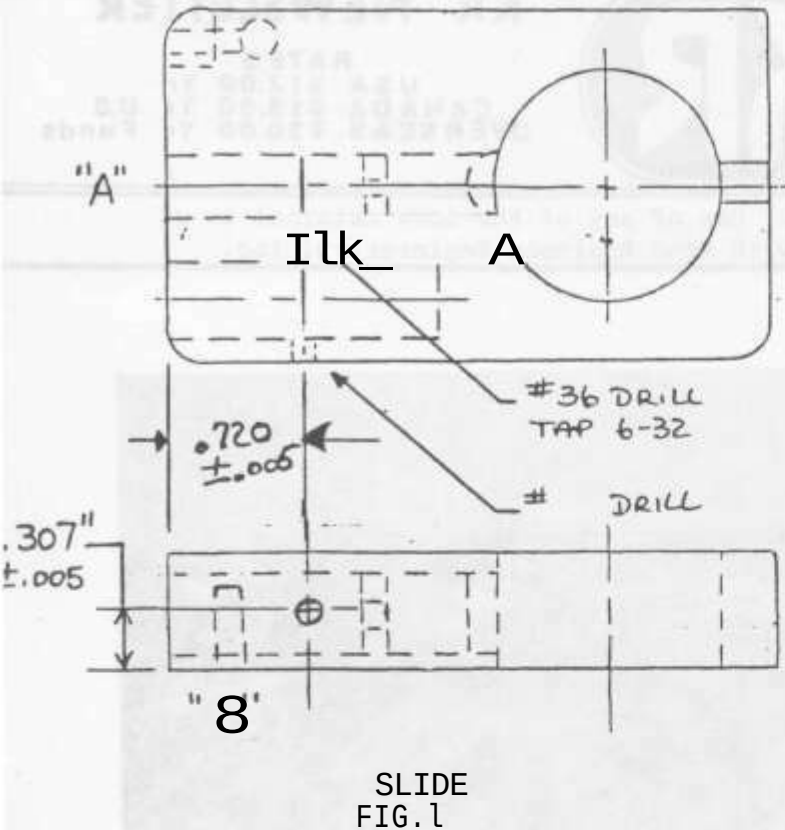
ONCE AGAIN MY KR-2 is nearing flight readiness. I promised a flight report would be coming soon back in July. Unfortunately, my KR-2 was damaged both at Oshkosh and again on the trip back home.

The canopy was caught by the wind while on display at the fly-in and then managed to get loose in the trailer on the way back home.

The aircraft sustained damage to the prop hub, engine cowling, pitot tube, gear fairings and lower wing panels along with some small damage to the elevator and rudder.

It is now back in the hanger and taxi testing will be done again to insure all is well before flight.

INSTALLATION INSTRUCTIONS



Needle Lock Set Screw

Ref. Fig. 1

Installing set screw in slide. It is important that the set screw be installed correctly. You have a + or - .005" tolerance in locating that hole! Measurements are taken from the end of the slide that has the cast hole for the throttle linkage "B".

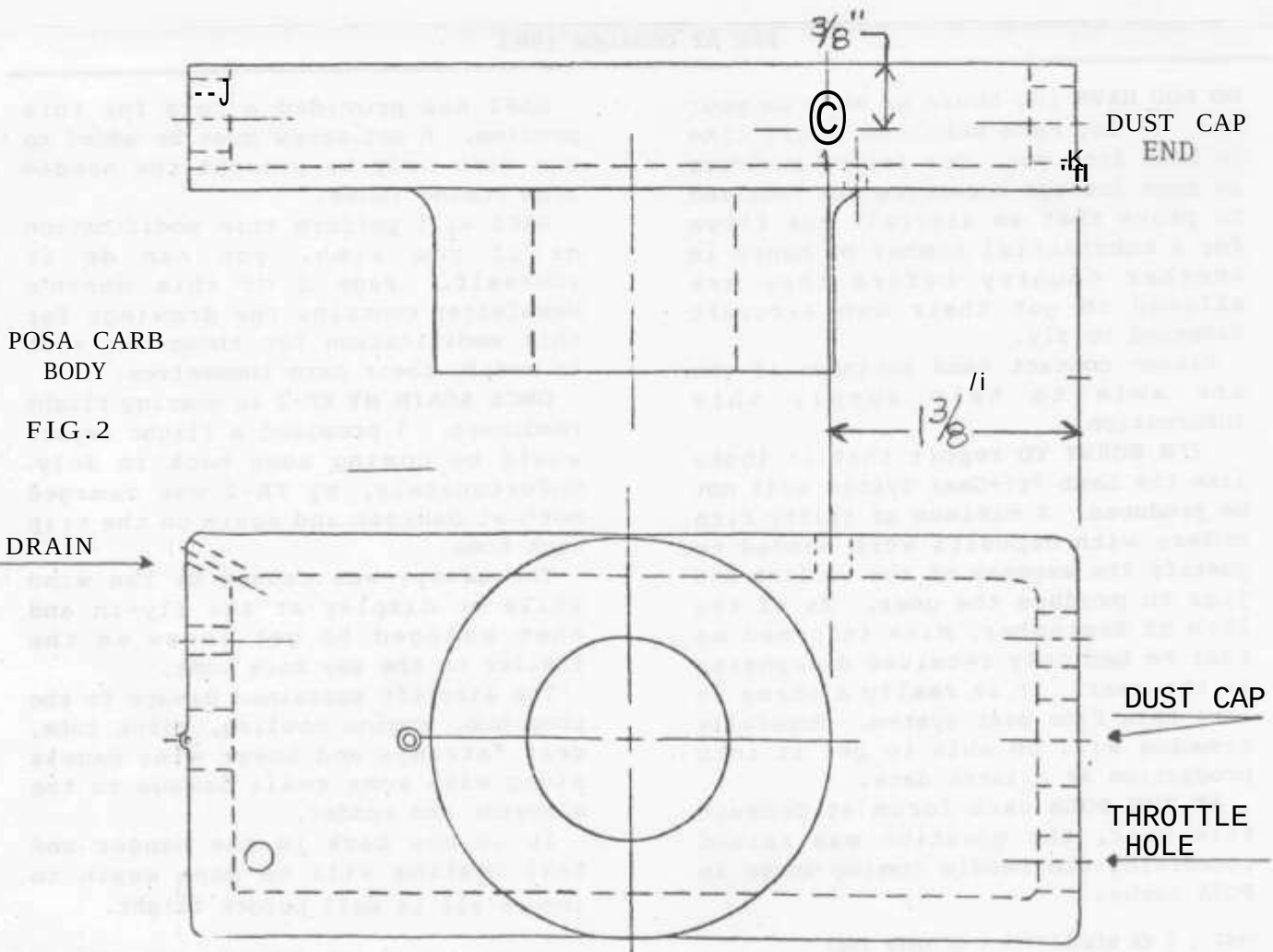
1. First drill #36 hole in slide 7/8" deep.
2. Next drill #27 hole in slide 1/4" deep.
3. Next tap hole 6-32.
4. Install 6-32 NY-Lock set screw 1/4" long.

Ref. Fig. 2

Drilling access hole in carb body use #5 drill.

IMPORTANT The set screw must be loosened to adjust the needle. You are allowed 12 turns of the needle adjustment. If you need more remove needle from carb and move needle into the needle adjuster an *extra* 1/4" and readjust carb. Do not attempt to lock needle that has been backed out more than 12 turns.

After the carb is adjusted, lock the needle in place with set screw.



KR NEWSLETTER



INDEX FOR ISSUES 58 THRU 99

Accident Reports.....	59, 61, 69, 71, 75, 78, 86, 91, 98.
Aerobatics.....	85
Aileron Balance Weights....	86
Ailerons.....	61, 69.
Air-Oil Serpeator.....	72
Airfoils.....	60, 71
Bellcranks.....	66, 93
Bolts.....	60, 67, 69, 77, 84
Borescope.....	82
Brakes.....	75, 82, 97, 98
Bulkhead Fittings.....	74
CAFE 250.....	72
Garb Ice.....	61, 82
Construction Checklist....	82
Controls.....	78, 81, 92, 93, 94, 98
Designees.....	67, 71, 75
Dyne1.....	88
Engine Cooling.....	92, 96
Engine Mounts.....	66
Engines.....	60, 64, 67, 68, 69, 70, 71, 72, 77, 91, 94, 96, 99.
Epoxy Balance Beam.....	89
Epoxy Allergies.....	66, 73, 81
Exhaust.....	69
Fiberglassing.....	93, 94
Finishing.....	68, 71, 90
Firewall.....	62, 71, 77, 1 97, 98, 99
Flaperons.....	97
Flight Reports.....	59, 61, 62, 65, 67, 69, 74, 76, 78, 80, 81, 83, 84, 86, 89, 90, 91, 92, 93, 96, 99.
Flight Test Guide.....	79, 80, 81
Flutter.....	61
Foam.....	64, 77, 85, 90
Folding Wings.....	74
Fuel Systems.....	60, 61, 62, 64, 93, 98
Fuselage Construction....	74, 86, 87, 88, 98
Gasahol.....	62
Gauges.....	91
Gear Latch Systems.....	62, 86, 88
Glue.....	77, 86
Gull-Wing Canopies.....	68, 69, 83
Gussetts.....	77, 96
Heat Muffs.....	60
Hinges.....	67, 71, 85, 90, 96, 98
Inspection Plates.....	91
Insurance.....	67, 69, 91
Kerrville.....	64
Kevlar.....	67
KR Club.....	60, 61, 62, 64, 93, 98
KR Fly-In.....	64, 67, 68, 69, 70, 71, 72, 73
KR-3.....	59, 77, 88, 93, 94

Landing Gear.....	67,	82,	86,	90,	96,	97
Landing Gear, Fixed.....	60,	67,	76,	91		
Landing Gear, Tricycle....	67,	74,	78,1	90,	91,	92, 98, 99
Liquid Foam.....	84					
Log Books.....	89,	93				
Moldmaking.....	97					
Oshkosh.....	63,	75,	85,	87,	98	
Oshkosh 500.....	65					
Painting.....	90					
Plans Revisions.....	68,	77,	91,	94		
Poor Construction.....	72					
POSA.....	70,	78,	90			
Pre-Molded Parts.....	86,	88,	91,	92,	93,	97
Props.....	60,	62,	64,	68,	74,	77, 88, 93, 97, 99
Radios.....	81					
Roll-Over Structure.....	93					
Rudder.....	60,	64				
Rudder Pedals.....	66					
Sanding Techniques.....	64,	84				
Scarf Joints.....	66,	76				
Shoulder Harness.....	71,	85				
Spars and Fittings.....	70,	74,	79,	86,	89,	93, 94
Starters.....	60					
Sun-n-Fun.....	70,	94				
Supertin.....	60					
Surface Cracking.....	69					
Tailwheel.....	71,	87,	89,	90,	94	
Trailing Edges.....	72,	90				
Trim Tabs.....	67					
Turbo-Charging.....	59,	60,	61			
Twenty Day KR-2.....	71					
Washout.....	60					
Weights for Parts.....	71,	87,	98			
Wing Tips.....	82,	85				
Wing Walk Area.....	74,	77				
Wings.....	68,	75,	88,	92,	96,	98
Wood.....	79,	82				
XTC.....	87					

Note: Index for issues 1 thur 57 is printed in issue no. 60.
Also available seperately. Send S.A.S.E. for free copy.

QUESTIONS & ANSWERS

Q. I've heard that someone is making a larger canopy that will fit the stock KR-2 canopy frame. Do you know who?

A. The Airplane Factory will make you a larger canopy for the KR-2 on a "custom-order" basis. Their address is 7111 Brandtvista Ave., Dayton, Ohio 45424.

Q. Why can't I "hot-wire" the foam for my KR? This would seem a lot easier.

A. Poly-urethane foam gives off a posionous gas when it is burned. While it is done in some commercial applications, it requires special equipment and **very** good ventilation and should not be attempted by homebuilders.

IF YOU'RE PLANNING TO STAY AT THE DORMS WITH THE KR GROUP AT OSHKOSH '84, THE DEADLINE FOR DEPOSITS IS OCTOBER 15. COST IS \$15.50 A NIGHT AND BUSES RUN TO THE FLY-IN EVERY 1/2 HOUR. SEND YOUR DEPOSIT TO LINDA BENNETT, 2606 NO. 125TH CIRCLE, OMAHA, NE. 68164. PHONE: 402-496-1507.

MARKETPLACE

FOR SALE—Carved your own propeller. Don't risk expensive prop during early tests. Flight tested, new method, ridiculously easy. \$6.95 USA, \$8.95 Overseas. G. Hess, 881 Emory Ct., Upland, CA. 91786.

FOR SALE OR TRADE...Have new Slick 4016 Mag. Also a Bendix SF6LN-8 Mag. for 6 cyl. Lye. Need mags for 6 cyl. Franklin. Either Bendix S6RN-21 or Eisemann LA-6. The Prop Shop, Box 237, St. Ansgar, IA. 50472.

FOR SALE—Complete KR-2 fuselage & wings - tailwheel assembly damaged & left wing root damaged. W/hydr. disc toe brakes, no instruments: \$500.00, with instruments: \$1,000.00. Wayne Ristine, 312-428-4564 after 7 pm Central Time,

FOR SALE—Radios - New Appollo Loran C \$1,900.00, Com 120 \$750.00, AT150 Transponder \$400.00, Genave GA1000 \$500.00 Wayne Ristine, 312-428-4564 after 7pm Central Time.

WANTED...New owner for KR-1 project. All woodwork completed. Numerous cables, bellcranks and hardware. Also foam kit and updated plans. \$850.00 or best offer. Todd Evans, 3112 Albert St., Omaha, NE. 68147. 402-731-2467.

FOR SALE....KR-2 project on gear, wing stubs, boat and tail feathers complete, controls installed. All Rand fiberglass parts. Exceptional workmanship. Includes Revmaster 2100 with electrics, engine mount, firewall materials, fuel system components, prop, instruments. 713-334-6006. John.

FOR SALE....N10KR KR-2, Revmaster 2100D, augmentor exhaust, Maloof prop, oil cooler, alternator, geared starter, gel cell battery, 360 channel comm, separate VOR nav, aux fuel tank and transfer system, 24 gallon total, deluxe instrument panel with many gauges, split flaps, HAPI gear latch system, 1" spring bar on gear for 1000 lb. gross, 575 empty, honest 170 mph cruise, 75 hours TT, was at Oshkosh this year. Bought a bigger plane. \$9,000.00. 703-250-3416, Richard Koehler, 5708 Wood Duck Ct., Burke, VA. 22015.

General Aviation
Parts & Supplies

Experimental
Aircraft Kits



- Composite Supplies
- AN Hardware
- Instruments and Radios
- Propellers
- DIEHL "SUPERCASE"
- "THE STING" Tuned Exhaust Systems
- **FAST** ¹ **AIRCRAFT ENGINES**

AUTHORIZED DISTRIBUTOR FOR



CATALOG \$3.00

P.O. BOX 4113
ENGLEWOOD, CO 80155

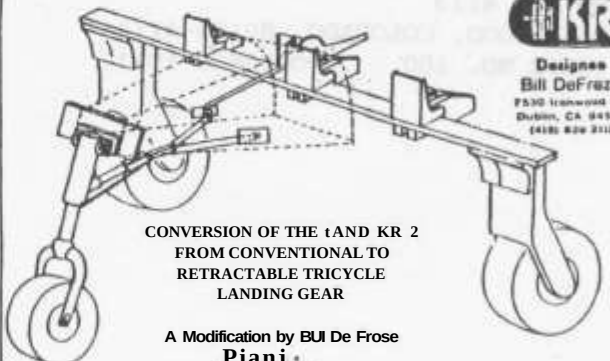


(303) 693-8239





Designer
Bill DeFrose
P530 Ironwood Dr.
Dublin, CA 94568
(415) 826 2112



CONVERSION OF THE 1 AND KR 2
FROM CONVENTIONAL TO
RETRACTABLE TRICYCLE
LANDING GEAR

A Modification by **BUI De Frose**
Pianj
USA -25 00
FOR.-30. CO




NEW! 11 400x5 6 PLY. RATED
TIRE SPECIFICATIONS INFLATED
HEIGHT 11.5 INCH WIDTH 4.0 INCH
TIRE WT. 3 LBS. TUBE WT 1/2 LB
LOAD RANGE C -70 P.S.I. MAX.

This tire fills the size gap between the 500x5 aircraft tire and the 3.40-3.00x5 go-kart tire. Looks like a scaled-down 500x5. Fits KR-1 & 2's and is recommended by Burt Rutan for the VanEze and Long-EZ. Also fits most other experimental* using 5 inch rims.

TIRE 6 PLY RAT. 25.00 TUBE 6.50+ SHIP & HAND.
MIKE LAMB, P.O. BOX 3324, OUARTZHILL, CA 93534

MINIATURE METRICS

Liteflite Hardware
7801 14th Street
Westminster, Calif. 92683
Phone (714)894-4875
Carey H. Anderson

Complete machining of Rand-Robinson extrusion kit #4
including landing gear. \$319. Shipping not included
Above machining, plus controls assembled \$420. Write
for detailed list.
Above work/shipping arranged through Rand-
Robinson

Aileron counter-balances
\$65. pair postpaid

Aileron pulley brackets assys.
\$30. pair postpaid

Lower elevator pulley brackets
\$28, assembled postpaid

Upper elevator pulley brackets
\$15. assembled postpaid

Rudder pedal
Mount Blocks
\$30. set postpr

Control stick assembly
per plans w/mike switch
\$75. postpaid

Rudder, elevator, tailwheel
Horns & Hinges, backup plate
\$60. postpaid

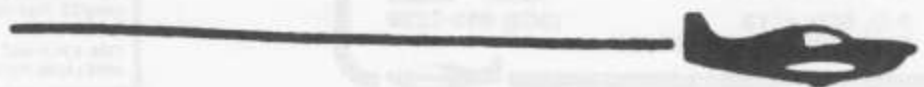
Aileron bellcra/ucs
& horns complete
Assemblies (24 pieces)
\$87. postpaid

KR NEWSLETTER

PO BOX 4113

ENGLEWOOD, COLORADO 80155-4113

ISSUE NO. 100 OCTOBER 1983



Issue no. 101



KR NEWSLETTER

November 1983

RATES
 USA \$1200 Yr
 CANADA \$15.00 Yr U.S.
 OVERSEAS \$2000 Yr Fund!

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand Robinson Engineering, Inc.



This picture is of my own KR-2, taken at Oshkosh this year. It is powered by a "FAST-1835" engine and has the "STING" tuned exhaust system, full electrical system and lights. She is equipped with dual nam-coms and transponder. The canopy is made of flat-wrapped Lexan. Empty weight is 520 lbs. Taxi tests are going well with the only problem having been brake chatter which was cured by new pads. New style tailwheel and fork make a big difference in handling and visibility.

Ray Ellis has informed me that he will no longer be able to serve as a KR Designee. Ray has been ill for some time now, which has resulted in some memory loss and doesn't want to give anyone incomplete or incorrect advice.

Ray has helped a great number of KR builders over the years and I'm sure that we all would like to thank him for his assistance and wish him a speedy recovery.

When using Glass Bubbles or Q-Cell it seems that more gets distributed into the atmosphere than gets into the mixing cup. To overcome this, obtain a large medical syringe, (about 50 or 60cc), and drill out the needle adaptor to about 1/4". Keep the bubble material in a large "Tupperware" container. The graduations on the syringe should enable you to mix fairly consistent batches. 1 ounce equals about 30cc. (A cubic centimeter and a millilitre are the same). When mixing small batches of Featherfill, take a" mixing cup and measure 4 oz. of water into it and measure the distance from the bottom of the cup to the waterline. Record this figure and

mark the cup you are using to mix the Featherfill to correspond with the measurement. A small syringe and an 18 gauge needle can be used to pierce the tube of hardener and measure out about 2.8 or 3 cc, which should be about right of a 4 oz. batch. This is just about right for one rudder or elevator surface.

Be aware that you may have to do a little explaining in order to obtain syringes and needles, as their distribution is usually limited to prescription users. The "Poor Man's Epoxy Pump", available from Scientec Services in Canada was the basis for these ideas and they may be able to help in obtaining these materials. Their epoxy pump, by the way, has held up well in almost a year of service and doubtless is responsible for the absence of more than one headache.

Finally, one of the lads at the Composite Workshop at Oshkosh this year showed me a nifty stunt for laminating trailing edges. Cut a 2" strip of glass cloth and secure it tightly to both the upper and lower surfaces with duct tape prior to applying the resin. When cured

the tape is removed and the unwetted cloth can be cut off with a razor and the remaining edge struck off with a sanding block. Neat! Thanks to Tom O'Donovan, 538 Old Elm Rd., Highland Park, II. 60035 for this tips.

Carey Anderson at Miniture Metrics has discovered an error in the new KR-2 plans. Page 88 shows an incorrect hinge and spar location for the ailerons. The text tells the correct sizes but if the drawing is followed, you will end up with an aileron that won't go down very much at all. The drawing on page 3 shows the correct locations. The incorrect drawing also appears in the old KR-2 plans on page 48.

Another error in the new KR-2 plans is on page 61. In the lower drawing for the control stick, the drawing shows hardware screw eyes in the control stick. These should be AN42 Eye Bolts. They should also have castellated nuts installed.

While we're on the subject, **ALL** bolts installed in control systems or in locations that are not easily accessible must have castellated nuts installed. Even "self-locking" nuts can come loose sometimes.

Most KR builders have found that 2-part liquid foam is about the easiest way to install foam panels, and fill gouges in foam but have a hard time finding it with the proper working qualities.

I have now had a chemical company manufacture a 2-part, 2 lb. density, liquid polyurethane foam specifically for our needs in aircraft. It is being marketed under the name "FAST-FOAM". It's working qualities are far superior to the common "insulation" or "model railroad" types of liquid foam. Cost is \$25.00 for a 2 qt. kit. (1 qt. part A, 1 qt. part B).

NATIONAL KR FLY-IN Although many of the regional fly-ins in California bring in many KR's, several people have expressed a desire to have a National KR Fly-in located in the midwest so that it would be centrally located and easier to attend. If you have any suggestions as to a place and time for a fly-in such as this, please write and let me know. It would be nice to be able to plan it for sometime next spring and get everyone fired up for the summer season and Oshkosh.

If your KR is using a Posa carb and you want to pick up some rpm try installing a tube over the intake throat of the carb and run up to an intake inlet located in the engine baffling. The Posa produces a small gas vapor cloud in front of the throat which is then blown away by passing air. By trapping this gas in the tube it is then sucked into the carb with the result being about 100 to 200 more rpm. I tried it on my KR-2 and instantly picked up 150 rpm.

With winter fast approaching and colder temperatures remember to keep your shop at least 70°. Although the R/R epoxy will cure at lower temperatures, it will be thicker which results in heavier lay-ups and poor wet-out of the cloth. Also make sure that all parts to be epoxied are at the same temperature. Don't bring your spars in from a unheated area and try to epoxy something to them. The pieces will try to cure at different rates.

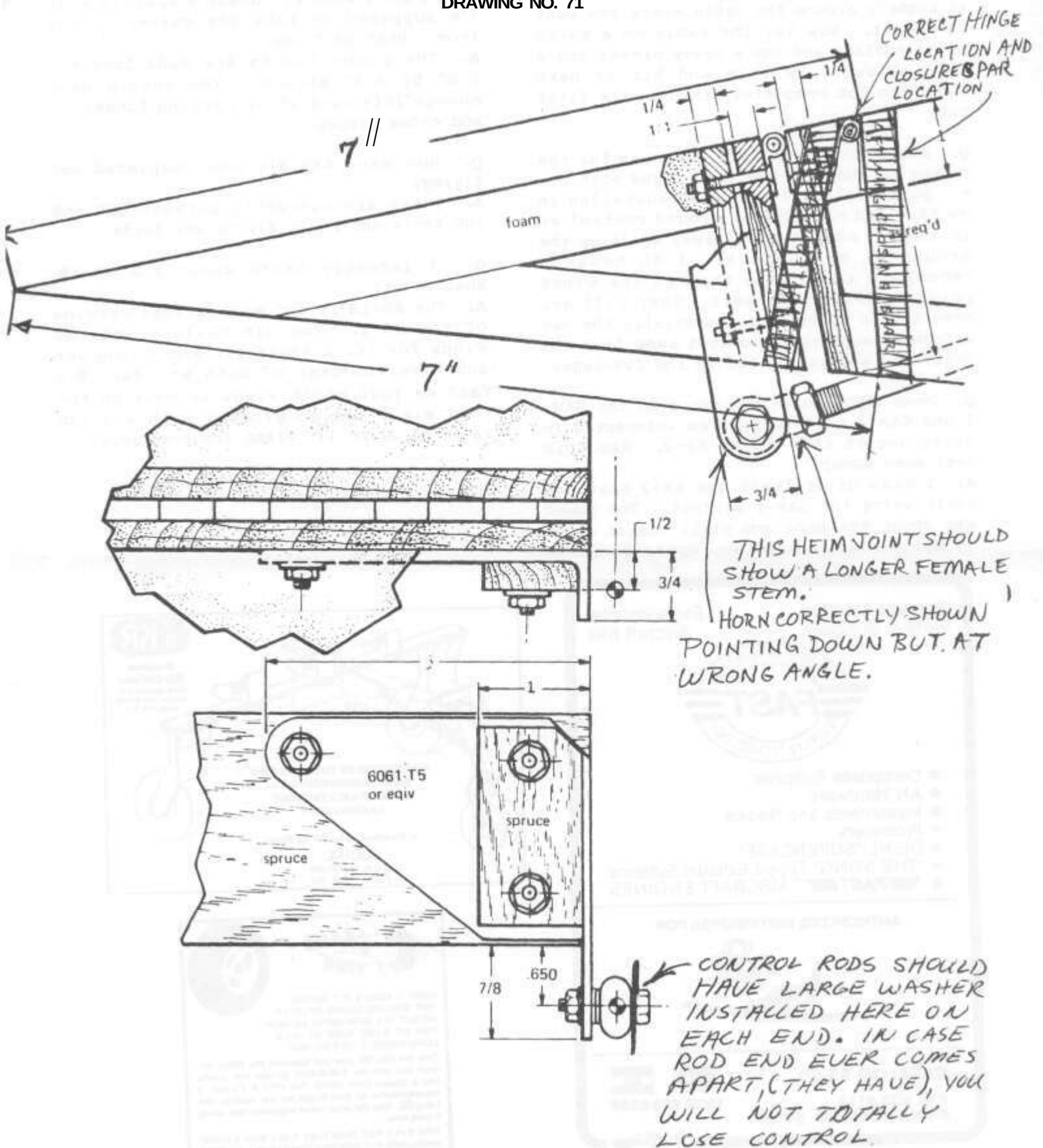
Many accidents in homebuilt aircraft are caused by fuel flow problems. The most critical time of course is during climb out just after take-off, with the aircraft in a nose-high attitude. Some systems will not deliver fuel correctly in this attitude.

To check yours, elevate the nose of the aircraft to simulate climb position. Remove the fuel line from the carb and get a 5 gallon pail and a stopwatch. Add fuel to the fuel tank in 1 gallon increments. Time how long it takes to run out of the fuel line at the carb fitting. Always start with an empty tank and work up from there. This will let you know how much fuel is required in the tank for take-off.

Your fuel system **must** be capable of delivering 1.50 times the fuel flow required at maximum power. For a KR, your fuel system should deliver at least 6 gallons an hour.

I also recently saw 2 KR's that had their gascolator mounted so that about 1" hung below the engine cowl. When questioned the owners explained that it was done so that it would be easy to drain fuel. Stop and think however what will happen if you accidentally land with the gear up or if it retracts on you someday. That gascolator will be ripped off and fuel will be sent flying all over your hot engine. Mount it totally inside the cowl.

AILERON & CONTROL HORN ASSEMBLY **DRAWING NO. 71**



QUESTIONS AND ANSWERS

Q. How can I cut aircraft control cable without cable cutters and still not fray the end?

A. Take about 1" of masking tape and wrap it tightly around the cable where you want to cut it. Now lay the cable on a solid metal surface and use a heavy hammer and a cold chisel. Be sure and hit it hard enough to cut completely thru on the first hit.

Q. How well do the foil antennas for the radios as shown in the KR-2 plans work?

A. Quite well. I have them installed in my KR-2 and can pick up ground control at an airport over 25 miles away while on the ground at my airport. I do however recommend installing them in the wings prior to final foam work. They will get even better reception, (especially the nav antenna), when it is located away from the metal and engine located in the fuselage.

Q. Does anyone have the specs on the GAW-1 and GAW-2 airfoils? I am interested in using one of them on my KR-2. Has this ever been done?

A. I know of at least one KR-2 that was built using the GAW-1 airfoil. Top speed was about the same and stall was at about 30 mph. I don't have any specs on these

airfoils. Perhaps someone can send them in.

Q. My KR-2 wood kit doesn't specify what I'm supposed to make the gusset blocks from. What do I use?

A. The gusset blocks are made from the 5/8" by 5/8" spruce. You should have enough left over after cutting longerons and cross pieces.

Q. How many KR's are now completed and flying?

A. There are currently between 600 and 700 KR-1s and KR-2s flying worldwide.

Q. I recently heard about the KR-IB. What is it?

A. The KR-IB is a motorglider version of the KR-1. You can build 2 sets of wings for it, 1 short set and 1 long set and have the best of both worlds. Fly fast on your short wings or bolt on the long wings and go gliding with a glide ratio of 21 to 1. Plans are available.

General Aviation
Parts & Supplies

Experimental
Aircraft Kits



- Composite Supplies
- AN Hardware
- Instruments and Radios
- Propellers
- DIEHL "SUPERCASE"
- "THE STING" Tuned Exhaust Systems
- - " " A I R C R A F T ENGINES

AUTHORIZED DISTRIBUTOR FOR



CATALOG \$3.00

P.O. BOX 4113
ENGLEWOOD, CO 80155



(303) 693-8239



NEW 11 400x5 6 PLY RATED TIRE SPECIFICATIONS INFLATED HEIGHT 115 INCH WIDTH 40 INCH TIRE WT 3 LBS TUBE WT y, LB LOAD RANGE C-70 P.S.I. MAX

This tire fills the size 9"0 between the 500x5 aircraft tire and the 3.40-3.00-5 go-kart tire. Looks like a scaled-down 500x5. Fits KR-1 A 2's and is recommended by Burl Rutan for the VariEte and Ldg-Ez. Also fits most other experimental using 5 inch rims.

TIRE 6 PLY RAT. 25.00 TUBE 6.50* SHIP A HAND MIKE LAMB. P.O. BOX 3324 OUARTZ HILL. CA 93534

MARKETPLACE



FOR SALE: KR-2 project on gear & spars signed off. Materials to complete including fiberglass parts and Westach gauges. Brian Sanford 305-974-6829 \$1,500.

FOR SALE: KR-2 about 85% complete with 1834 Revmaster, (0-time), and most materials to complete. Any reasonable offer. Cannot complete for health reasons. Don Fleming, 15751 Primrose Lane, Westminster, Ca. 92683 714-897-2238.

FOR SALE: KR-1, 1835, full electric, (Diehl Supercase), "Almost Constant Speed" prop, RST 6 channel radio, cruise 145 mph, top speed: 160 mph. Completed Sept. 1982. 50 Hrs. TT. Gary Swanson, 1003 Swan Lake Ct., Edmond, Ok. 73034 405-348-7446.

FOR SALE: KR-2 project, tri-gear, steerable & retractable, custom controls, boat complete, FAA sign off, all parts to complete, wing spar complete, pro job. \$1,500 213-828-2123 Robert Hamill

FOR SALE: Never used Revmaster R2100D, full opted, Great American prop & spinner, \$3,000 213-828-2123 Robert Hamill.

FOR SALE Parting out my KR-2. Everything goes, wings, fuselage, etc. Send S.A.S.E. for price list, description and pictures. D.E. Moore, 12138 Hines Ct., Plymouth, Mich. 48170.

FOR SALE: 2 blade fixed Maloof prop, slightly used, 4 years old. No dents or damage. \$325. James Belt 213-592-2061.

FOR SALE: KR-2 project, excellent workmanship, 65% complete, all materials to finish except engine. \$1,600.

Engine Accessories, (new): Slick mag, Posa carb, accessory case w/starter, electrics, prop & hub, spinner, etc. \$750. Robert Berry, 3051 Beaver Dr., Douglasville, Ga. 30135. 404-949-8949.

FOR SALE: R/R engine mount, new, still in box from R/R. Will ship prepaid anywhere in U.S. for \$95. Tom Jones, 4531 Larado Pi., Orlando, Fl. 32806.

FOR SALE: KR-2, Retractable gear with wheels, tires & brakes, (new), & newsletters. Best offer. FOB Corvallis, Oregon. Key Sys. Inc., 4905 SW Dresden, Corvallis, Or. 97333.

FOR SALE: KR-2 project on wheels, inspected by FAA up to covering. Materials to complete. \$1,200. Delmar Henneke, RFD #3, Ottawa, II. 61350. 815-434-0301.

FOR SALE: KR-2 project, center section complete including rudder, elevator, electric trim, firewall & engine mount, instrument panel, all control systems. Not completed: turtle deck, canopy, engine or cowling. Wings glassed including R/R wing tips and fuel tanks, (w/electric gauges). Ailerons not cut out. Gear complete & faired. Toe brakes, wing root venturi, strobe lights and more. Some instruments, NASA/EAA lightweight autopilot. Must sell. Raising 2 yr. old doesn't leave time to finish project. Make offer. Ron Schendel 213-376-0963.

MINIATURE METRICS

Liteflite Hardware
7801 14th Street
Westminster, Calif. 92683
Phone (714)894-4875
Carey H. Anderson

Complete machining of Rand-Robinson extrusion kit #4
including landing gear. \$319. Shipping not included
Above machining, plus controls assembled \$420. Write
for detailed list.
Above work/shipping arranged through Rand-
Robinson

Aileron counter-balances
\$65. pair postpaid

Aileron pulley brackets assys.
\$30. pair postpaid

Lower elevator pulley brackets"
\$28, assembled postpaid

Upper elevator pulley brackets
\$15. assembled postpaid

Rudder pedal
Mount Blocks
\$30. set postpaid

Control stick assembly
per plans w/mike switch
\$75. postpaid

Rudder, elevator, tailwheel
Horns & Hinges, backup plates
\$60. postpaid

Aileron bellcrank
& horns complete
Assemblies (24 pieces)
\$87. postpaid

KR NEWSLETTER

PO BOX 4113

ENGLEWOOD, COLORADO 80155-4113

ISSUE NO. 101 NOVEMBER 1983



Issue no. 102

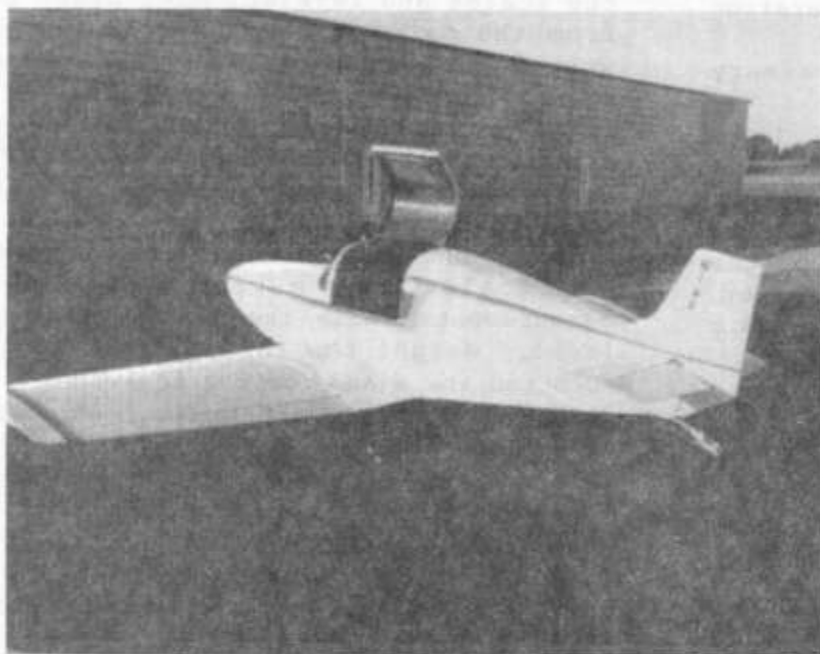
December 1983



KR NEWSLETTER

RATES
 USA \$1200 Yr
 CANADA \$15.00 Yr U.S.
 OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand Robinson Engineering, Inc.



THIS KR-2, N1WR, was built by Wayne Ristine, 614 Lisa Rd., Dundee, Illinois, 60118.

Construction was begun on January 14, 1982 and had it's FAA final inspection June 30, 1983.

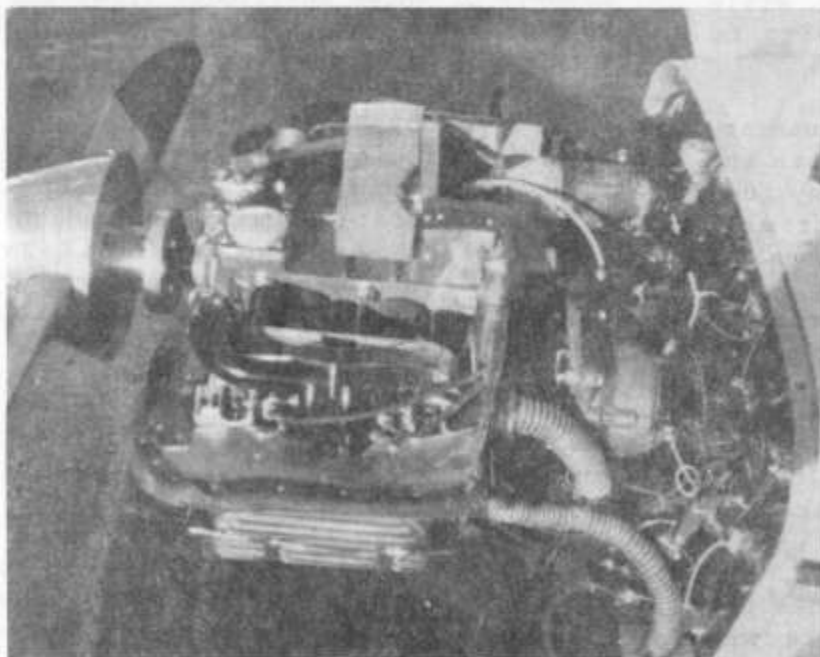
N1WR is powered by a 2180cc VW with dual magnetos, full electrical system, Tillotson carb. and is equipped with both carb and cabin heat.

Modifications include the gullwing canopy and hydraulic disc brakes.

The interior is fully upolstered and is well instrumentated, including nav/com.

Empty weight came out a 502 Ibs., including all the goodies. It's sure nice to see so many nice KR's coming out the lighter side lately, even when well equipped.

At the time I received these pictures from Wayne at Oshkosh, he had not had a chance to fly yet, but should have flown by the time this is printed.



I MUST APOLOGIZE for the last two issues of the Newsletter being late. Things have been very hectic around here lately with trying to get my KR-2 airborne and building a new home. Things should be back to normal in January.

**Seasons
greetings**

ONE OF THE QUESTIONS that constantly are received are how do I weigh my aircraft and determine the CG? This month we're going to review the proper procedure for proper weight and balance.

Weighing an aircraft is a very important and exacting phase of aircraft maintenance and must be carried out with accuracy and good workmanship. Thoughtful preparation saves time and mistakes.

To begin, assemble all the necessary equipment, such as:

1. Scales, hoisting equipment, jacks leveling equipment. (If using common "bathroom" scales, (not recommend), be sure and place a solid surface on the top of the scale for the wheel to rest on. These scales will bend from pressure.
2. Blocks, chocks, or sandbags to hold your KR in place.
3. Straightedge, spirit level, plumb bobs, chalk line and measuring tape.
4. Several friends.

If possible, your KR should be weighed in a closed building where there are no air currents to cause incorrect scale readings. The surface should also be level.

Drain the fuel system until the quantity indication reads zero, or empty with the aircraft in **level** attitude. If any fuel is left in the tanks, the aircraft will weigh more, and all later calculations for useful load will be affected.

If possible, drain all the oil from the engine. Remove all items such as headphones, maps, etc.

Ailerons and elevator should be level and flaps should be retracted. Close canopy.

Be sure and properly calibrate the scales to zero before starting.

Now put your KR onto the scales, one under each main wheel and one under the tailwheel. Be sure the wheels are centered on the scales and that the brakes are released.

The aircraft must be leveled now. Use the top longerons for your leveling points. You will have to make some sort

of stand for the tailwheel to get it at the proper height. (Remember, this stand is not part of the aircraft weight and must not be included in the readings).

You may use any point on the aircraft for the Datum, but it is best to use either the firewall or the spinner tip.

After the aircraft has been placed on the scales and leveled, hang plumb bobs from the datum, the center of the main wheels and the tailwheel. Make a chalk mark on the floor at the points of contact. If desired, a chalk line may be drawn connecting the chalk marks. This will make a clear pattern of their relation to the datum.

Record the weights indicated on each of the scales and make the necessary measurements while the aircraft is still level. Weight the tare, (anything used such the the stand for the tailwheel), and deduct it from the the weight recorded at it's respective scale.

To obtain gross weight and the e.g. location of the loaded airplane, first determine the empty weight and the EWCG location. When these are known, it is easy to compute the effect of -fuel, etc. This is done by adding all the weights and moments of these additional items and recalculating the e.g. for the loaded airplane.

The empty weight of the aircraft is determined by adding the net weight on each weighing point. The net weight is the actual weight less the tare weight.

The e.g. location is found through the progressive use of two formulas. First calculate the total moments using the following formulas:

$$\text{Moment} = \text{Arm} \times \text{Weight}$$

The Arm is the distance from the datum to point weighing, (main gear, tailwheel).

When you have these answers, add the total moments and divide them by the total weight of your aircraft. The answer will tell you how many inches from the datum the e.g. is located.

On a KR-2 the e.g. must fall between 15-35% of the wing chord, which is between 8" to 16" aft of the leading edge of the

inboard wing leading edge.

Now that you know what the empty weight e.g. is you may begin the loaded weights.

This is done by adding in oil, fuel and crew weights and refiguring with the earlier formulas.

Begin first with the oil and other items that will always be in the aircraft. You may either reweigh the aircraft with these items installed or measure distance from datum weigh separately and use the formula to refigure.

These steps are repeated for pilot weight, passenger weight, baggage weight and fuel weight. On a KR I recommend doing the fuel weights by actually filling the tanks and reweighing the aircraft for an exact figure.

On some KR's ballast may be needed to keep the e.g. in it's proper place. Always mount the ballast as far forward or as far aft as possible. This will allow you to use the least amount of weight. You should also look at items that may be moved to change e.g. (Maybe that battery will work better if installed on the firewall instead of behind the rear spar, etc.)

All ballast should be painted red and **securely** fastened, to the fuselage. Label it as "PERMANENT BALLAST-DO NOT REMOVE" and be sure and enter it on your weight and balance sheet. Also remember that this ballast will add to the empty weight of the aircraft, so reweigh and refigure e.g. after installation.

One final note. When figuring fuel and passenger weights, do it with empty tanks and pilot and passenger weights first. This will let you make sure you are balanced when you are low on fuel and

fully loaded. Also be sure and reweigh your aircraft each year. You'd be amazed at the weight your aircraft can add over the years thru additions, repairs, etc.

AT OSHKOSH THIS this year there was a very interesting exhibit located behind mine and drawing quite a crowd. Dan Duncan from Duncan Aviation Engines was showing his new rotary engines and judging from the interest they were drawing, we should be seeing several turn up in aircraft next year. I understand that currently there some Van-Eze's flying on these engines and doing very well.

They are currently producing 2 engines that will work in the KR-1 and KR-2.

The first is a 60 hp model that weighs 110 lbs. and includes a 10 amp alternator, fuel injection, dual electronic ignition, starter, aluminum water pump and prop flange. Weight is 110 lbs. installed. Dimensions are 16" wide, 16" tall, and 18" long. Cost is \$1,800.

The second could make a KR a real rocket! This engine produces 120 hp, and includes fuel injection, dual electronic ignition, 35 amp alternator, starter, aluminum water pump, starter, prop drive and only weighs 150 lbs. installed. Dimensions are 20" wide, 21" high, 19" long. Cost is \$3,200. There is also a turbo available for \$1,500. This increase the weight to 165 lbs.

Recently some of the local chapter members visited the factory in Oklahoma and were VERY impressed. Dan started an engine laying on a bench and revved it to 9,000 rpm and it just lay there and purred. No vibration at all. (Yes, these engines use a gear reduction drive to the prop). For further information contact Dan at Duncan Aviation Engines, Rt. 1, Box 256, Comanche, Ok. 73529, 405-439-2473.



**MERRY
CHRISTMAS**

QUESTIONS & ANSWERS

Q. My KR-2 is very springy at the tailwheel. I'm afraid the wheel will hit the rudder. Can this be strengthened?

A. Yes. The new tail springs are not as long which results in a stiffer tail. You may cut the old spring down so it is only 9" long. You may also install a 2nd spring plate if desired to make it even stiffer. The new tailwheel fork for the KR also helps take care of this problem.

Q. Which side of the elevator is the trim tab supposed to be located?

A. I doesn't matter which side. I have seen them installed on either side with good results. I installed mine on the left.

Q. What kind of fuel pump is used to transfer fuel from the wing tanks?

A. The best is a lightweight transistor pump available from many supply houses.

Q. Have you received any more information regarding the installation of the 0-200 engine in a KR-2?

A. I haven't received any written information concerning this modification but I have talked to several builders who are planning to install this engine in their KR-2 so hopefully builders will begin sending in information concerning this modification.

Q. Will the R/R engine mount made for the Revmaster accessory case fit the HAPI accessory case?

A. No. HAPI's case will only fit the HAPI engine mount.

Q. Do the pre-molded parts from R/R have to be prepared for installation?

A. Yes. First sand off the gel coat about 2" wide along the bottom edge and then sand the fuselage side also about 2" wide. Then fiberglass into place as usual.

Q. Has anyone ever built a tandem KR-2?

A. There was a tandem KR-2 at Oshkosh this year. The only information I have is that it was from Canada.

Q. Are most of the KR's flying with auto gas or avgas?

A. I'm finding more and more KR's are flying on avgas instead of auto gas. The problem is that the VW engines are usually running higher compression than a standard aircraft engine and therefore don't run as well with auto gas unless they can obtain premium which is almost impossible these days.

Q. Where do I get the forms for application for an "N" number?

A. Contact your local GADO office for these forms.

KR-2 PLANS ERRORS

Page 21 of the new KR-2 plans. Outer wing aft spar drawing shows 1/2 x 1 15/16 uprights in the spars. This should be 1/2 x 15/16.

Page 36 of the new KR-2 plans. The drawing for the gear lock down arms shows the "down lock notch" cut incorrectly. It should angle the other direction, back towards the pivot bolt or it won't lock into place.

PRODUCT TEST REPORTS

I have recently received several different products manufactured for use in KR's and we will be resuming test reports in the January, 1984 issue.

Have you discovered a better way to build your KR? If so please share it with other builders thru the **KR Newsletter**.

MARKETPLACE

WANTED... KR-2 Wood Kit, would prefer unused. Dan Croy, 7030 W. Redrock Dr., Gillette, Wy., 82716. 307-682-1363.

FOR SALE... Wing attach fittings, \$80.00 post paid, 1328 Canal Ave., Long Beach, Ca. 90813.

FOR SALE... New "0" Time, Firewall Forward for KR-2, 1835 cc Turbo'd, Monnett prop hub, Diehl Supercase, includes engine mount and prop. \$2,850. Mike Lamb, PO Box 3324, Quartz Hill, Ca. 93534.

FOR SALE... KR-2 project, tri-gear, steerable & retractable, custom controls, boat complete, FAA sign off, all parts to complete, wing spar complete, pro job. \$1,500. 213-828-2123 Robert Hamill.

FOR SALE... Never used Revmaster R2100D, full opted, Great American prop and spinner, \$3,000. 213-828-2123 Robert Hamill.

FOR SALE... Complete KR-2 Wood kit, including firewall. \$350. Erwin Cruz, 404-922-5805.

FOR SALE... KR-1, 1835, full electric, (Diehl Supercase), "Almost Constant Speed" prop, RST 6 channel radio, cruise 145 mph, top speed 160. Completed Sept. 1982. 50 hrs TT. Gary Swanson, 1003 Swan Lake Ct., Edmond, Ok. 73034 405-348-7446.

FOR SALE... KR-2 project, denter section complete including rudder, elevator, electric trim, firewall and engine mount, instrument panel, all control systems. Not completed: turtle deck, canopy, engine or cowling. Wings glassed including R/R wing tips and fuel tanks, with electric gauges. Ailerons not cut out. Gear complete and faired. Toe brakes, wing root venturi, strobe lights and more. Some instruments, NASA/EAA lightweight autopilot. Must sell. Raising 2 year old doesn't leave time to finish project. Make offer. Ron Schendel 213-376-0963.

FOR SALE... KR-2 project on wheels, inspected by FAA up to covering. Materials to complete. \$1,200 Delmar Henneke, RFD #3, Ottawa, II. 61350 815-434-0301

FOR SALE... KR-2 project, excellent workmanship, 65% complete, all materials to finish except engine. \$1,600 Engine Accessories, (new) Slick mag, Posa carb, accessory case w/starter, electrics, prop and hub, spinner, etc. \$750.00 Robert Berry, 3051 Beaver Dr., Douglasville, Ga. 30135 404-949-8949.

General Aviation
Parts & Supplies

Experimental
Aircraft Kits



- Composite Supplies
- AN Hardware
- Instruments and Radios
- Propellers
- DIEHL "SUPERCASE"
- "THE STING" Tuned Exhaust Systems
- **FAST** AIRCRAFT ENGINES

AUTHORIZED DISTRIBUTOR FOR



CATALOG \$3.00

P.O. BOX 4113
ENGLEWOOD, CO 80155



MINIATURE METRICS

Liteflite Hardware
7801 14th Street
Westminster, Calif. 92683
Phone (714)894-4875
Carey H. Anderson

Complete machining of Rand-Robinson extrusion kit #4 including landing gear. \$319. Shipping not included Above reaching, plus controls assembled \$420. Write for detailed list.
Above work/shipping arranged through Rand-Robinson

Aileron counter-balances
\$65. pair postpaid

Aileron pulley brackets assys.
\$30. pair postpaid

Lower elevator pulley brackets
\$28, assembled postpaid

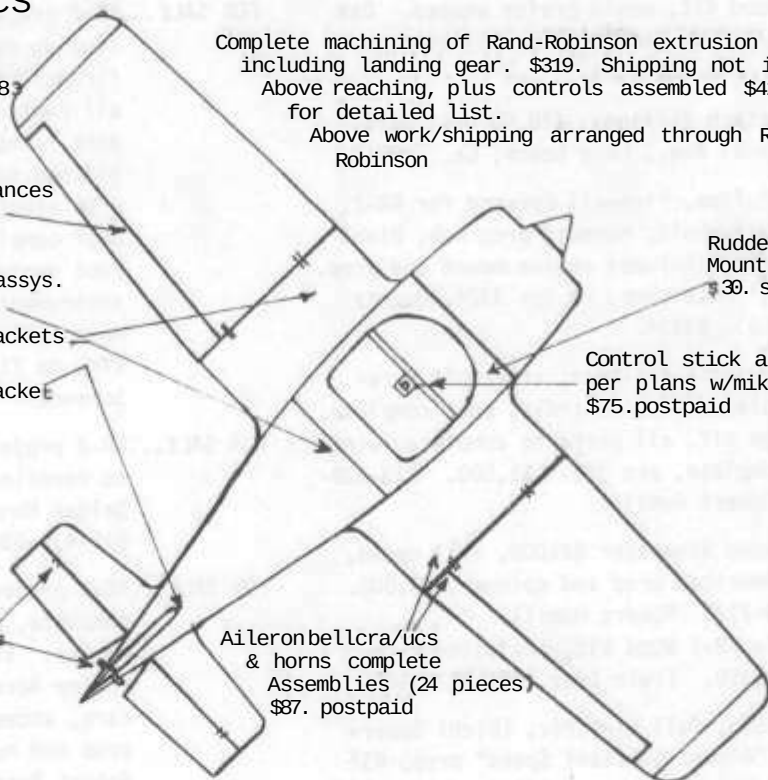
Upper elevator pulley bracket
\$15. assembled postpaid

Rudder pedal
Mount Blocks
\$30. set postpt

Control stick assembly
per plans w/mike switch
\$75. postpaid

Rudder, elevator, tailwheel
Horns & Hinges, backup plates
\$60. postpaid

Aileron bellcranks
& horns complete
Assemblies (24 pieces)
\$87. postpaid

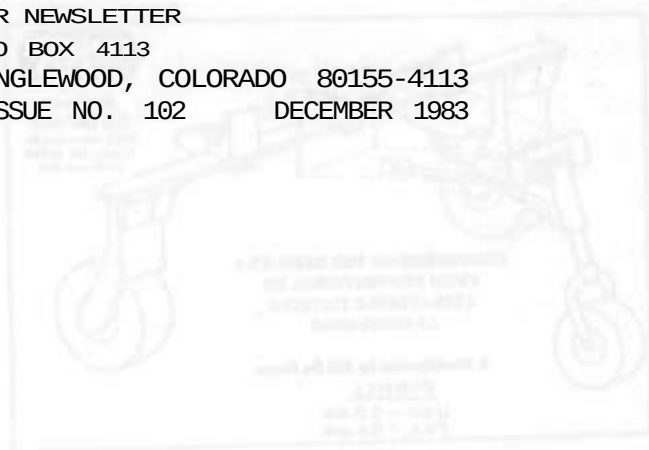


KR NEWSLETTER

PO BOX 4113

ENGLEWOOD, COLORADO 80155-4113

ISSUE NO. 102 DECEMBER 1983



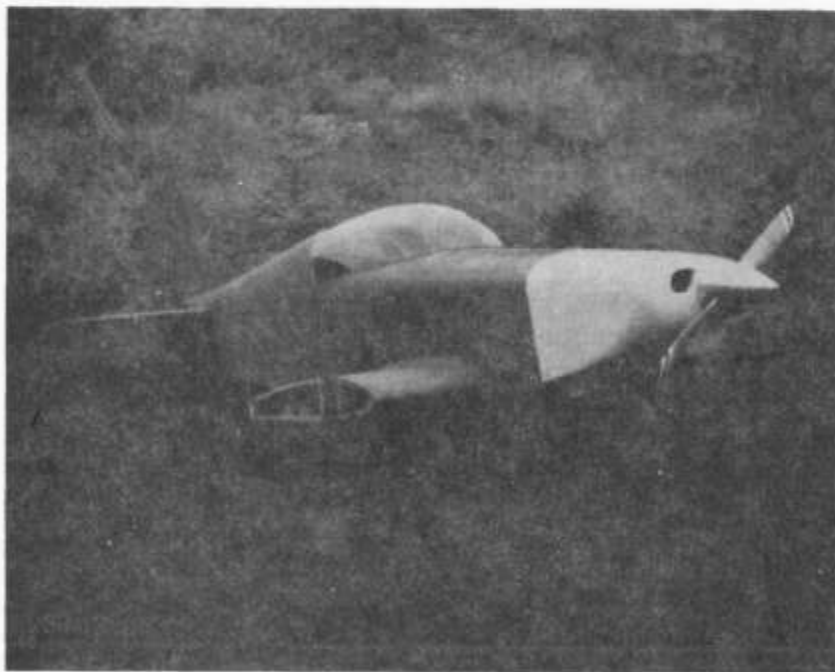
Issue no. 103 JANUARY 1984



KR NEWSLETTER

RATES
USA \$1200 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$2000 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand Robinson Engineering, Inc.



This month's cover KR-2 belongs to David L. Feiger, PO Box 581, John Day, Oregon 97845.

David built his KR-2 using Douglas Fir instead of Spruce and used Safe-T-Poxy.

It was completed to the primer stage in November, 1983 and David expects to fly early this spring.

Power is from a HAPI 1834 and empty weight is expected to be about 600 lbs.

The time and place for the annual KR Dinner at the Sun 'n Fun Fly In has been set. The dinner this year will be held on Wednesday, March 14th at Raffles Restaurant, 6606 S. Florida Ave, Lakeland, Florida.

Reservations may be made by signing up at the Wick's booth at the Fly-In.

The unusually frigid weather we had here in Denver last month made it impossible to do any further flight testing of my KR-2. After repeated problems with the POSA Supercarb that I originally had installed, I am now installing the new Rev-Flow carb which hopefully will eliminate the mixture problems.

It seems that Wes Fisher really started something when he brought his KR-2 to Oshkosh this year with an O-200 installed. I have now heard from over 20 builders who have decided to install this engine in their KR-2. In fact I have now decided to build another KR-2 that will be powered by the O-200 and will have a fully retractable tri-gear.

Construction will begin next month and should provide plenty of information for future articles on this conversion.

If you are planning to use the O-200 in your KR-2, please take some time and send in any drawings, pictures, etc. on the conversion to assist other builders.

Should be an interesting year for KR's.

FLIGHT REPORT

KR-2, N15RN, flown and built by Richard Neate, Port Orange, Florida at New Smyrna Beach Airport, Florida, at 1500 hours, 10 Dec 83.

WEATHER: Winds 8-10 knots down Runway 11, temp. 75°, sky partly cloudy, humidity about 70%.

BUILDING REPORT: Started Oct. 78 in California, (meanwhile moved to Florida, took new job, gained a son in Jan. 80), and finished Dec. 83. Kr-2 was mostly plans built with a 2" wider cockpit, one-handed gear latch and flaps being the only significant modifications. Has 2100D Revmaster with forged crank, dual mags, geared starter, ring alternator,

oil cooler. Has airspeed, alt., and mag compass, plus oil temp/pressure, CHT, (basic panel). Empty weight is 575 lbs. Total cost was about \$7,200.

GROUND HANDLING REPORT: Airplane was noticeably easy to taxi except for visibility. (Had to taxi with canopy open and lean out to see). 10 knot winds did not tend to pick up a wing or tail at all. I first held full aft stick while taxiing, but I finally decided that the wind and power changes did not tend to bring the tail up.

HIGH SPEED TAXI REPORT: After about 1 1/2 hours of ground handling checkout, I tried some high speed taxi tests. The KR-2 accelerates very quickly even though I never used full power. The low seating and quick acceleration led me to believe I was taxiing at 20 to 30 mph, when I was actually doing 40 to 60 mph. I was used to the slow acceleration of a Cessna 172 and just assumed I must be going slower. Even though I was not at full power, there was a very noticeable torque, (I was forced to use a lot of left rudder). I will adjust the rudder cables to help relieve this. Picking up the tail and lowering it was not too hard, even though the stick is very sensitive. I compare the stick sensitivity to that of a T-38 at 450 knots, (my Air Force training in high performance airplanes probably kept me from too much overcontrolling in pitch, even though I still did some mild porpoising).

FLIGHT REPORT: On my third high speed taxi run, (with the top part of the cowling off to aid engine cooling), the torque unfamiliarity got to me and I got a little bit sideways and rather than ground loop, I added power and took off. On downwind, I finally calmed down, finally took my foot off the left rudder and noticed that it flew very well. Since I was minus half my cowling, I decided to land. On downwind, with 2700 RPM, gear down, carb heat on, and half a cowling, I was indicating 105-110 mph, (and doing some mild porpoising). This is a quick little machine! I turned final, put down two notches of flaps and made a very nice touchdown. Landing roll was maybe 700 feet. I noticed that the flaps tended to reduce the mild porpoising tendency due to overcontrolling the stick.

FLIGHT IMPRESSIONS: Although I was scared at first, by the time I landed, I

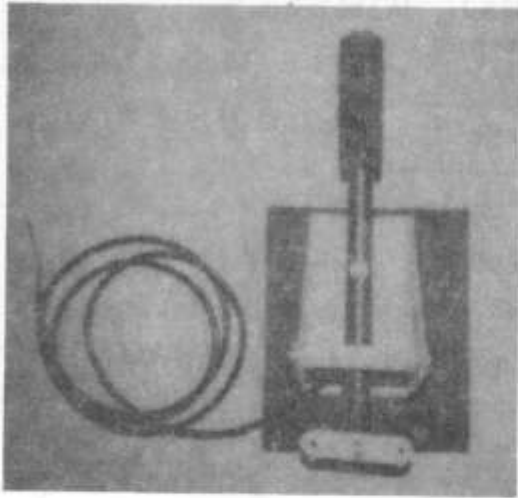
was reasonably calm. This is probably due to my confidence in the engine and having built the airplane right, (I had a lot of expert help). The engine starts the first time every time, (I love the Posa), it runs very smoothly and just sounds, (sound is very important, too), well made. Overall, this is a very nice airplane. Hat's off to Ken Rand.

NEXT DAY POSTFLIGHT IMPRESSIONS: My Kr-2 burned about 1 1/2 gallons of fuel during the 2 1/2 hours of taxiing and flight. The tailwheel held up quite well despite its bad press clippings. The wing attach bolts are very difficult to get on and off. I may have to devise a new system—I can't spend 2 hours per flight attaching and detaching the wings. The KR-2 is so light that I was airborne, 5 feet or so, for a part of the taxi runs. The airplane is so quiet on its main gear that there was to change in noise to tell me I was in the air. The tailwheel is noisy, but since I rode with Ken Rand in N4KR, I was prepared for this. A little insulation in the rear would help this.

BUILDING ADVICE: The best advice I could offer would be to have good tools and good friends. I struggled along solo with just hand tools for a while and it was hard and slow. After I took a job teaching aeronautical engineering at Embry-Riddle Aeronautical University, I acquired both volunteer student help and access to a good shop. It really helped.

FINAL NOTE: Since I now have a three-place family, my two-place airplane has to be sold. I had to fly it to see if 5 years building time and the money was well spent. Well, it certainly was! I don't regret a minute of the time or a dollar of the money. As I said, the KR-2 is a beautiful machine, but I'll have to take my money from the sale and get an airplane that fits my family. Reading this, the thought of selling the airplane makes me very sad, but I don't see any way around it. Our family just can't take those trips I envisioned when I first started building.





This month's PRODUCT REPORT is on another fine product from Miniature Metrics.

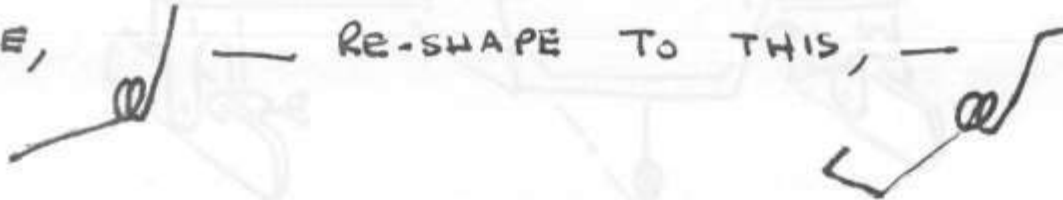
The KR Control Stick Assembly is built to the exact dimensions in the plans and includes a foam grip and a built-in mike switch and wiring leads.

As with all of the products from Miniature Metrics, I found the quality to be unsurpassed. All the edges are milled smooth, all rotating surfaces are fitted with precision and it is topped off with a good finish of zinc chromate.

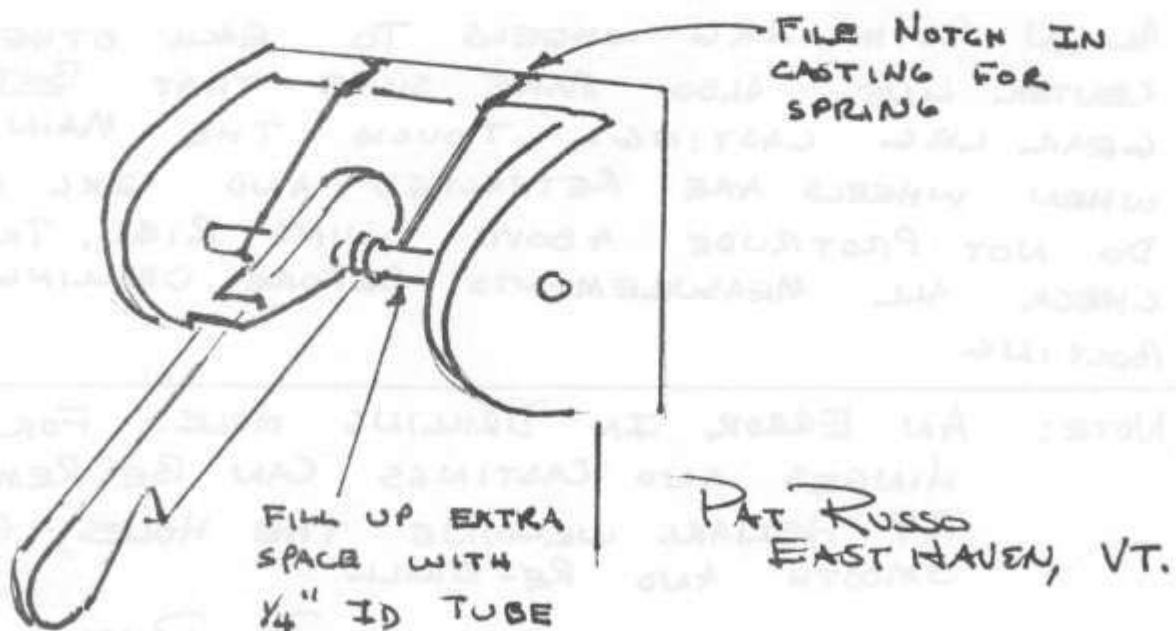
Price is \$75.00 Postpaid from Miniature Metrics.

GEAR LATCH SPRINGS

LOCAL HARDWARE STORES USUALLY HAVE SPRING DISPLAYS FROM AJAX SPRING CO. SPRING #414 IS WHAT I USED. PURCHASED IN THIS SHAPE,

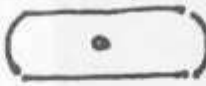


YOU NEED A RIGHT AND LEFT SIDE SHAPE FOR EACH LATCH.

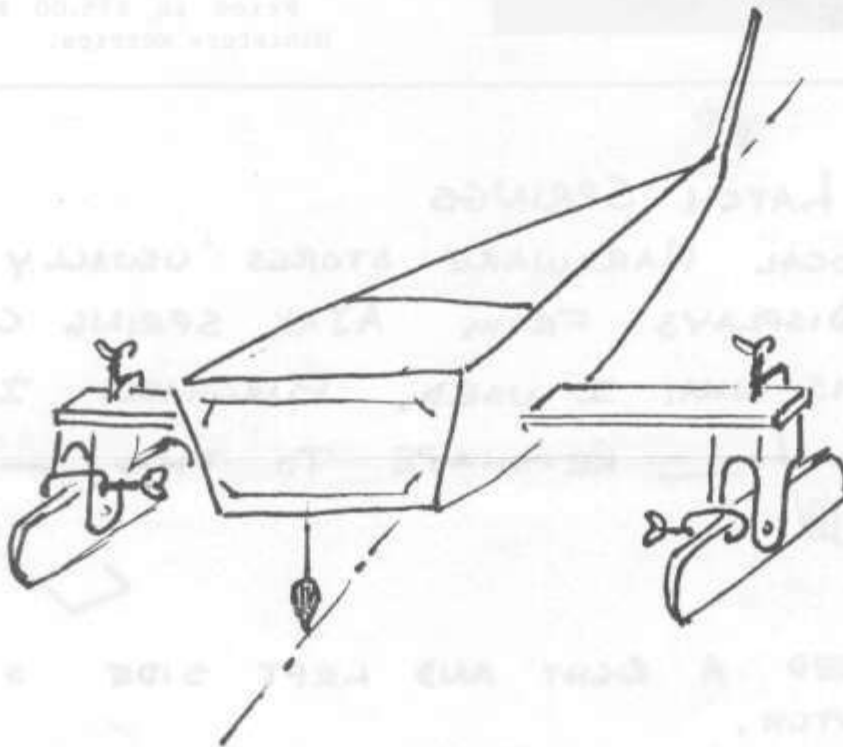


PAT RUSSO
EAST HAVEN, VT.

ALIGNING MAIN WHEELS

INSTEAD OF INSTALLING TIRES, CUT TWO WHEELS FROM 2"x6" LUMBER, ..  10 1/2" DIA, 1/4"

IN CENTER. INSTALL ON GEAR LEG CASTINGS AND CLAMP TOWARDS INSIDE. CLAMP CASTINGS TO SPRING BAR. SET FUSELAGE ON FLOOR, PLUMB LINE FROM CENTER OF FUSELAGE, EACH END, SIOAP CV4ALK Li/oe o/u FLOOR



ALIGN BOTH 2x6 WHEELS TO EACH OTHER AND CENTER LINE. ALSO AUv<e SURE THAT BOTH GEAR LEG CASTINGS TOUCH THE MAIN SPAR WHEN WHEELS ARE RETRACTED 0 \N»0 2x6 WHEELS DO NOT PROTRUDE ABOVE WING RIBS. TRIPLE CHECK ALL MEASUREMENTS BEFORE DRILLING AND BOLTING

NOTE: AN ERROR IN DRILLING HOLES FOR HINGES AND CASTINGS CAN BE REMEDIED BY HELIARC WELDING THE HOLES, GRIND SMOOTH AND RE-DRILL

PAT RUSSO
EAST HAVEN, VT.

MARKETPLACE

FOR SALE... KR-?, 2100cc Revmaster with Forged Crank, Dual Mags, Oil Cooler, Starter, Alternator, Great American Prop, Plans Built, FAA Certified, First Flight: December 10, 1983. Flew beautifully, (See Flight Report in this Newsletter). \$7,200 Includes Custom Trailer. Rich Neate 904-761-7261 After 7:00pm EST.

FOR SALE—Two new R/R Brake assemblies, (the inner assembly with bonded linings, not the brake drums). Best cash offer. Bill Thomas 203-728-4061 Workdays.

WANTED.....R/R Spinner for 2 blade prop. Bill Thomas 203-728-4061 Workdays.

FOR SALE—KR-2 Project, 98% complete, FAA paperwork done: Best offer over \$6,500. George Kahnk 4535 Y St., Lincoln, Ne. 68503 ^02-464-003

FOR SALE—KR-2, 1834cc₅ Electric start and Trim, KX-170, excellent condition, always hangared. \$7,000 415-635-4888 Jack Romanski.

FOR SALE....Canadian KR-2 - Boat, Spars, Landing Gear, Turtle Deck, Canopy, Fuel Tank Assembled, Signed off to close. All Newsletters and Updates. Must sell due to epoxy allergy. Write: Lyle Black, 46511 Chilliwack Lack Road, RR #8, Sardis, BC, Canada VOX 1Y0.

WANTED. . . KR-2 Canopy and Cowling. Also prop for 1834 engine. 309-647-7797.

FOR SALE....1 R/R Engine Mount, new, will fit VW Case or Diehl Supercase. Bead blasted & Zinc plated, with rubber mounts, \$75.00. Also 1 Stainless Steel Firewall, Never opened, \$9.00 Clyde Wetherbee 715-258-5191 After 5:00pm.

FOR SALE... KR-2 project - Excellent workmanship, fuselage & wing spars inspected and signed off. Fixed landing gear and mounting brackets and 4" aircraft style tail wheel, including spring. Gear designed by Bill Roseman, manufactured by Monett. Extruded aluminum angle for reinforced engine installation. Horizontal and vertical stabilizer frame completed, including hardware installed. Elevator cable pulley brackets for rear spar and horizontal stabilizer. All wing attach fittings, fittings on forward spars installed. Complete bolt kit. All hardware purchased from Miniture Metrics. Fuselage fiberglassed, various other parts. Over \$1,500 invested - will sell for \$1,200. Call South Carolina 803-576-5635 after 5:00 pm, EST.

FOR SALE... KR-2, 95% completed, Beautiful white with red and blue trim. All complete except for engine. Have HAPI 1835 engine and Rand 3-blade prop, Asking \$4,000 ro best offer. Call 509-547-2863



NEW! 11 400x5 6 PLY RATED
TIRE SPECIFICATIONS INFLATED
HEIGHT 115 INCH WIDTH < 0 INCH
TIRE WT. 3 LBS. TUBE WT 1/2 LB
LOAD RANGE C -70 P.S.I. MAX

This tire fills the size gap between the 500x5 aircraft tire and the 3.40-3.00x5 Qo-kart tire. Looks like a scaled-down 500x5. Fits KR 1 & 2's and is recommended by Burt Rutan for the VariEze and Long-EZ. Also fits most other experimentals using 5 inch rims.

TIRE 6 PLY RAT. 25.00 TUBE 6 50+ SHIP A HAND.
MIKE LAMB. P.O. BOX3324. QUARTZ HILL. CA93534



CONVERSION OF THE 1AND KR «
FROM CONVENTIONAL TO
RETRACTABLE TRICYCLE
LANDING GEAR

A ModH«xio« »r MI De Praae

Plans:
USA-25.00
FOR. -32.00

General Aviation
Parts & Supplies

Experimental I
Aircraft Kits



- Composite Supplies
- AN Hardware
- Instruments and Radios
- Propellers
- DIEHL "SUPERCASE"
- "THE STING" Tuned Exhaust Systems
- • " A I R C R A F T ENGINES

AUTHORIZED DISTRIBUTOR FOR



CATALOG \$3.00

■ P.O. BOX 4113
ENGLEWOOD, CO 80155

(303) 693-8239

MINIATURE METRICS

LitefLite Hardware
7801 14th Street
Westminster, Calif. 92683
Phone (714)894-4875
Carey H. Anderson

Complete machining of Rand-Robinson extrusion kit #4 including landing gear. \$319. Shipping not included. Above reaching, plus controls assembled \$420. Write for detailed list. Above work/shipping arranged through Rand-Robinson

Aileron counter-balances
\$65. pair postpaid

Aileron pulley brackets assys.
\$30. pair postpaid

Lower elevator pulley brackets
\$28, assembled postpaid

Upper elevator pulley bracket
\$15. assembled postpaid

Rudder pedal
Mount Blocks
\$30. set postpt

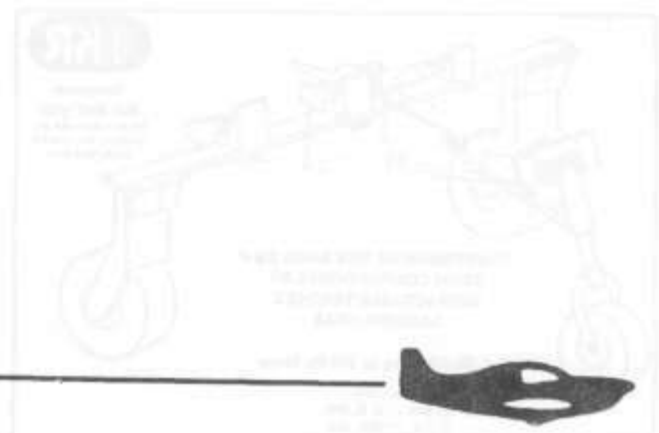
Control stick assembly
per plans w/mike switch
\$75. postpaid

Rudder, elevator, tailwheel
Horns & Hinges, backup plate
\$60. postpaid

Aileron bellcrajrucs
& horns complete
Assemblies (24 pieces)
\$87, postpaid

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLORADO 80155-4113
ISSUE NO. 103 JANUARY 1984

FIRST CLASS MAIL
U.S. POSTAGE
PAID
DENVER, COLORADO
PERMIT NO. 2677



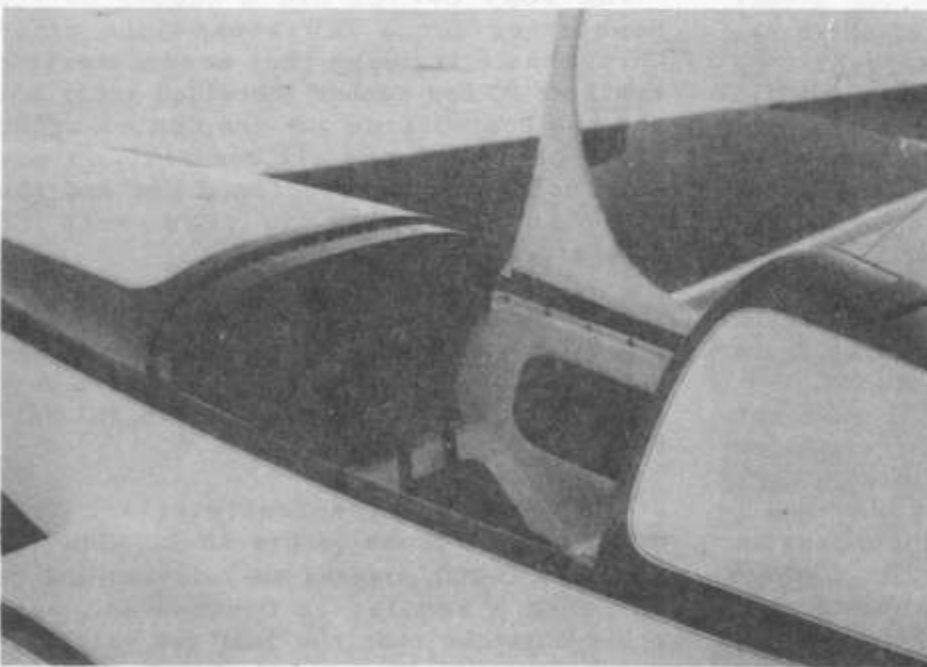
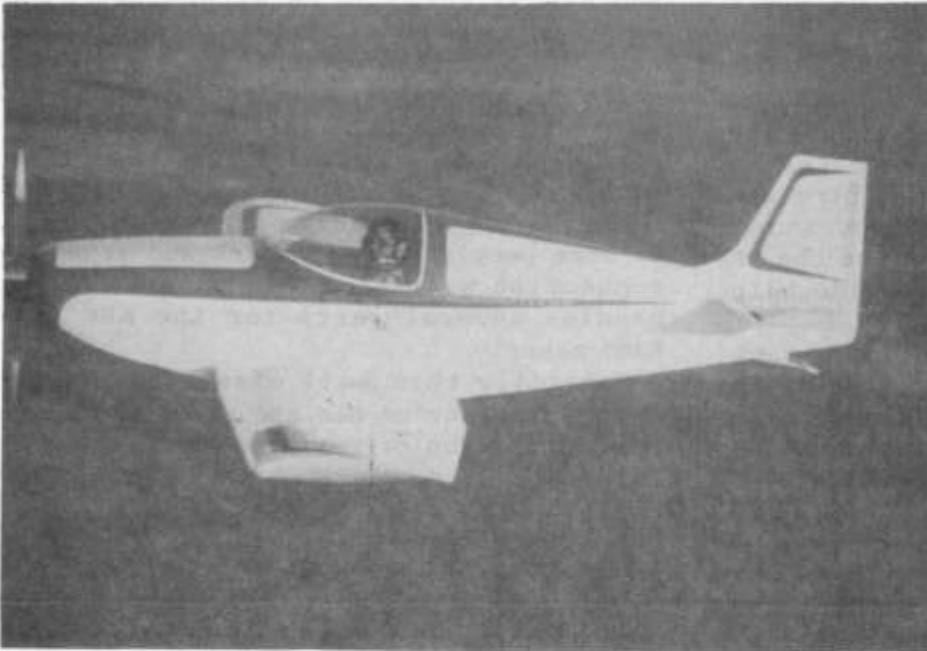
Issue no. 104
February
1984



KR NEWSLETTER

RATES
USA \$12.00 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand Robinson Engineering, Inc.



JIM NALLEY, 1312 Second Ave., Albury, Ga., 31707:

"Here are the pictures I promised for the newsletter. They are not the best, quality, but, maybe you can use them.

If you have'n't flown your KR yet, believe me you are in for a real treat. I have flown a lot of airplanes, but my KR is my favorite. It is a sheer joy to fly. Here is a flight report for N88JN.

Take Off: 600' est.

Landing: 900' est.

Engine: Revmaster 1834-D with 52x48 Props Inc. prop.

Top Speed, Full throttle, level flight, (IAS): 189

Cruise, (IAS) 174 mph at 3,000 rpm/5,000¹.

Stall: 50mph, (IAS)

Empty Weight: 566 lbs.

N88JN is also equipped with starter, alt., dual magnetos, cabin air, cabin heat, carb. heat, electric trim, 720 Nav-Com., full instrument panel, upholstered interior, and insulated to keep the noise out.

It is painted with Dupont Imron. I also have a dive brake installed and it works.

I started building August 27, 1982 and it was finished and signed off on August. 3, 1983.

SUN 'N FUN 1984 is March 10 - 17. The KR Dinner is scheduled for the 14th at 7:00 pm. It will be at Raffles Restaurant, 6606 S. Florida Ave. Be sure and sign up early at the Wick's booth so they can get a head count. You might also pray for nicer weather this year. I don't as yet have the date for the KR Forum, but it will most likely be on Tuesday or Wednesday.

THE FIRST ITEM that needs to be addressed this month concerns the KR Newsletter itself.

Judging from some of the mail and phone calls I've been getting the last few months, I feel it's time to get a few items straightened out.

First, The KR Newsletter is not connected in any way with Rand Robinson Engineering, Inc. This Newsletter is an independent source of information on KRs and is intended as an open forum for ideas only. Unless directly stated in an article, the modifications, tips and hints, etc. are not from Rand Robinson. Whether or not you decide to use any information printed in the Newsletter is completely at your discretion. There are currently several THOUSAND KRs under construction around the world and the KR Newsletter simply tries to provide help and assistance to builders.

Second, The KR Newsletter is not my full-time job. My primary profession is an Investment Banker with a major Brokerage firm here in Denver and the KR Newsletter is strictly a part-time job. I do it because I enjoy writing and I love the KR aircraft.

Third: A recent letter I received accused me of making numerous "excuses" concerning the full flight testing of my own KR-2. As most any builder can attest to, there can be many unexpected set-backs when constructing your own aircraft. My own is no different and because my KR-2 is supposed to be a pleasurable hobby and not an obsession I work on it when I have the time. My KR-2 has flown, but there are several things I want to change before full flight testing begins.

This does not mean, as the letter accused, that I am "disgruntled" with my KR-2, nor does it mean that I am "afraid of it's handling qualities".

The same letter stated that I must not be very impressed with the Revmaster Engines and that I should be using a HAPI engine in my KR for reliability and then I wouldn't have to go to an O-200 engine in my next KR-2.

Actually, I think both the Revmaster and the HAPI engines are excellent engines and have nothing against either of them. My own engine, built by myself, is very reliable and has had no problems in over 15 hours of running so far, except mixture problems in the carb.

I am building another aircraft because I enjoy building and have several ideas that

I want to try. I also wanted a slightly larger aircraft with more power, remember I fly out of any airport with an elevation of almost 6,000 feet.

Lastly, "FAST" is not a "large-scale" parts supply operation as some people feel. It is a small aircraft supply company owned by myself, with the help of friends when needed. As most of you know, finding parts for our "homebuilt airplanes" can be very difficult at times and always seems to be expensive. Over many years of building aircraft I have been able to establish many varied contacts and outlet points for parts and less expensive prices and "FAST" was formed to help supply builders with these parts. It should also be pointed out, that "FAST" is not a division of Rand Robinson, as some people seem to think and it's only connection with Rand Robinson is that it handles several parts for the KRs that Rand makes.

Hopefully this will clear up any misconceptions anyone has and allow us to get back to the fun of building our aircraft.



THE POST OFFICE did a number on the Newsletter for a few weeks just after Christmas. It seems that someone with a similar PO Box number cancelled their box and the Post Office got the number wrong and began returning all our mail. I now have gotten it straightened out and the mail is again coming thru with no problems.

AFTER SEVERAL MONTHS of not knowing when the move would be I am finally in my new house. Consequently I now have a new phone number. The new number is 303-841-8651.

WES EVANS WAS tragically killed last month in the crash of his KR-2. Wes had the only O-200 powered KR-2 flying and he has been a regular at Oshkosh and many other airshows over the last few years.

Witnesses on the ground stated that the aircraft was flying low at a high rate of speed when it hit some "interstate high-voltage power lines. The impact cut the KR-2 literally in half. There was no reported mechanical or structural problem with the aircraft at the time of the

accident.

Wes was a tremendous person and a great inspiration to many builders and will be sorely missed.

!!! WARNING 1!!

DAN DIEHL IS currently refurbishing his KR-2 after over 1,000 hours of flight time and he reported that he found the rear-most spar in his horizontal stabilizer had come loose from the fuselage. It seems that the only thing holding it in place was the stiffness of the stabilizer and the fiberglass fillets where it meets the turtledeck.

This spar is only attached to the fuselage by the one plywood web and the web had cracked. This is the second problem reported in the last couple of months in this area. Chris McKeage also had a problem with his horizontal stabilizer. He found that when the nose of the airplane was pulled into a sharp climb, he could feel and see the horizontal stabilizer fluttering slightly.

To insure that you do not have this problem I recommend installation of gusset blocks between the spar and the top longerons of the fuselage and making the plywood web out of 1/4" plywood instead of 3/32".

All KR's flying should probably be inspected periodically to make sure that they also do not have this problem. You should be able to see into the hole for the elevator and see if the spar is coming loose from the longerons.

Another modification to this area that should help is the addition of a balance weight for the elevator. Dan's KR-2 would develop a flutter in the elevator at 193 mph and this may have contributed to the cracking of the web.

QUESTIONS AND ANSWERS

Q. Is the nose wheel on the DeFreeze tri-gear conversion steerable?

A. As designed it is not, however I have talked to several builders who either are planning to or have converted it to nose wheel steering.

Q. What is the latest word on the KR-3?

A. The KR-3 has gone back to Rand Robinson. Rand has decided not to release

any plans for this aircraft at this time and no work is currently being done on the prototype.

Q. Is anyone currently producing a fixed-gear conversion for the KR-2? I operate from a fairly rough strip and need a stronger gear.

A. Monnett Aircraft currently has a fixed, conventional gear available for the KR-2.

Q. Where can I obtain an engine mount for the O-200 engine for my KR-2? What is the weight of this engine?

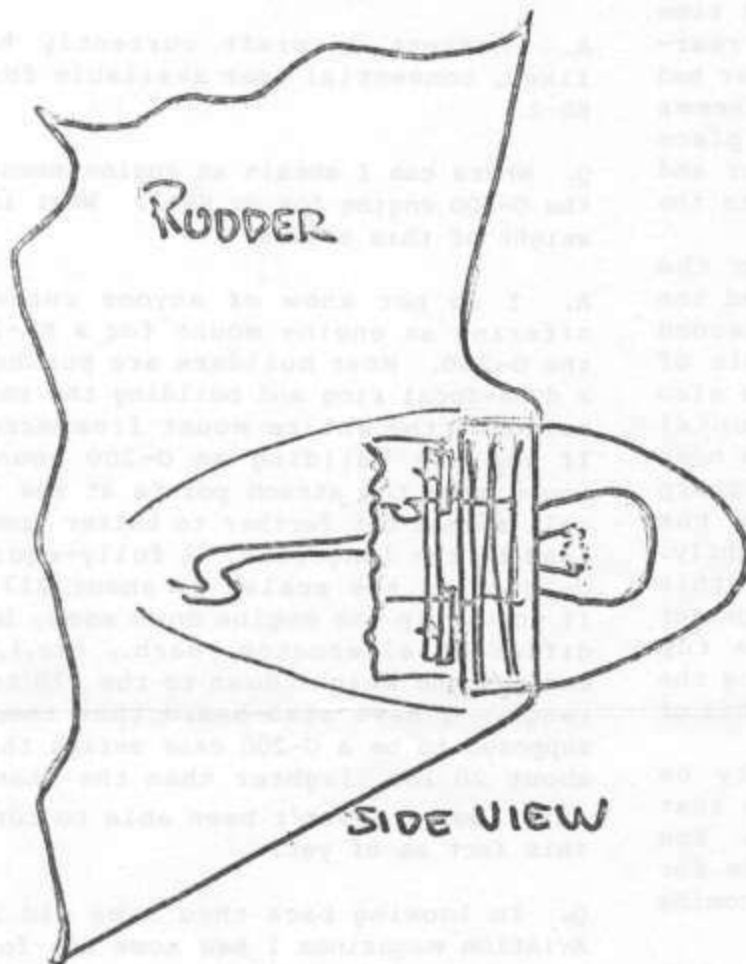
A. I do not know of anyone currently offering an engine mount for a KR-2 for the O-200. Most builders are purchasing a dyna-focal ring and building the rest, or building the entire mount from scratch. If you are building an O-200 mount, I would make the attach points at the firewall spread out further to better transfer load to the longerons. A fully-equipped O-200 tips the scales at about 217 lbs. If you strip the engine down some, (use a different alternator, carb., etc.), you can get the weight down to the 170 to 180 range. I have also heard that there is supposed to be a O-200 case series that is about 20 lbs. lighter than the standard case, but I haven't been able to confirm this fact as of yet.

Q. In looking back thru some old Sport Aviation magazines I saw some ads for the GB-1. I'm told that it was a completely pre-molded version of the KR-2. What has happened to it? Is it available?

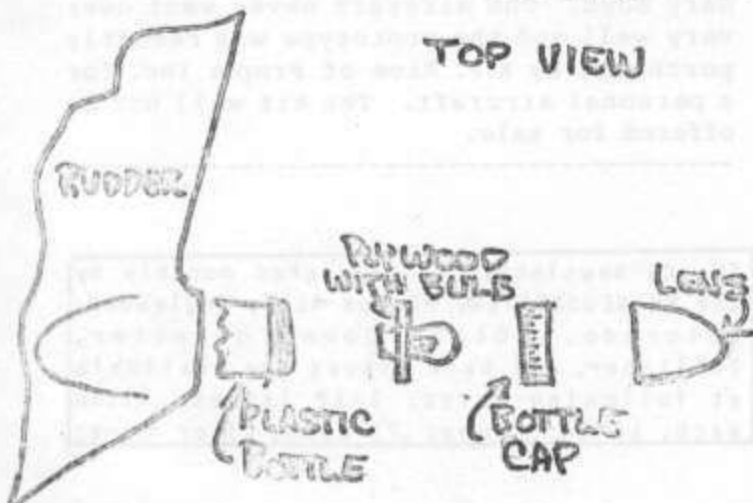
A. The GB-1 was a pre-molded copy of the KR-2 made available several years ago by Gary Boyd. The aircraft never went over very well and the prototype was recently purchased by K.P. Rice of Prop's Inc. for a personal aircraft. The kit will not be offered for sale.

The KR Newsletter is published monthly by the KR NEWSLETTER, PO Box 4113, Englewood, Colorado, 80155, John Forrester, Publisher. All back issues are available at following rates: 1-12 issues; \$1.00 each, 13-24 issues; .75 each. 25 or more;

NAV, LIGHT (TAIL)



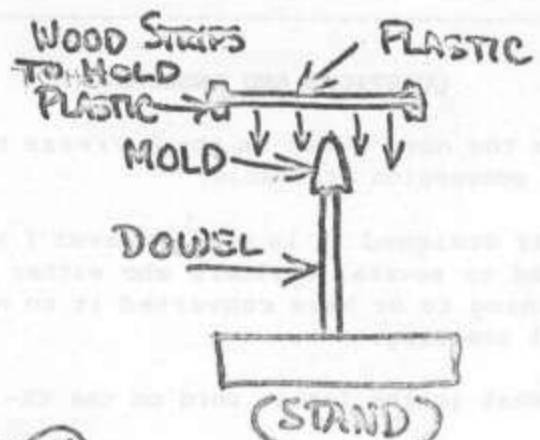
TOP VIEW



LOCATE SMALL PLASTIC MEDICINE BOTTLE WITH SCREW ON CAP.

CUT BOTTOM $\frac{3}{4}$ OF BOTTLE OFF. CUT TOP OUT OF CAP ALSO.

FORM RUDDER WITH FOAM TO ACCEPT BOTTLE WITH CAP ON. RECESS IN TAIL UNTILL CAP IS FLUSH WITH EDGE OF OPENING. SHAPE WOOD BLOCK TO OUT SIDE SIZE OF CAP. HEAT PLASTIC (LEXAN) IN OVEN AND PUSH OVER WOOD MOLD. COOL-TRIM- EPOXI TO BOTTLE CAP. LEAVE ABOUT $\frac{1}{4}$ " OVER- SIZE IN OPENING FOR SCREWING CAP ON. EPOXI $\frac{3}{32}$ PLYWOOD IN BOTTLE FOR MTG. LIGHT BULB.



Handwritten signature: Kelly C.

MARKETPLACE

FOR SALE—KR-2 Canopy and Cowling. Also prop for 1834 engine. 309-647-7797

FOR SALE—KR-2, 95% completed. Beautiful White with red and blue trim. All complete except for engine. Have HAPI 1835 engine and Rand 3-blade prop. Asking \$4,000 or best offer 509-547-2853



ANNOUNCEMENT

SINCE I BEGAN publishing the KR Newsletter, I have gotten a lot of requests to expand the Newsletter to cover other types of composite aircraft. Many techniques are the same and a lot can be learned with the sharing of information. Other readers stated they did not want the Newsletter diluted with other types however.

I CONSTANTLY RECEIVE hundreds of letters, tips, photos, etc. on all types of composite aircraft and in order to share this information and still keep the KR Newsletter for KR's only I have decided to begin publishing another newsletter titled "COMPOSITE AIRCRAFT" to be issued quarterly.

THE KR NEWSLETTER will continue as always with no changes and will keep bringing you the latest information on KR's.

INTRODUCTION SUBSCRIPTIONS for KR Newsletter subscribers who wish to also receive "COMPOSITE AIRCRAFT" will be \$10.00 a year. Standard subscription will be \$12.00 a year, or \$30.00 for 3 years.

FOR SALE—Warnke 52 x 52 prop, new, never used. Complete landing gear assy., including new tires, wheels and brakes. Complete welded rudder pedal assy. Will accept any reasonable offer. Jim Karr, 304-347-0344 work 304-744-3983 home.

FOR SALE—1 new R/R motor mount for KR-1 or KR-2. Bead blasted and zinc plated, complete with rubber bushings. Fits VW case or Diehl Supercase. \$75.00
1 New stainless steel firewall for KR-1 or KR-2. \$7.00 Clyde Wetherbee, 817 Evans, Waupaca, Wi. 54981 715-258-5191 after 5:00 pm.

FOR SALE—KR-2 Brand new all FAA paperwork complete. HAPI 1835, basic VFR instrumentation, ELT, 35 hr TT. \$6,795. Possible trade. Call Colorado 303-879-4603

FOR SALE—KR-2, about 85% finished - 1834 Revmaster, (0-time) with most materials for completion. \$3,000. Sylvia B. Fleming, 15751 Primrose Lane, Westminster, Ca. 92683 714-897-2238 (ed: Builder, (Don Fleming), passed away before he was able to complete).

FOR SALE—KR-2, 2100cc Revmaster with Forged Crank, Dual mags, oil cooler, starter, alternator, Great American prop, plans built, FAA certified, first flight: Dec, 10, 1983. Flew beautifully. \$7,200 includes custom trailer. Rich Neate 904-761-7261 after 7:00 pm.

FOR SALE...KR-2, 1834cc, electric start and trim, KX-170, excellent condition, always hangered. \$7,000 415-635-4888 Jack **Romanski**.

WANTED.....R/R Spinner for 2 blade prop. Bill Thomas 203-728-4061 Workdays.

FOR SALE...KR-2 project - Excellent workmanship, fuselage & wing spars inspected and signed off. Fixed landing gear and mounting brackets and 4" aircraft style tailwheel, including spring. Gear designed by Bill Rosman and manufactured by Monnett. Extruded aluminum angle for reinforced engine installation. Horizontal and vertical stabilizer frame completed, including hardware installed. Elevator cable pulley brackets for rear spar and horizontal stabilizer. All wing attach fittings, fittings on forward spars installed Complete bolt kit. All hardware from Miniature Metrics. Fuselage fiberglassed, various other parts - will sell for \$1,200. 803-576-5635 after 5:00 pm EST.

FOR SALE...KR-2 project, 98% complete, FAA paperwork done, Best offer over \$6,500 George Kahnk, 4535 Y St., Lincoln, Ne. 68503,

MINIATURE METRICS

Liteflite Hardware
7801 14th Street
Westminster, Calif. 92683
Phone (714)894-4875
Carey H. Anderson

Aileron counter-balances
\$65. pair postpaid

Aileron pulley brackets assys.
\$30. pair postpaid

Lower elevator pulley brackets'
\$28, assembled postpaid

Upper elevator pulley bracket
\$15. assembled postpaid

Rudder, elevator, tailwheel
Horns & Hinges, backup plates
\$60. postpaid

Complete machining of Rand-Robinson extrusion kit #4
including landing gear. \$319. Shipping not included
Above reaching, plus controls assembled \$420. Write
for detailed list.
Above work/shipping arranged through Rand-
Robinson

Rudder pedal
Mount Blocks
\$30. set postpi

Control stick assembly
per plans w/mike switch
\$75. postpaid

Aileron bellcraiwcs
& horns complete
Assemblies (24 pieces)
\$87. postpaid

KR NEWSLETTER
PO BOX 4113

ENGLEWOOD, COLORADO 80155-4113
ISSUE NO. 104 FEBRUARY 1984

FIRST CLASS MAIL
U.S. POSTAGE
PAID
DENVER, COLORADO
PERMIT NO. 2677



issue no. 105

March
1984

KR NEWSLETTER

RATES		
USA	\$12.00	Yr
CANADA	\$15.00	Yr
OVERSEAS	\$20.00	Yr
		U.S. Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand Robinson Engineering. Inc.

**FLIGHT REPORT KR-2 N38TF****Tim Firestone**

330 S. Third St., Lemoyne, Pa. 17043

"The odyssey of N38TF start life as N81932, built by Jack Aldrich of Bradentown, Fl., first flight January 21, 1978. Jack kept the plane for a year and flew it 12 hours. It was sold and left set for a year.

Next it was acquired by Richard Kunc of Orlando, Fl., in April 1980. Richard completely rebuilt the control systems and power plant. It appears he re-designed and rebuilt almost everything, put on about. 8 hours flight, only to have the plane severely damaged by a hail storm on April 9, 1982.

I saw the advertisement by Richard to sell the plane in the KR Newsletter, (already had bought my plans), and arranged purchase over the phone after seeing photos.

By way of a favor owed by a friend the unit. was shipped to my home in Pennsylvania suspended from the roof of a new trailer filled with **watermellons**. My first, sight of the plane created a feeling

of illness, and as one helpful person suggested, it must have come from the Falkland Islands War.

Received on June 18, 1982, I immediately started to rebuild. I hoped to take six months. I chose a 914, 2.0 liter Porsche Type IV and began to do it my way. Twelve days short of a year later, on June 6, 1983 a re-registered N38TF, (my age and initials), took to the air again. **Now** the work was worth it. Performance is great, take off at half throttle. So far I've been to 140 at 2800 and have plenty of throttle left.

The engine is too powerful on take-off and runs cool at. 180 oil and 300 CHT. Climb out is very fast, but not neasured yet. She's a pussycat, to land over the fence at 65 and wants to float forever.

I would like to hear from anybody else running a Type IV. N38TF weighs 600 lbs. empty and 870 at take off.

Engine Specs:

1975 Porsche 914, 2.0 liter Type IV
Stock oil cooler, filter & oil pump
Isky truck grind cam and lifters
Stainless steel valves

HAPI case and alternator (modified)
 Super Carb
 Equal length collected exhaust
 Slick single mag and 18mm plugs
 52x48 Aymar prop 52x54 Wanke for
 later flights
 VW automatic starter
 Carb heat and mixture control
 TM Designs prop hub (modified)
 Custom Aircraft mag drive and starter
 wheel, (both modified)

Everything has been handmade and seems to work fine. Engine installation weighs 215 Ibs and can be substantially lightened. This engine could be built to 2600cc with the same weight and should turn out over 100 hp and not cost much more than a 2100cc Type III case."

FLIGHT REPORT KR-1 N31097
Jim Paris EAA Designee #1273
 129 Crest Ave. Lancaster, Pa. 17602
 717-393-5928

" My KR-1 appeared in Issue #78, December 1981. I have a complete up date from then till now - Engine VW 1834 with Warnke 52-48 prop. The flatback VW oil cooler installed on top of crankcase with HAPI adapter. The HAPI cylinder baffels were extended 2" on bottom of fin for more direct cooling. Cylinder fins on top have a curved scoop at rear to also direct air to back fins. I used a REVMaster front baffel in front of crankcase to keep air underneath crankcase from blocking bottom draft. I installed a selector box for ram air on 32mm Posa Supercarb with mixture control. Box has a selector from cockpit for ram air or filtered air from cowl. (similar to carb heat). I then installed a small NASA scoop on bottom cowl to gasalator box for fresh air in box at all times. Gas cannot get hot this way. Single mag. with HAPI mount. Installed a breather collector can on firewall for oil overflow, keeps things clean.

I have no prop extension on crankshaft, the front exhaust in cowled inside and looks better. I made form fitting tanks, 14 gallon profile types and installed sump on bottom of tanks. A selector valve was installed on sight gauge on the bottom fitting in case of breakage it can be turned off.

Two NASA scoops were cut on cowling for cabin air and a heat box was built on rear exhaust pipe and run to selector box for which cabin heat can be controled from the

cockpit. I have a sliding canopy from a RV-3 with desk drawer sliding windshield seperate with roll bar installed.

I installed covers on gear legs to keep air out of cabin in the winter. Had flaps on origanally, but extended them across fuselage underneath, connected them as one unit which increases them 30%. This helps with more down pitch on landing approach and less roll out.

Wing tips are the Mooney 201 upswept tips which look very good. Deck was built straight to rudder tailpost which was increased 4" and rudder area about 15%. I then static balanced rudder and elevator. Springs on tailwheel help yaw on landing tail down.

I have one-handed gear operation - bicycle grip flips both levers up at same time. Squeeze, push and it automatically locks up. Squeeze, push, slightly release lock and pullback and lock lever for landing. I installed control stick in center of aircraft, heel brakes and I made my own seat from a 1968 Sport Aviation Article.

Interior is fully upholstered with rug on floor. Side panel at instrument panel has controls for cowl flaps, mixture, ram air and cabin heat. Removeable instrument panel for maintance. A bag-type luggage compartment installed rear of seat can hold 60 Ibs.

I had a barrel of fun upgrading my KR-1 to what I like. I did not change wing area or stabilizer area, this I would stay away from, the KR-1 is very versitile with out those types of changes."

PERFORMANCE DATA

Net Weight:	488 Ibs.
Gross Weight:	834 Ibs.
Usefull load:	346 Ibs.
Cruise 3100 rpm:	160 I.A.S.
Climb 3200 rpm:	2100 F.P.M.
Cruise 3000 rpm:	150 I.A.S.
Full Power 3300 rpm:	180 I.A.S.
Top Speed VNE:	210 MPH
Stall Speed:	50 MPH
Oil Temp:	160°
CHT:	350°
Oil Pressure:	60 Ibs.
Total Flying Time to Date:	100 hrs.

The KR Newsletter is published monthly by the KR NEWSLETTER, PO Box 4113, Englewood, Colorado, 80155, John Forrester, Publisher. All back issues are available at following rates: 1-12 issues; \$1.00 each. 13-24 issues; .75 each. 25 or more;

CAUTION

The last couple of years we have seen a tremendous interest in the use of oil "wonder" additives for aircraft use. They promise all kinds of benefits such as reduced temp and longer engine life.

In a recent conversation with KR Designee Steve Bennett, Steve told me what happened when he tried one in his KR-1.

Shortly after he installed the additive, his engine began to lose oil pressure and overheat resulting in a fast return to the airport. When investigating he found the oil pickup screen and tube completely blocked by a heavy sludge.

After this I was talking to a friend with the NTSB who told me that they have had several reports lately of total engine failure in aircraft using additives. In each case the oil pickup was filled with a sludge.

At this time the NTSB is investigating further and may possibly restrict the use of these additives in aircraft use.

AT THE KR FORUM at Oshkosh last year, several builders expressed interest in using some of the new foams available but were having trouble finding suppliers for them. I promised to try to locate them and here is a list of the most popular.

Aluminum Honeycomb
American Cyanamid Company
Havre de Grace, MD 21078

Rigid PVC Foam
American Klegecell Corporation
204 North Dooley Street
Grapevine, Texas 76051

Balsa Wood Cores
Baltek Corporation
PO Box 195
Northvale, New Jersey 07647

Glass & Nomex Honeycomb
Ciba-Geigy
10910 Talbert Avenue
Fountain Valley, California 92708

International Honeycomb Mfgs.
2542 Del Amo
Carson, California 90749

Urethane Foam Cores

Clark Foam Products
25887 Crown Valley Parkway
South Laguna, California 92677

Diab-Barracuda (Divinycell)
2001 108th St., Suite 102
Grand Prairie, Texas 75050

General Plastics Manufacturing
PO Box 9097
Tacoma, Washington 98409

Kraft Paper Honeycombs
Hexagon Honeycomb
7803 Clayton Rd., Suite 201
St. Louis, Missouri 63117

International Honeycomb Corporation
1149 Central Ave.
Park Forest South, Illinois 60466

Honeycomb Structural Products
15100 Via Frontera
San Diego, California 92127

Aluminum, Glass, Nomex & Kraft Paper Cores
Hexcel Corporation
PO Box 2312
Dublin, California 94566

Semi-Rigid PVC Foam
Torin, Incorporated
125 Sheridan Terrace
Ridgewood, New Jersey 07450

Commercial Paper Honeycomb
Vertice1 Company
4607 So. Windermere
Englewood, Colorado 80110

Vertice1-Chicago
2117 N. 15th Ave.
Melrose Park, Illinois 60160

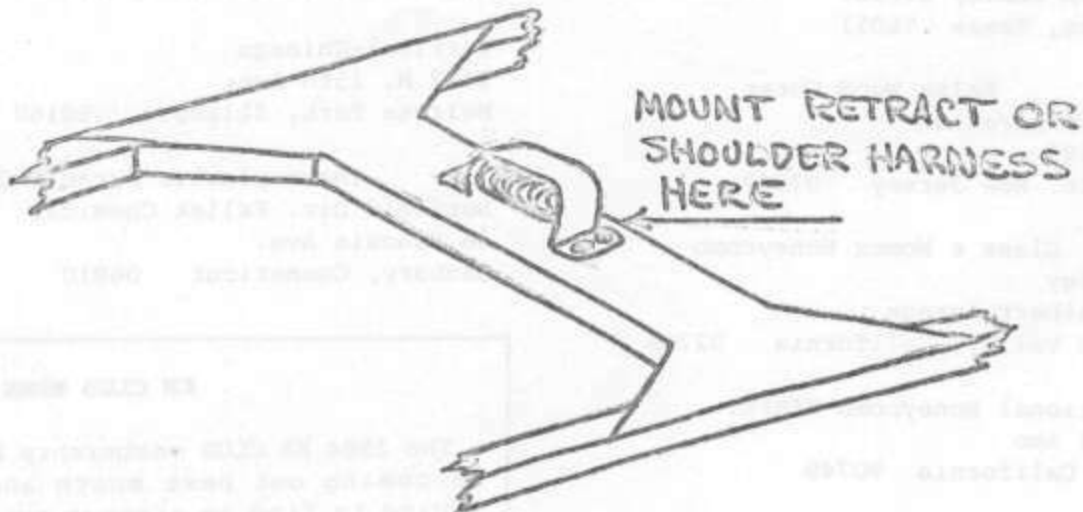
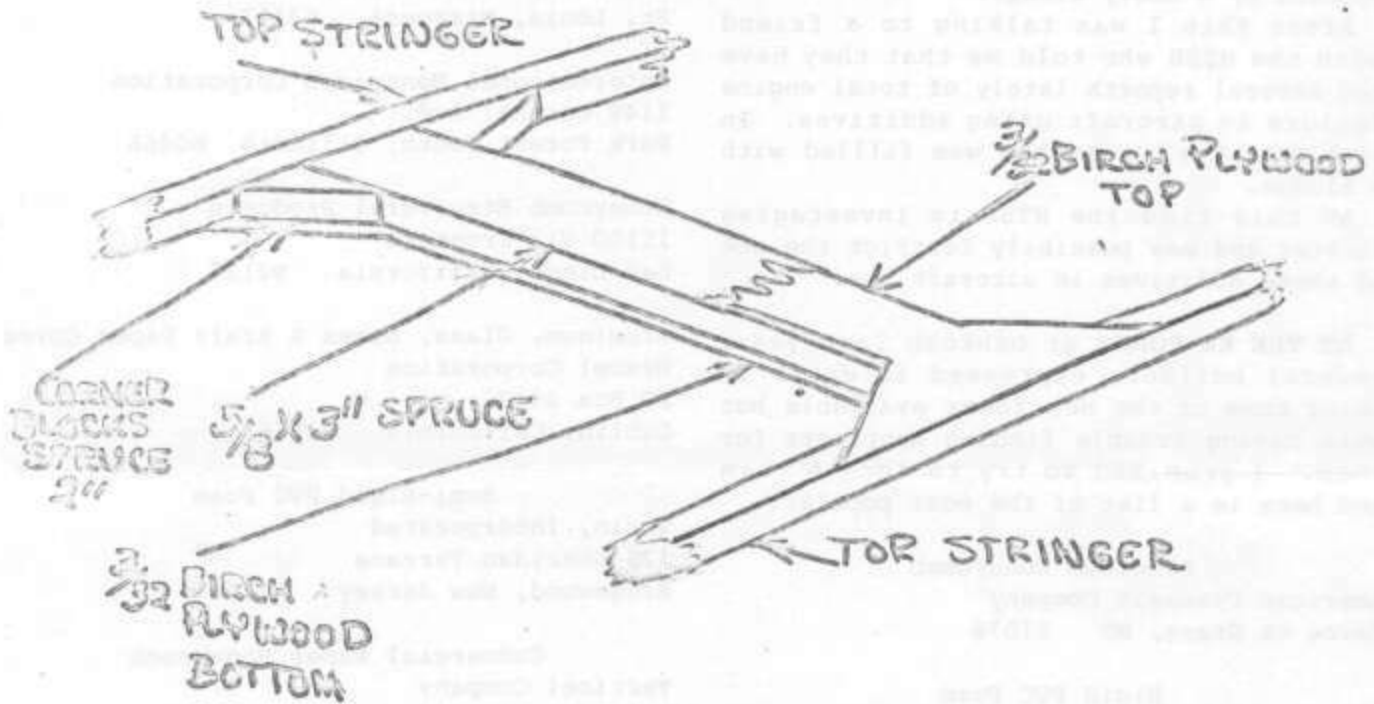
Thermoplastic Pyramid Core
Norfield Div. Fallek Chemical
36 Kenosia Ave.
Danbury, Connecticut 06810

KR CLUB NEWS

The 1984 KR CLUB membership booklet will be coming out next month and I'm still trying to find an airport suitable for a large KR CLUB Fly-In. I should have a firm date and location in the April Newsletter.

KR-1 SHOULDER HARNESS ATTCH. POINT

BUILD IN TO MEET OWNERS
REQUIR



Handwritten signature

ANNOUNCEMENT-

SINCE I BEGAN publishing the KR Newsletter, I have gotten a lot of requests to expand the Newsletter to cover other types of composite aircraft. Many techniques are the same and a lot can be learned with the sharing of information. Other readers stated they did not want the Newsletter diluted with other types however.

I CONSTANTLY RECEIVE hundreds of letters, tips, photos, etc. on all types of composite aircraft and in order to share this information and still keep the KR Newsletter for KR's only I have decided to begin publishing another newsletter titled "COMPOSITE AIRCRAFT" to be issued quarterly.

THE KR NEWSLETTER will continue as always with no changes and will keep bringing you the latest information on KR's.

INTRODUCTION SUBSCRIPTIONS for KR Newsletter subscribers who wish to also receive "COMPOSITE AIRCRAFT" will be \$10.00 a year. Standard subscription will be \$12.00 a year, or \$30.00 for 3 years.

MARKETPLACE




NEW! 11.400x5.6 PLY. RATED
TIRE SPECIFICATIONS INFLATED.
HEIGHT 11.5 INCH WIDTH 4.0 INCH
TIRE WT. 3 LBS. TUBE WT. 1/2 LB
LOAD RANGE C - 70 P.S.I. MAX

This tire fills the size gap between the 500x5 aircraft tire and the 3.40-3.00x5 go-kart tire. Looka Haka a calad-Oown 500x5. Frta KR-1 A 2+ and is raccomandad by Burt Rutan for the VanEta and Lono-12. A.Jao fita most othar aparamantala using 5 inch rima.

TIRE 6 PLY RAT. 25.00 TUBE 6.50+ SHIP A HAND.
MIKE LAMB, P.O. BOX 3324 QUARTZ HILL, CA93534

GREAT PLAINS

AIRCRAFT SUPPLY CO.

312-359-6558

\$69.95 EA

ANTI-COLLISION LIGHT

Model ACR/ACL-4 - Brilliant stationary xenon strobe light for marine, recreation or industrial use. 750,000 peak lumens per flash, this mini giant draws only 0.1A*at 12VDC. Weighs 8 ounces. Unique dual mount bracket; base or side mounting. Durable; weather resistant; rugged. Will survive severe conditions; even operates submerged.



11-400x5 RIBBED TIRE AND TUBE

2 TIRES & TUBES
 ONLY \$28.95



Excellent replacement tire for KR's and EZ's. Tire is 4.1" wide and 10.7" in diameter. This RIBBED tire has almost a full 3/8" of rubber. 2 tires & tubes for less than the cost of 1 LAMB tire & tube.

P.O. BOX 1481 PALATINE ILL 60078

FOR SALE...Brand new VW accessories. Custom Aircraft-Accessory Case: \$125.00 and flywheel: \$70.00, Starter: \$40.00, Chrome Aluminum valve covers: \$15.00, Slick 4016 Magneto: \$135.00. Harlan Anderson, Box 237, St. Ansgar, Iowa 50472.

WANTED—Complete and Flying KR-2. K.M. MacKenzie, Jr., 1439 Vernon Ridge Ct., Dunwoody, Ga. 30338 404-394-4084.

FOR SALE...KR-2 project, 98% complete, FAA paperwork done, Best offer over \$6,000. George Kahnk, 4535 Y St., Lincoln, Ne. 68503.

FOR SALE...KR-2 Canopy & cowling. Also prop for 1834 engine. 309-647-7797.

WANTED—R/R Spinner for 2 blade prop. Bill Thomas 203-728-4061. Workdays.

MINIATURE METRICS

Litaflite Hardware
7801 14th Street
Westminster, Calif. 92683
Phone (714)894-4875
Carey H. Anderson

Complete machining of Rand-Robinson extrusion kit #4
including landing gear. \$319. Shipping not included
Above reaching, plus controls assembled \$420. write
for detailed list.
Above work/shipping arranged through Rand-
Robinson

Aileron counter-balances
\$65. pair postpaid

Aileron pulley brackets assys.
\$30. pair postpaid

Lower elevator pulley brackets
\$28, assembled postpaid

Upper elevator pulley bracket
\$15. assembled postpaid

Rudder pedal
Mount Blocks
\$30. set postpt

Control stick assembly
per plans w/mike switch
\$75. postpaid

Rudder* elevator, tailwheel
Horns & Hinges, backup plates
\$60. postpaid

Aileron bellcranks
& horns complete
Assemblies (24 pieces)
\$87. postpaid

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLORADO 80155-4113
ISSUE NO. 105 MARCH 1984

FIRST CLASS MAIL
U.S. POSTAGE
PAID
DENVER, COLORADO
PERMIT NO. 2677



Issue no. 106**APRIL
1984****KR NEWSLETTER**

RATES	
USA	\$1200 Yr
CANADA	\$15.00 Yr
OVERSEAS	\$20.00 Yr
	U.S. Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand Robinson Engineering, Inc.

**FLIGHT REPORT KR-1 N9136J****Charles Jones**

PO Box 92, Geraldine, Al. 35974

"I'm enclosing photos of my KR-1, N9136J. I began construction on an already begun project in February, 1981, and it was signed off for flight December 13. It has a 1500cc factory-rebuilt VW engine, Slick mag., a 53x36 prop carved by a friend, (Earl Bain), no electrics, and is pretty much plans-built except for the dorsal fin. Empty weight is 455 lbs.

At 3,000 rpm I'm indicating 110-115 with the gear extended, (still haven't retracted the gear yet), oil and cylinder head temps are excellent. Contrary to what I had heard, the KR-1 is an easy ground handler and is a joy to fly."

Those of you who read HOMEBUILT AIRCRAFT magazine have probably seen the series of articles by Andy Marshall on Composite Construction. Andy is considered to be one of the most knowledgeable person in composites and he recently informed me

that the series will be available to builders this summer in book form with expanded section added.

Andy also presents several Seminar/Workshops thruout the country each year. I attended the seminar at Sun 'n Fun last year and I highly recommend it to anyone building a composite aircraft.

The seminars are held in about a dozen cities each year, including Oshkosh each year. For more information contact: Marshall Consulting, 415-945-6051.

KR-2 PLANS ERROR

There is a misplaced dimension on Drawing No. 1 of the new KR-2 plans drawings. The 29.75" bottom cross piece arrow should be pointing to the next cross-member aft, ("I").

Several builders have broken glue joints trying to clamp as indicated so please make a not of this correction.

CONSTRUCTION TIPS

Carey Anderson
MINIATURE METRICS

"Dear KR Builder:

We recommend mounting the horns and hinges on the bare spars before you put on the ribs and foam. The elevator spar has a 1/4" plywood center brace about 12" long; glue this on first. (p. 46, KR-2 manual). Use small clamps to hold while drilling thru part, spar and backup plate; use a new 3/16" drill. Use a clean polished 3/16" rod to line up all the hinges. The elevator horn and hinge half go on offset so the horn blade will be on the center line, not as shown in drawing #44, p. 46, KR-2 manual. Varnish only the spots where the parts touch the spars before putting bolts thru the parts. Heads are on the part side, nuts on the backup plate side. Then test the motion of the spars and proceed with the other parts, foam, etc.

The landing gear could be test mounted on the main spar before putting the spar into the fuselage. Drilling, etc. is easier with the spar on padded saw horses. Finish your main spar and close after FM inspection. Mark or remember the spar location heights on the face forward side of the spar assembly. Assemble the landing gear spring bar, rotation blocks and stop blocks and bolt a large hinge casting with plain 1/4" x 28 T.P.I., nuts. Do not mount gear legs at this time. Proper centering and correct height are important. Calculate the space needed for gear rotation and that will be the height location for your gear on the spar. The spar should not receive any extra holes so plan carefully. The wedge blocks must be in place and extra wedge blocks could be used behind the spar for ease in clamping so the clamps will fit on parallel surfaces. Then drill with a new 1/4" drill; do not drill without the wedge blocks as we have jig drilled the mount holes in the hinge blocks at the correct angle. Dismantle all spar fittings and install the spar when ready.

The aileron pulley brackets should be attached before covering the center section with foam. The bolts must be low enough to catch the lower spar cap. Orient the brackets so the pulleys are in line horizontally with the cable. You can use a string for this lineup from control stick aileron connector plate thru pulley,

thru the aft spar to the hole in part "B" of the aileron bell crank assembly. Use 3/16" holes for mounting.

Proceed to mount the double pulley bracket as marked and as in the plans. Be sure the assembly is high enough to clear the aileron cross-over cable. (See p. 72, drawing #66, KR-2 manual).

The aileron bell cranks are mounted after you have mounted the wing spar connector plates, also called wing attach fittings. Move them in or out as much as 1/4" to get the best bolt hole location in the parts. The upper part (angle) will protrude above the finished spar and must be cut off after mounting or the easiest way for you. Keep the assembly low profile as it is essential that the aileron bell crank fits the airfoil. However, the bottom side of the wing will probably have a small bump over the pivot bolt and nut. When finishing the wing center section be sure the free motion of the aileron bell crank is not blocked by foam or other materials.

Study the aileron horn location in the plans book. The horn points down. Again, check for the critical distance, 21/32" or from the aileron spar to the eye of the horn. Page 88 shows the mounting and also an incorrect drawing of the aileron and wing junction. Read paragraphs 10.57 and 10.58 in the new plans book; also, the drawing #72 on page 89 for a nearly correct illustration of the aileron cross section.

The aileron counter balance arms are bolted on the spar 41" from the root of the aileron or inboard end. Follow the plans for balancing and we suggest a 3" long piece of 3/32" plywood be added to the spar between the aileron balance arm and the aileron spar to the spread the stress on this 1/4" spar before mounting the arm.

Mount the up elevator cable pulley bracket on the face forward side of the forward horizontal stabilizer spar as shown in plansbook. About this part we must suggest that when joining the cables from the control stick to horn that the cable from the lowest end of the control stick passes thru the rear spar thru the double pulleys bracket, thru the up elevator bracket to the top, (up), end of the elevator horn. Please, don't laugh! Tired builders have reversed these and one successfully flew his KR until someone with more flying time pointed out the error!

The control stick brackets share bolt holes and bolts with the central springbar hinge casting on the KR-2 and is central on the KR-1. The microphone switch wires should be fastened with a nylon/aluminum clip along the face side of spar so it cannot be kicked and damaged on its way to the radio connection. The large hinge casting mount bolts should have a mounting plate on the back side of the spar center section.

All of the preceding information is given to you in a spirit of being helpful and to save you time, money or a busted part #1."

Yours Truly,
Carey H. Anderson

NEW KR PARTS AVAILABLE NOW FROM MINIATURE METRICS

Rudder pedal positioning & centering kit: 2 pulleys and 2 spring, special for KR-2: \$14.00 each.

Aileron push rod arms and 4 Heim joint ball bearing ends: \$26.00 a pair.

Landing gear lock bar springs, mouse trap spring pattern, positive action, special for the KR-2 and plated: \$12.00 a pair.

(ed: I have a set of these and they are excellent-they put a lot of pressure on the gear lock bars to keep them locked)

Gear legs machined for brake arm slot and axle hole and brake arm relief. We pick up from Rand and machine and return to R/R for shipping: \$25.00 a pair.

Landing gear retract handle. Weight 8.5 oz: \$30.00 each.

Prop hub bolt to fit VW crankshaft, 20mm x 1/5 mm x ____ mm. Please specify length, either standard 55 mm or other. Weight 8 oz. average: \$12.00 each.

Positive lock pin system designed by Rex Taylor for KR landing gear: gear handle assembly, pins, springs and blocks assemblies, radius plates with mount holes, and 1/16" cables and nico press sleeves: \$95.00.

FLIGHT REPORT KR-2 N122MS

M.T. Sparks, 10202 Kit Carson Place
Santee, California 92071

"To date, N122MS has 112 hours on it and has been flying for 1 1/2 years. It's built very close to the drawings and from scratch except the spruce kit and wing tips. First flight was August 1982.

It took me 2 years, (approx. 2,000 hours), to build. Cost including engine is approx. \$4,000. Engine is 1834 VW with Supercarb, starter, alternator and dual ignition, (1 mag and C.D.U.). I built using MAPI's book "How to Build a Reliable VW Airplane Engine".

The KR-2 handles very nicely. A little sensitive on the elevator, especially with 2 people aboard, but you get used to it quickly.

I've had it to 200 mph in shallow dive and it indicates 155 mph cruise at sea level at 3200 rpm with a 52 x 46 Great American prop and burns 4 gallons, per hour. Empty weight is 502 lbs.

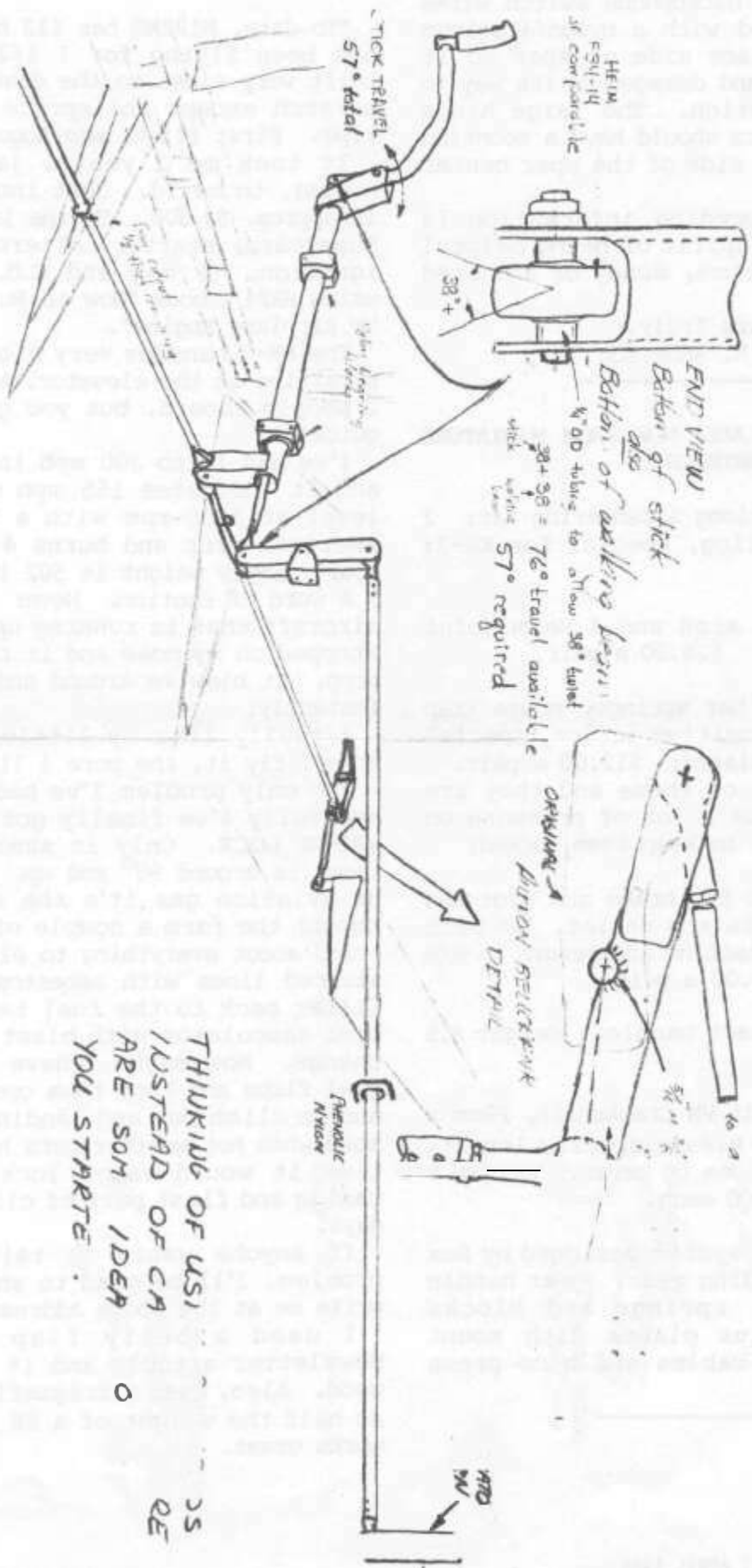
A word of caution. Never taxi behind an aircraft that is running up. I did and I stopped on my nose and it cost me a \$250 prop. It blew me around and up on my nose instantly!

I really like my little KR-2 and the more I fly it, the more I like it.

The only problem I've had with it, and hopefully I've finally got it fixed, is **VAPOR LOCK**. Only in summer, when the temp, is around 90° and up. With auto gas or aviation gas it's the same. Almost bought the farm a couple of times. I've tried about everything to eliminate it. I wrapped lines with asbestos, vented fuel filter back to the fuel tank, put cover over gascolator with blast tube etc. No change. Now maybe I have it. I put on cowl flaps and keep them open when taxiing and on climb out and landing. Will know more when hot weather gets here. The only time it would vapor lock was in long taxiing and first part of climb out on hot days.

If anyone wants to talk about this problem, I'll be glad to share it. Just write me at the above address.

I used a belly flap per the KR Newsletter article and it works pretty good. Also, used a dragonfly tail spring at half the weight of a KR spring and it works great.



THINKING OF USI
 IUSTED OF CA
 ARE SOM IDEH
 YOU STARTE

CS
 DE

MARKETPLACE

GREAT PLAINS

AIRCRAFT SUPPLY CO.

312-359-6558

\$69.95 EA

ANTI-COLLISION LIGHT

Model ACR/ACL-4 - Brilliant stationary xenon strobe light for marine, recreation or industrial use. 750,000 peak lumens per flash, this mini giant draws only 0.1A* at 12VDC. Weighs 8 ounces. Unique dual mount bracket; base or sWe mounting. Durable; weather resistant; rugged. Will survive severe conditions; even operates submerged.



11-400x5 RIBBED TIRE AND TUBE

2 TIRES & TUBES
ONLY \$28.95

Excellent replacement tire for KR's and EZ's. Tire is 4.1" wide and 10.7" in diameter. This RIBBED tire has almost a full 3/8" of rubber. 2 tires & tubes for less than the cost of 1 LAMB tire 8 tube.



P.O. BOX 1481 PALATINE ILL 60078

BUYING, SELLING OR
LOOKING FOR PARTS FOR
YOUR KR?

Ads for Newsletter Subscriber's who are buying, selling or looking for parts for their project are FREE. That extra part you don't need may be just, the thing another builder needs, so advertise it.



NEW 11 400x5 6 PLY RATED
TIRE SPECIFICATIONS INFLATED
HEIGHT 115 INCH WIDTH 40 INCH
TIRE WT 3 LBS. TUBE WT VJ LB
LOAD RANGE C -70 P.S.I. MAX
This tire fits the 500x5 aircraft tire and the 3.40-3.00x5 go-kart tire. Looks like a scaled-down 500x5. Fits KR-1 A 2* and is recommended by Burt Rutan for the VariEta and Long-EZ. Also fits most other experimental* using 5 inch run*.
TIRE 6 PLY RAT. 25.00 TUBE 6.50+ SHIP A HAND
MIKE LAMB, P.O. BOX 3324 QUARTZ HILL, CA 93534

FOR SALE...KR-1, Tri-Gear, 75hp Cont. engine M.O.H., 500 x 5 wheels, Cleveland brakes, 36 hours total A & E, Ground handling is beautiful, cruise 145, no electric. Painted white, green and brown trim. Picture in KR NEWSLETTER, issue no. 93, March 1983, also SPORT AVIATION, April 1980. \$5,500 Jerry Boggs, 614-279-4667, after 6:00 pm No collect calls, please.

FOR SALE...KR-2, 80% complete, Turbo'd 1834 VW, built by Aeronautical Engineer. Have another KR-2 flying. I only need one. \$3,500 303-258-7206 Tom Johnson.

The KR Newsletter is published monthly by the KR NEWSLETTER, PO Box 4113, Englewood, Colorado, 80155, John Forrester, Publisher. All back issues are available at following rates: 1-12 issues; \$1.00 each, 13-24 issues; .75 each. 25 or more;

ANNOUNCEMENT-

SINCE I BEGAN publishing the KR Newsletter, I have gotten a lot of requests to expand the Newsletter to cover other types of composite aircraft. Many techniques are the same and a lot can be learned with the sharing of information. Other readers stated they did not want the Newsletter diluted with other types however.

I CONSTANTLY RECEIVE hundreds of letters, tips, photos, etc. on all types of composite aircraft and in order to share this information and still keep the KR Newsletter for KR's only I have decided to begin publishing another newsletter titled "COMPOSITE AIRCRAFT" to be issued quarterly.

THE KR NEWSLETTER will continue as always with no changes and will keep bringing you the latest information on KR's.

INTRODUCTION SUBSCRIPTIONS for KR Newsletter subscribers who wish to also receive "COMPOSITE AIRCRAFT" will be \$10.00 a year. Standard subscription will be \$12.00 a year or \$30.00 for 3 years.

MINIATURE METRICS

Liteflite Hardware
7801 14th Street
Westminster, Calif. 92683
Phone (714) 894-4875
Carey H. Anderson

Aileron counter-balances
\$65. pair postpaid

Aileron pulley brackets assys.
\$30. pair postpaid

Lower elevator pulley brackets
\$28*assembled postpaid

Upper elevator pulley bracket
\$15. assembled postpaid

Rudder, elevator, tailwheel
Horns & Hinges, backup plates
\$60. postpaid

Complete machining of Rand-Robinson extrusion kit #4
including landing gear. \$319. Shipping not included
Above machining, plus controls assefled \$420. write
for detailed list.
Above work/shipping arranged through Rand-
Robinson

Rudder pedal
Mount Blocks
\$30. set postpt

Control stick assentoly
per plans w/mike switch
\$75. postpaid

Aileron bellcranks
& horns complete
Assemblies (24 pieces)
\$87. postpaid

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLORADO 80155-4113
ISSUE NO. 106 APRIL 1984

FIRST CLASS MAIL
U.S. POSTAGE
PAID
DENVER, COLORADO
PERM IT NO. 2677



ISSUE 107-108 MAY/JUNE 1984



KR NEWSLETTER

RATES
USA \$12.00 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand/Robinson Engineering.



NI22MS was built by M.T. Soarke, 1111 Carson Place, Sacramento, CA 95811. Empty weight 110 lbs. Engine VW with electrical system at 3200 rpm. 50 x 46 G West American 2004.

As you have surely noticed, this month's newsletter is not only late, but quite longer. The reason is that with the many changes undergone personally lately, (new job, new house, etc.), and my crash of my own KR-2 has slowed me down a bit lately. Since I had gotten behind and also happened to have quite a bit of information for builders at this time I decided to do a one-time combination issue. This issue is longer because it combines the May and June issues into one.

Another area that suffered is the KR Club rooster. I was not able to finish it during the turmoil so it has not been sent out yet. It is nearly complete now and may be expected shortly.

The KR Fly-In that we were planning has been post-poned until hopefully later this fall. We have not been able to find a centrally located airport willing to host the event yet. If you know of one, please talk to them and let me know.

A sure sign of spring is the number of new KR's now being completed. I have been receiving word of several just beginning

their flights and even more that should be flying by summer. Maybe Mother Nature had decided we have finally had enough winter and will let builders get back to their KR's.

We finally had a weekend that didn't snow here and I was able to take my KR-2 back to the airport. The new "Rev-Flow" carb is now on and working beautifully and other than a radio which is transmitting a little weak, all is well.

One of the problems I had during testing last fall was that the engine would only turn up 2500 rpm static. No matter what I did I couldn't get any more rpm. The engine started easily, ran cool and sounded good, just not enough power. I talked to a dozen people and got a dozen answers. The most common ones were "too much prop", (52 x 48), and "you're altitude is too high to develop more rpm", (field elevation: 6,000 feet). Neither is true and I think it's time to try and correct a statement that is being told many builders using VW conversions above 5,000 feet. It simply is not true that a

engine will not develop the same static rpm at altitude that it will at sea level. THEY WILL AND SHOULD! While it is true that you are not developing as much horsepower at the higher elevation, the thinner air also affords less resistance for the propeller. So if you are flying from a field above 5,000 ft. and having problems with rpm, you have another problem, NOT FIELD ELEVATION!

Back to my rpm problem. One night I was reading a book on aircraft construction and there was a firing order diagram shown for the VW engine. As I looked at it I realized that mine was not wired that way. I took the book out to the shop and checked and sure enough, it wasn't.

I then immediately pulled all the wires and wired it according to the book and tried to start, it. NO LUCK. The engine now backfired terribly. Another study of the diagram in the book showed that the magneto rotation direction in the diagram was incorrect.

The magneto I had purchased had the supposed cylinder numbers stamped into the leads, but this also turned out be incorrect. When wired according to this engine builders diagram and stampings, the engine would run, but you could hear it-popping in the exhaust and would only turn up to about 1800 rpm.

I then re-wired it according to a VW car manual, only making cylinder #4 become #1 and continuing the firing order from there. This time when I hit the starter it started with authority and will easily turn 3200 rpm static.

A lesson learned is that the VW engine will run with the wrong, firing order and sound fine, (mine was even flown once this way). The only clue was lack of rpm.

FLIGHT REPORT KR-1 N8029J

Homer Sanders

1926 Roberta Dr., Decatur, II, 62521

"I've just completed 100 hours in my KR-1, N8029J, and thought I should pass on some information that might prove of value to other builders. The plane flies very well and seems to draw a crowd anyplace I go. We don't have many KR's in the area that I have seen.

I had a few problems and maybe a word or two will help others.

1. I had installed a nice NACA inlet for ventilation just below the instrument panel on the right side. This isn't a

good place for one. I was getting carbon monoxide from the exhaust. Gave my quite a headache on the first and second flights. I have now have an inlet on the canopy skirt and it works fine. (ed. - this is not a problem on KR's which have exhaust, systems exiting under the belly, but is on those with "short stacks").

2. I had originally installed clear tubing for gas lines and gauges. I don't know where I got it but it wasn't a very good investment. It got stiff and one piece broke and I lost about half a tank of gas. Most of it sprayed across my feet, but, really caused no other problems. I now have aircraft tubing and hoses.

3. At one point I had a rough running engine and discovered several small intake manifold leaks. It pays to check all bolts and fittings occasionally.

4. I had a real nagging oil leak. A half hour flight would result in the plane looking like a loser at Reno with oil all over. I changed the oil seal which didn't help. I called Steve Bennett and he suggested I check the puller holes in the magneto adapter. This was the problem. They had never been sealed. I sealed them and now have a clean engine thanks to one of our fine KR Designees.

5. I had a canopy come off in flight a few moments after lift off after about 40 hours of flights. I was lucky - it didn't hit the tail. The plane flew well without the canopy. I retrieved the canopy, reinstalled it and flew it the next day. The problem occurred because I forgot to latch the canopy. I now pre-flight better!

6. One other problem that would be easy for builders to avoid. I didn't build any jack points into the wing or engine mount area. I had the plane elevated on some blocks, (resting on the spars at the wing attach fittings to check my retraction system), and I let it fall. Knocked a couple of holes in the wing panels. Better build jack points in. I'm going to add some now.

That's about, all the problems I've had. I did install a primer which was a good investment. It only cost me about \$10.00 and my KR started all winter very well."

(Although the following article departs somewhat from the normal KR information presented, I have talked to so many builders who are interested in something like this, (we are even seeing Stromscopes in some KRs now), that I decided to present this information. I might add that I am installing this complete system in the new aircraft that I am now building).

ONBOARD COMPUTER: The Future is Now

Frank Williams

Box 44167 Tacoma, WA. 98444

"While for many years the upper echelon of the aviation community have enjoyed the benefits of highly technological devices, general aviation has been slow to adopt the now ubiquitous computer into their cockpits. With the advent of the personal home computer, cockpit implementation of a small computer is now both economically feasible and practical.

The price and features of the home computer have enjoyed an inverse relationship to the point where sophisticated equipment that cost tens of thousands of dollars only a few years ago can now be had for less than the cost of an annual inspection on a light aircraft. This equipment, when installed in the cockpit, can do things from the trivial to the tremendous. This article will examine the installation and use of a small home computer, the Commodore 64, as a pilot aid in the cockpit.

The Commodore 64 computer was chosen as a likely computer to install for several key reasons. This computer is compact, light, readily available for under \$200.00 and requires only a single voltage to operate. These features make the installation of the computer a matter of finding a place and means to mount the computer, (velcro, rubber band, bubble gun), and to install the necessary electronic components to condition, regulate, filter, and protect the computer from spurious signals present on the battery buss.

Figure 1 shows a simple schematic diagram that will allow the computer to be installed onboard. A complete installation package for under \$40 is available from PRACTIPUTING - at the above address. This kit includes all necessary filters, regulators, and connectors.

Once the computer is installed, a legitimate question to ask might be "now what?". Boy, am I glad you asked. This wondrous piece of silicon is just waiting for the required instructions to make it earn it's keep. These instructions, or software, are what tell the computer which acts to perform.

The computer is a very effective way to store and manipulate large amounts of information quickly. To apply this device in the cockpit becomes necessary as the aircraft industry increases the complexity of its products. The pilot is confronted with a plethora of information and just-digest it rapidly and make command decisions based on his/her interpretations of this information. The computer can be a great asset to the pilot in collecting this data and allowing the pilot to perform his/her prime function: to fly the aircraft.

As the cost of electronic equipment-decreases, (or demand dictates), more and more automation of this informational gathering can be accomplished. For example, the computer could determine which Nav-Aids to scan, (VOR, DME, LORAN, Glideslope, etc.), set the proper frequencies, read and interpret the signals and apply an appropriate voltage to control servos to fly the aircraft to the destination, (Autopilots). This author believes that the complete Flight Director described can be implemented using current technologies for under \$3,000 in non-certified use.

As software becomes more intelligent, the hardware implementation of the computer will spread to many other areas. With proper transducers, (converters of mechanical energy to electrical energy), engine and aircraft parameters can be constantly monitored with alarms sounding only when out-of-range conditions exist. These readings now include such things as oil temp, oil pressure, airspeed, rate of climb, roll rate, angle of attack, (stall indicator), cylinder head and exhaust temperature, fuel flow and level, altitude, crab angle, and magnetic heading just to name a few. Does this sound similar to the Boeing 757 Avionics package?

Another area where the computer can shine is in an Area Navigation System. When properly programmed into the computer, this system aids the pilot in gathering information, calculates position, and by using trigonometric

functions on Cartesian coordinate points, can direct the pilot on a heading to to his/her destination, correcting for winds and magnetic variation. The computer will also display time to destination, fuel status, alternate airport course computation, groundspeed, and other items of interest to the pilot.

In order to further understand the use of the computer as an Area Navigation System, an example of how this system works will follow.

Figure 2 is an abbreviated enroute, low level map of the northwest U.S. and gives distance and heading information between navigational aids. To use the program, first pick a reference point, usually the VOR closest to home, in our case, the Seattle VOR, and enter, when prompted, the distance and heading to the other VOR's in the chosen area. For our example, we will enter information for points one through six shown on figure 2 chart. Once this information is entered for any area, (an area can be up to 50,000 square miles), it is stored in a non-volatile memory section of the computer. Non-volatile means that the information will not be lost when the computer is turned off so the information entered can be used repeatedly. Any future trip within the same area requires only a new flight plan with no further entries of the VOR network.

Before flight, the computer prompts you for flight information of your aircraft and destination. This includes things like beginning fuel amount, fuel burn rate, beginning and ending points in the flight, and magnetic variation over the intended route. Other information that will be used in flight is stored and is available at a moments notice any time during the flight. This information can be anything from inflight emergency checklists to a reminder to pick up an anniversary present before going home. With this ability to regurgitate information at any time, it is no longer necessary to consult outdated sectional maps in marginal lighting and not so marginal turbulence. Nav-aid frequencies, runways in use, tower frequencies, enroute obstructions, pre-flight checklists, and aircraft performance charts represent a small portion of the possibilities of informational retrieval the computer allows.

Our example test flight will be from Portland, Oregon, (fix #2), to Seattle, Washington, (fix #1). The computer will

prompt you for beginning and ending waypoints at which the user will type in the number 2 and 1. The computer will then compute distance and heading to destination corrected for winds and magnetic variation. This will be your initial heading to fly until your flightplan is updated in flight. At some point later in flight, shown as T1 on the map, the computer will direct you to select the Astoria VOR on frequency 114.0 and center the needle to determine the radial you are on. After typing in the radial for Astoria, the computer will respond with a query for the same information for the Olympia VOR, (fix #5). From the information given the computer, it determines your position, distance flown, distance off course, wind correction factor, new distance and heading to destination, estimated time of arrival, and fuel required to destination at present burn rate. At any time during the flight, this procedure can be repeated so the computer can keep abreast of positional information.

The Area Navigation Program is menu driven so that all the user must do is select the number that corresponds to the desired function and press a single number between 1 and 9. All data entered into the computer is numeric and can be entered via an optional 10-keyp keypad that is strapped to the pilots knee or mounted on the panel.

The theory of operation of the poor man's RNAV is as described below. From the entered information, (bearing and distance from reference point), the computer performs a polar to Cartesian coordinate conversion for each VOR. After this computation is made, it is a simple problem in coordinate geometry to locate the aircraft on the Cartesian grid given two radials from two points whose position are known. Once the position of the aircraft is determined, the distance and magnetic course to any other point on the grid is displayed and your flightplan is updated based on the new data. Fuel required to complete flight is calculated and warnings flashed if insufficient fuel remains to reach your destination. If for any reason your destination is unobtainable, the computer will determine a new course to any other airport in the area, corrected for actual winds and magnetic variation.

The monitor used to display the information can be as simple as a portable black and white television screen. The

prototype system installed in the authors Cessna 152 uses a five inch diagonal portable television installed at a distance of 30 inches. Shielded cable was used in all installation wiring and in over fifty hours of use, no interference between standard avionics and the onboard computer have been noted, (ed: there are also available small screens measurings 5" x5" x 2" for output screens).

The beauty of the installed system is that the computer prompts you for all inputs. The user does not need to memorize sequences of numeric entry or cryptic codes in order to reap the benefits of the silicon age. (And all this for under \$250 including computer, monitor, and software).

The capabilities of the onboard computer system are limitless. The ability to rapidly process information will increase the overall performance of the pilot and go a long way towards a safer flight. Computer programmers are ready and willing to meet the demands the pilots place upon them in customizing software for use in aircraft applications, and it is these demands that will shape the future of complex avionics."

ACCIDENT REPORT KR-2 N4531Y
John Forrester

"Fortunately both N4531Y and myself escaped with relatively minor injuries in our recent cross-wind accident.

As most readers know, I had taken my KR-2 back to the shop this winter to make some adjustments and improvements, (change carb, etc.), and with the recent-improvement in weather I was able to finally take it back to the airport.

Tom Johnson, one of our local KR-2 pilots, is a retired Air Force fighter pilot with lots of experience so he was recruited to do some test flights to insure that everything was in order.

The first day he attempted to fly we experienced vapor lock problems. This was traced to several contributing areas. First was temperature, (about 90°), fuel line getting too much heat from exhaust-headers, insufficient cooling air flow in the cowl, and use of auto fuel).

In order to correct these problems the following changes were made. A cooling box was built to completely seal the gascolator and a tube was installed in the back of the engine baffle plate to duct cool air onto the top of the gascolator.

A 2" hole was then cut in the bottom of the cowl under the gascolator for exit air. The fuel line was then rerouted farther away from the exhaust, wrapped in asbestos cloth and inserted in firesleeve to keep line cool. The cowl air exit opening was enlarged to about 7" x 12" and a small lip was added to the edge to create a suction effect. I also added a small 3/4" x 6" slot about 1" under the spinner with a duct to direct cool air onto the bottom of the engine case.

The Rev-Flow carb had been using cowl air, so a tube was installed to run up to the engine baffle plate in the right air inlet area and a filter was installed. I also switched to 100LL av-gas.

The switch to av-gas resulted in a great improvement in idle speed. Previously we could not get it to idle lower than 1,000 rpm. With no other adjustment, the idle was now about 850 to 900 rpm and the vapor lock problems were gone.

Tom then preceded to take-off and fly low down the runway and land and if everything was alright he would taxi back and fly around the pattern once.

Lift-off was smooth and he sailed by my at about 10 feet above the runway while I clicked away with the camera.

As he taxied back he waved and headed for the runway again. This time he was off quicker and rapidly climbing, but as he passed us at about 50 foot altitude we could hear the engine cutting out. He immediately cut the engine and headed back for the runway. This is where Tom's experience really came in handy. The runway we were using is one of the airport's secondary runways and is not very long. I did not think he would be able to get back on the runway and stopped in the short amount of distance remaining and I ran for the car fully expecting to go down and pick up a bent KR-2. Tom was able to get back on and stopped however and he soon taxied back to the ramp. Needless to say a little nervous however.

We then returned to the hanger to try to find out the problem. She seemed to be running a little lean on the #53 needle supplied so the needle was cut down to a #49 which seemed to help some. We then checked all the fuel lines and fuel flow and couldn't find anything out of order. Mixture was fine-tuned some more and we then tried a full power run-up for about 5 minutes. She never missed a beat so Tom taxied back to the runway for another try. After the previous experience, it was decided another low pass was in order and

we watched as Tom again lifted off smoothly. As previously however, as soon as he started to climb, the engine began to miss and lose power. Later Tom also said that it "missed a beat or two" during the take-off roll.

Good news however was that Tom declared that she handled better on the ground than his did and was very solid in the air, with no tendency to drop a wing.

Back to the hanger to scratch our heads. That night I was talking to Dan Croy about the problem, (Dan has a beautiful tri-gear KR-2 flying), and found out that Dan had experienced the same problem. He had also talked to another builder who also had the engine begin to miss almost everytime he took off. The only thing we all had in common about our engines was the spark plugs. We all had AC brand, #LA 47 plugs that were purchased from HAPI about two years ago. The plugs turn out to be 30 years old according to the dates on the packages. All three of us had the plugs checked and they did check out alright, but when replaced with new Champion REL-37B plugs, the miss on take-off dissappeared in every engine. Not only that but they ran quieter, smoother and mine idled lower, (600 rprn now) and yielded about 100 more rpm at full static.

The Champion plugs are now available from HAPI and Revmaster informs me t.hat they have always used these plugs.

I then taxied out. to try a couple of low and medium speed taxi runs to see if everything was running alright before Tom flew again.

I was cleared onto runway 10 at Arapahoe County Airport and was told that the wind was directly down the runway at 8-10 raph. A quick check of the windsock verified that and I set the throttle at 2,000 rpm and began my roll. As I began rolling I ran the throttle up to about 2,900 for a couple of seconds to see if it would cut out and then pulled it back to about 1,700 rpm. I continued for about 300 feet at this setting, never lifting the tail.

As I reached up for the throttle to pull it back to idle, I was hit by a wind from the left side so hard that it lifted the tail and we began to dance back and forth on the runway for a second. I was then hit with another gust so strong that I swerved almost sideways and despite the fact that I had full left rudder, aileron, and the tail back on the runway, we went off the right side and into the dirt. As

soon as I hit the dirt, the airplane ground-looped, snapping off the right gear leg. (It did not. break off the spring bar, but the lower fork section broke off leaving the wheel hanging by the brake cable). We then slid sideways for about 40 to 50 feet, coming to rest with the tail pointed straight up in the air. Five years of hard work was now laying on its nose in the weeds.

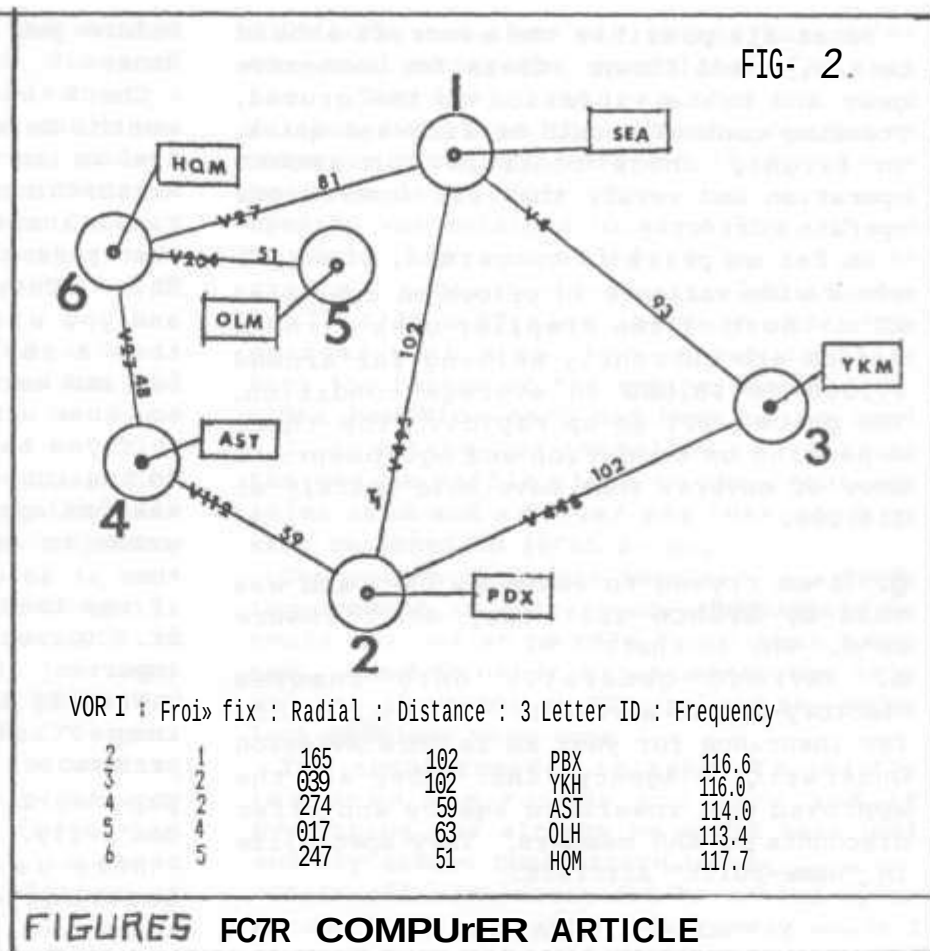
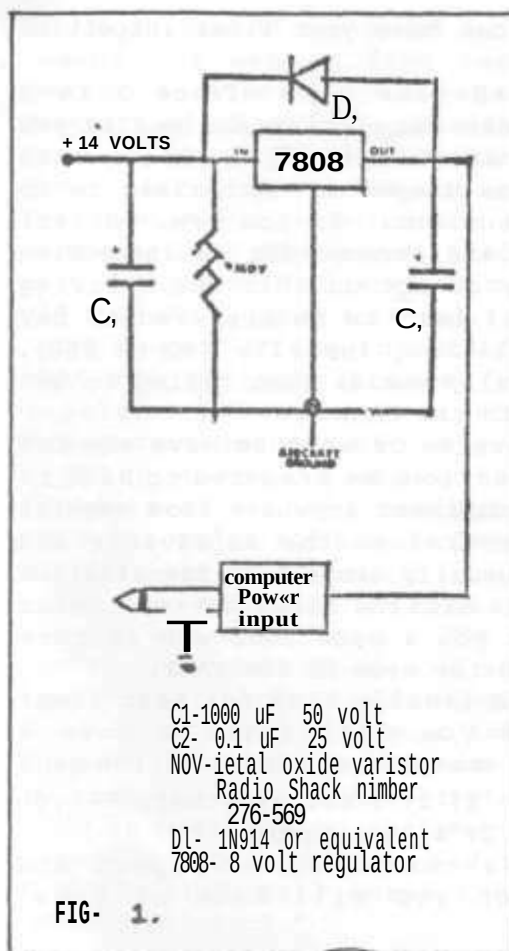
I called the tower to let them know I was unhurt, (I must have been a little numb because I thought I was unhurt), and climbed out. and started to check damage. Surprisingly, damage did not seem all that bad considering the violent ride I had just had. The prop was now about 14" long, (not much climb rate left in it now), the engine cowl was broken underneath, the right gear leg snapped in two and the wheel then imbedded itself in the belly under the seat resulting in a hole in the belly. Somehow the wings managed to come thru without a scratch, top and bottom and the fuel tanks held and no fuel was leaking out.

The second surprise was that it took the Fire Department and Rescue Squad almost 10 minutes to arrive, (despite the fact that they are located on the field), followed by the Airport Authority, County Sheriff, etc. Then began the FAA red tape of clearances, reports and reports.

Fortunately the KR was moved back to the hanger without further damage thanks to the people at Beechcraft's Air Center 1 operation, and as soon as I recover from my injuries, (all minor thankfully), N4531Y will come back to the shop for some repairs.

During the coming down-time I will be installing the Lamb Tires and individual brake controls for better directional control during cross-wind and I'm going to add some more lenght to the rudder. (It is a sickening feeling to have full left rudder in and be going to the right).

Mine is the second KR-2 to be blown off the runway here in Denver in the last 6 weeks and has always been a problem with KR's due largely to their light weight and low wings. BE CAREFULL IF YOU SUSPECT A CROSSWIND!"



QUESTION & ANSWERS

g. What type of hose should be used for the sight tube on the fuel tank?

A. Tygon tubing has proven to be the best for this. It is clear, strong and resists gas.

Q. Which side of the elevator should the trim tab be located? I have seen them on both sides.

A. It doesn't matter, however I like to put it on the pilot's side so that you can easily check the position before takeoff.

Q. I am putting a fixed gear on my KR-1 and will only be flying at about 120 mph. Due to my slower speed, I don't have to balance the ailerons do I?

A. The ailerons must be balanced regardless of anticipated speed! One builder reported flutter at 110 mph with unbalanced ailerons. Those of you who anticipate speeds near 200 should also give serious thought to balancing the elevator and rudder also.

Q. I want to buy a KR that is already built and flying, but I don't know how to tell if it is well built. Is there anything I should look for? Also, what

price should I expect to pay?

A. The most important overall thing is how does the aircraft look overall. Take a good look. If it looks smooth and well taken care of, chances are better that the same care was taken during construction. Look closely inside at the glue joints of the fuselage longerons, etc. Are they good, tight joints? Look into the tail cone if possible. It should be clean and neat. Check all the cables and pulleys. Are they well placed and riding the pulleys properly? Check the inside of the fuel tank with a strong flashlight. Look for walls that may be flaking off. Also drain some fuel out and check it for contamination for tank epoxy.

If the wings are removable, check the wing attach fittings for wear and check the ends of the spars for cracking. Take a good look at the gear latch arms. They should lock down well without play. Make a good inspection of the engine compartment. It should be neat with everything well placed and secure. Does the baffling fit well? Any signs of oil leaks? If equipped with POSA carb, find out if it has had the needle lock modification done. If not you should have it done ASAP.

If at all possible the aircraft should be taxied and flown. Check for excessive gear and brake vibration on the ground. Steering control should be firm and quick. In flight, check controls for smooth operation and verify that all instruments operate correctly.

As far as price is concerned, you will see a wide variance in prices on completed KR's. Most of the simpler ones without radios are currently selling for around \$7,000 to \$8,000 in average condition. The price will go up rapidly from there depending on condition and equipment. I know of several that have sold quickly at \$14,000.

Q. I am trying to insure my KR-2 and was told by AVEMCO that they don't insure KR's. Why is that?

A. AVEMCO generally only insures "factory-built" aircraft. The best source for insurance for your KR is thru Aviation Underwriting Agency, Inc. They are the approved EAA insurance agency and offer discounts to EAA members. They specialize in "home-built" aircraft.

If this is your first homebuilt aircraft-project or its been awhile since you had to go thru the FAA's paperwork shuffle, take heed.

Even if you are a long way from completion, apply to the FAA for your N number now. This can take up to 6 months for the FAA to issue and usually they operate like most government agencies and that means they will either lose your application or tell you that forgot to put a period after a sentence so you have to start over.

Check first with your local GADO office. Many of them have put together a packet-just for us homebuilders. This will get you started.

Most FAA GADO offices no longer do in-process inspections and several do not do final airworthiness inspections either. It is still a good idea to have someone inspect your aircraft during construction and some designated final inspectors will not sign your aircraft off if it wasn't inspected during construction. If your local EAA chapter has a Designee, he is authorized to do in-process inspections.

Be sure to file your "Application for Airworthiness Certificate" well in advance of your anticipated completion date. You must have the paperwork back from the FAA

before you can have your final inspection done.

Check with your GADO office 2 to 3 months before completion and see if you are in an area that has a "Designated Airworthiness Inspector" authorized to do final inspections. If you are, contact that person and arrange for an inspection date. They do not do this for a living and you will have to be prepared to pay them a small fee, (usually \$40 to \$50), but its usually easier than trying to get together with the FAA.

If you have to or want to have the FAA do the inspection, be prepared to have to make an appointment anywhere from several weeks to several months in advance and then it is usually subject to cancellation if the local airline needs a tire looked at. (Gives you a good idea who is more important in the eyes of the FAA).

When it is finally time for that final inspection you will have to have a tremendous amount of information and paperwork. If it's not all there -- you don't fly. It's that simple.

Here is a checklist of papers and information you will have at final inspection.

1. Aircraft Name, Make and Model
2. Registration
3. Aircraft Serial Number
4. Engine Make and Model
5. Engine Serial Number
6. Propeller Make, Model and Size
7. Propeller Serial Number
8. Registration Number Installed (N No.)
9. Builder Data Plate in Plain View
10. Passenger Warning
11. Experimental Sign at each entrance
12. Weight and Balance Sheets, Limits
13. Equipment List
14. Operating Limitations
15. Instruments marked for limitations
16. Map to show Flight Test Area
17. Engine Log Book
18. Aircraft Log Book
19. Maintenance and Flight Records
20. Application for Airworthiness Copy
21. Inspection Records and Technical Data to establish conformity
22. Document for Determination of 51%
(This must be either a notarized statement or certificate)
23. Receipts for all Materials
24. Application for Repairman Certificate
25. Log showing construction times for Repairman Certificate
26. Radio Station license (if radios installed)
27. Aerobatic Maneuvers authorization

Wing ATTACH covers - "Reverend Billy" 4-30-8

1. Fabricate 2 clamp mechanisms + 2 Fibreglass STRIPS.
2. * I used Galvanized Tin From My construction site.
3. Use wood spacers To keep STRAP centered over gap only where needed.
4. Hook installs on Lower FORWARD REAR spar wing mount.
5. By Turning Double NUTS BACKWARDS, it will Tighten.
6. Make clamp in vise around $\frac{3}{8}$ " bolt. 

PATTERN For CLAMP

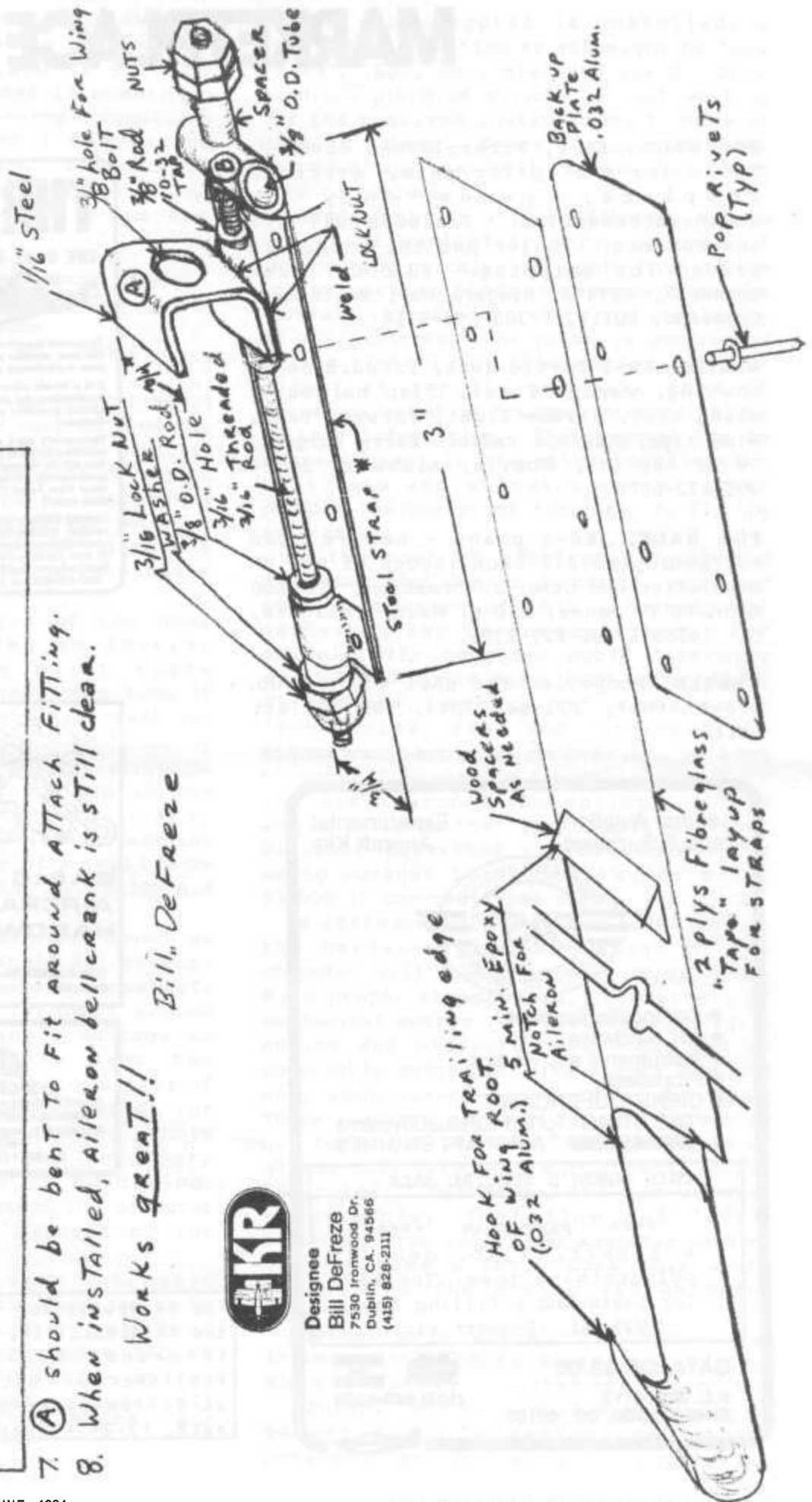
7. **A** should be bent To Fit around ATTACH Fitting.
8. When installed, Aileron bell crank is still clear.

Works GREAT!!

Bill, DeFreze



Designee
Bill DeFreze
7530 Ironwood Dr.
Dublin, CA. 94568
(415) 828-2111



MARKETPLACE

FOR SALE___KR-2, Fiberglassed covered, built for 6'2" pilot/pass, airframe complete, needs only an engine/accessories. Includes all VFR instruments, trailer and the wings are crated for shipping. \$3,000. Jack Grandman, 6274 S. Niagara Way, Englewood, Colorado, 80111. 303-694-3714

WANTED...KR-2 Turtle deck, forward deck, cowling, canopy frame, flap hardware, sling seat, strobe light, forward tank, wing tips, nav/com radio. Barry Burgess, 59 N. Ann St., Mobile, Alabama 36604 205-432-0078.

FOR SALE___KR-2 plans - new revised edition, plus all back issues of the KR Newsletter and other information. \$100.00 Kenneth T. Jones, 210 N. Main, Coalgate, OK 74538 405-927-2396.

WANTED...Propeller for HAPI engine hub. Steve Ernst, 303-443-3044. No Collect Calls.

General Aviation
Parts & Supplies
Experimental
Aircraft Kits



- Composite Supplies
- AN Hardware
- Instruments and Radios
- Propellers
- DIEHL "SUPERCASE"
- "THE STING" Tuned Exhaust Systems
- ***-FAST~-AIRCRAFT ENGINES**

THIS MONTH'S SPECIAL SALE

***** FAST-FOAM *****

A 2 part, 2 lb. density polyurethane foam. The BEST for fastening & filling foam.

\$22.00 (2-quart kit)

CATALOG \$3.00

P.O. BOX 4113
ENGLEWOOD, CO 80155



(303) 693-8239

THRESHOLD

THE BLUE ANGELS EXPERIENCE



Threshold is a movie of rare merit that truly captures the awe, wonder and amazement of those special peak-experiences encountered in flight.

It is a heroic adventure and a stunning experience manifesting the raw physical excitement, and soul-stirring grandeur of the Blue Angels Jet Acrobatic Airshow!

Threshold's stark pilots-eye photography puts you into the cockpit of a 1600 mile per hour F-4 Phantom. You will fly through violent buffeting jet streams in gut-straining 8-G formation aerobatics. You and five other Blue Angel Phantoms. All within three feet of each other!

Limited Edition: Original, uncut, 89 minute theater version. Written by Frank Herbert and narrated by Leslie Nielsen. Available in V.H.S., Beta, 16 mm, and 35 mm. Contact AeroSpace Visuals Society, 2500 Seattle Tower, Seattle, WA 98101. CALL TOLL FREE MMIM26-9933 or (206) 624-9090 in WA STATE



BON AERO

**BASIC AN/MS
AIRCRAFT**

H A R D W A R E
FREE CATALOG

BON AERO
7688 SUMMIT RO.
D>ptSA

PARKER, CO 80134
303/841-3602



4130 CHROMOLY STEEL

Round • Square • and Streamline Tubing • Sheet Material • Material Kits for many homebuilts
Also Alum. Tubing V" to W- FREE PRICE LIST

PHONE (303) 665-5817
Box 307 • Lafayette, Colorado 80026

The KR Newsletter is published monthly by the KR NEWSLETTER, PO Box 4113, Englewood, Colorado, 80155, John Forrester, Publisher. All back issues are available at following rates: 1-12 issues; \$1.00 each. 13-24 issues; .75 each. 25 or more;

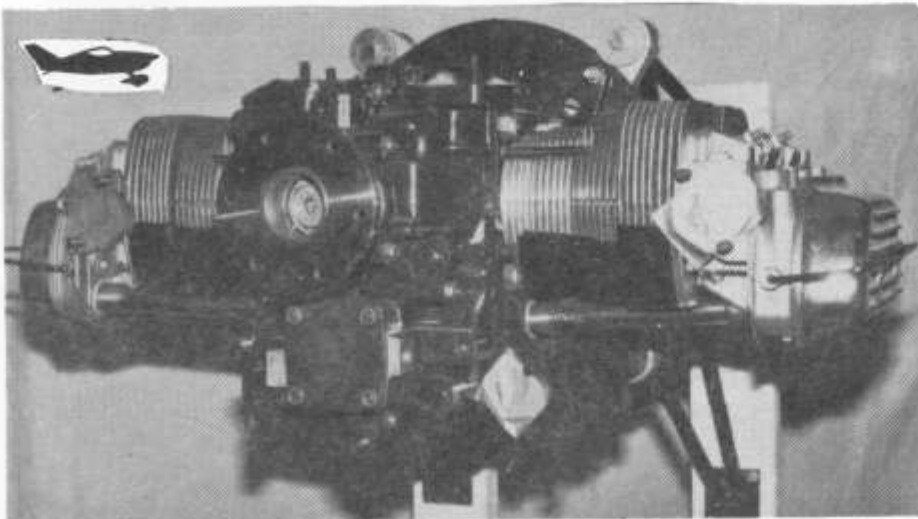
1

INTRODUCTION SUBSCRIPTIONS for KR Newsletter
 subscribers who wish to also receive
 "COMPOSITE AIRCRAFT" will be \$10.00 a year.
 Standard subscription will be \$12.00 a year.
 or \$30.00 for 3 years.



MODEL18C \$2395.001

Great Plains Aircraft is proud to announce a new engine program that will save you the homebuilder, \$500.00 to \$1000.00 on the cost of a new VW AIRCRAFT ENGINE CONVERSION. We are offering our Model 18C (I835cc) for the low price of \$2395.00 complete. How? Fly or drive to Chicago and plan on a 2 day visit. While you are here, we will assemble the engine of your choice, using your labor and our knowledge, supervision, tools and parts. After the engine is assembled we will test run it to insure its proper operation. You'll leave with a new engine, plus the knowledge and experience gained from assembling your own powerplant. Be sure to tell your fellow EAA members and friends about the lowest priced engines around. All of our other engines are available at substantial savings also. Contact us for further information or make your reservation **TODAY!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!**



FEATURES:

- ENGINES AVAILABLE FOR ALL VW POWERED HOMEBUILTS

MINIATURE METRICS LITEFLITE HARDWARE

7801 14th Street
Westminster, CA 92683
894-4875 (unlisted)

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Heim joints & spacers \$26.*

Landing gear lockbar SPRINGS mouse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates drilled, ready for Camloc \$54. *

'Upper elevator pulley bracket \$15*
Assembled

Rudder, elevator horns & hinges & back-up plates \$55.*

Aileron bellcranks & horns complete Assemblies (24 pieces) \$87. *

"Lower elevator pulley brackets \$28. assembled*

Rudder pedal mount blocks \$30. *
Control stick assembly per plans w/mike switch \$75.*

Aileron pulley brackets assemblies \$30.*

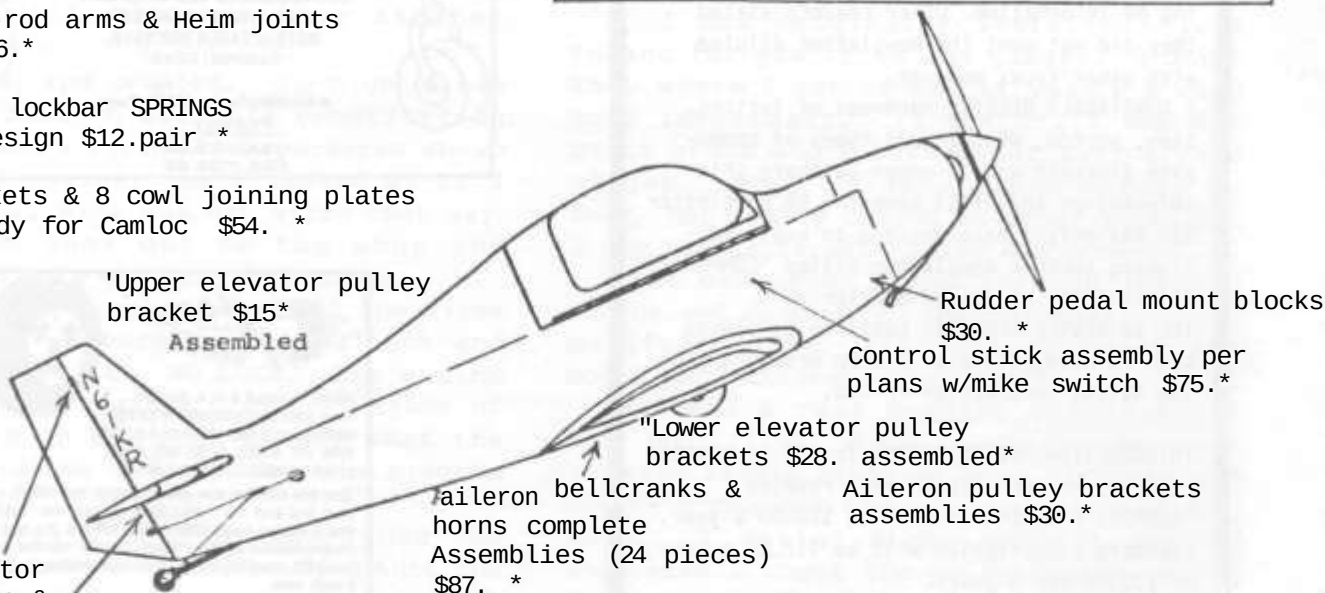
Quality...all material is aircraft aluminum/steel as specified in the KR Construction Plans Book. S.A.S.E. more information.

*postpaid items

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLORADO 80155-4113
ISSUES #107 & 108 MAY-JUNE 1984

FIRST CLASS MAIL
U.S. POSTAGE
PAID
DENVER, COLORADO
PERMIT NO. 2677

Planning to purchase the Rand-Robinson #4 Aluminum Extrusion Kit? Let us save you time and money. Miniature Metrics will pick up the kit from Rand-Robinson, perform necessary machining and return to Rand-Robinson for shipping. Parts will be cut, milled, drilled and shaped. Send us a S.A.S.E. for more information.

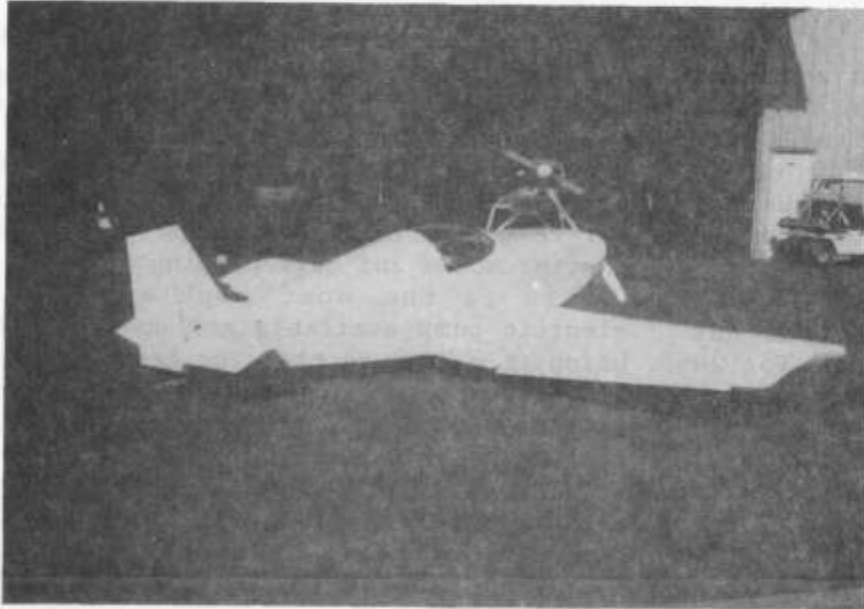




KR NEWSLETTER

RATES
USA \$12.00 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand/Robinson Engineering.



This month's KR-2 belongs to Jim 'Burns, PO Box 602, Kihei, Hawaii, 96753.

Jim has promised a full flight report shortly.

Should be a lot of fun flying a KR around the islands!

ALL DAMAGE THAT my KR-2 suffered in my crosswind incident have now been repaired and the aircraft is back at the airport again and flying. I won't be able to fly it to Oshkosh this year as planned now however because there isn't enough time to get the balance of restriction hours flown off. Looks like I'll have to fly the "Wichita Spam-Can" back again this year.

The change over to the Lamb Tires really helped on the ground handling. The larger tires do make a big difference.

THE TIRE CHANGE on my KR does bring up a point that many builders have been having problems with. When using the Lamb Tire there is not much clearance in the gear leg and some won't fit at all. Reports from builders have shown as much as 3/16" difference in gear leg width. When using the KR axle kit, **DO NOT CUT THE AXLE LENGTH TO MAKE IT FIT THE GEAR LEG.** If you can't get it in with a small amount of force, get another gear leg. You will also have to cut down the brake drum lip. You can take off most of the outward facing lip to allow clearance.

For those of you who are changing to the Lamb Tires from the stock Rand tires should be sure to do a retraction test afterwards. The Lamb Tire is larger in diameter and may not fit a tight wheel without some reworking on the wing. The extra work is worth it however.

IN LAST MONTH'S issue I mentioned the use of Tygon tubing for fuel indication line. Chuck Cooke sent me some further information that you should know about. It seems that Tygon is actually a name for about 8 different types of tubing and not all a compatible with gasoline long-term. If using Tygon for fuel line, be sure that it is F-4040-A. The other types can get brittle in time. Chuck recommends using an ester base, Polyurethane tubing. Look to industrial suppliers for it and make sure that it has an ester base.

NOTICE TO KR'S FLYING TO OSHKOSH. LETS TRY TO GET OUR OLD ORIGINAL PARKING SPOT BACK THIS YEAR. THE AREA WHERE THE VARI-EZE'S HAVE BEEN PARKING THE LAST COUPLE OF YEARS, (IN FRONT OF THE CONTROL TOWER) IS

WHERE WE WOULD LIKE TO BE. THE FIRST KR'S COMING INTO OSHKOSH SHOULD MAKE A STRONG EFFORT TO PARK THERE AND HOPEFULLY WE WON'T BE STUCK OFF AT THE END OF THE FIELD AGAIN.

ANOTHER WORD TO Oshkosh bound flying KR's. Many of you will be flying your KR to Oshkosh for the first time this year and for some it is the first time flying into unfamiliar airports along the way. The last couple of years we have lost some pilots because they got into trouble at unfamiliar airports. Don't, make stupid mistakes! If you still need a lot of runway to get down, don't plan stops at short fields and watch out for tailwinds and crosswinds when landing. Don't try to impress the locals with your superior climb-outs and lets all get to Oshkosh and home safely this year.

ADRIAN CARTER IN Alberta, Canada has informed me of a very good source for VW parts for Canadian builders. A & H Mueller Automotive Parts & Accessories, Ltd., #22, 1410 40th Ave. N.E., Calgary, 403-277-9685 has been very helpful to several KR builders.

EAA CHAPTERS 43 and 660 will be having a Weight and Balance Clinic on Saturday, August 18th at the Front Range Airport at Watkins, Colorado.

For those of you who want a **ACCURATE** weighting and weight and balance done, make plans to attend. It is **FREE** and they will be using the Electronic Load Cell Scales for accurate weighting right down to ounces.

The Front Range Airport is 5 miles north of Interstate 70 and about 10 miles east of Denver, Colorado.

For more information contact Marilyn Schneider at 303-750-5535.

MICKEY MAHONEY SENT me a great tip, especially for those who suffer allergies from fiberglass dust. Before you start sanding on grinding on your fiberglass, cover all exposed parts of your body with Baby Powder. It will fill you skin pores, keeping out the fiberglass dust. It really works great!

I RECENTLY CAME across a neat fuel, gauge that while it is intended for use on Vari-Eze's it could easily be adapted for our KR's. It is a molded, triangler shaped tube with a white background. Fuel flows thru opening in the top and bottom and the

triangler shape eliminates sloshing in the gauge. There is also a small red LED at the base of the gauge which illuminates the gauge and another which lights to alert you to low fuel. Contact Paul Prout, 4039 Olive Point Place, Claremont, Ca. 91711 for more information and prices.

IF YOU ARE planning on using a electric fuel pump either to transfer fuel to main tank or for pressue systems, take heed.

Several pilots have reported problems with the "Facet" brand electric fuel pump when exposed to high tempature conditions.

All reported problems have occured in aircraft with the pump installed in the engine compartment. As soon as the cowl air temp gets high, the pumps will make a chatter sound and quit pumping.

This is the most popular type of electric pump available now so if you are using it make sure that you either install it inside the cockpit or make a box around it and duct, cool air to it if installed in the engine compartment.

LOOKING FOR A really good way to dispense small amounts of epoxy? Try using the bottles that some brands of Catsup and Shampoo come in with the top that flips open to reveal a small hole allowing you to squeeze out the product. They seal air-tight and self-clean the hole every time your close them.

IF YOU ARE planning to make your own antennas as per the KR plans, try using 1/4" copper foil tape. It's very strong and easy to use. Check a local craft store for it as it is used in stained glass works. This is also an excellant place to obtain epoxy brushes and mixing sticks at very low costs.

IF YOU'RE PLANNING on going to the National KR Fly-In and need more information, here are some numbers.

Airport Manager-Mike Scanlin: 913-827-8077
Chamber of Commerce-Bob Whitworth-913-827-9301

Flower Aviation-Olivia Storr-913-825-6739
Local KR Builder-Bill Ficke-913-434-7463

MARKETPLACE

FOR SALE....KR-2, N4531Y, 25 hours total time. 1834cc, Rev-Flow Garb., Ram Air & Alternate Air, Sting Exhaust System, Full electrical system and starter, (Diehl Supercase), Aircraft battery, 3" Prop Extension. 52"x46" Prop's Inc. prop installed. (also included is a 54"x48" prop). Lamb tires and improved tailwheel. Panel equipped with Turn & Bank, True Airspeed, Compass, Artificial Horizon, Altimeter, Rate of Climb, Oil Temp, Oil Pressure, Cylinder Head Temp, Electric Fuel Gauge, Tachometer, 1 Narco Nav/Com and 1 Narco Com. Cabin Speaker and Dual Headset and Mike plugs installed, Cabin Lighting, Upolstered and Carpeted. Lot's of room for tall pilot! Turtledeck is 4" higher than normal and canopy is changed to fixed windshield and gull-wing door. 24 gallon main fuel tank capacity with baffles installed in tank. 540 pound empty weight.

For photo see KR Newsletter issue No. 101. I am now at the point in construction of my new 0-200 powered version that I must-sell N4531Y to provide funds for purchase of 0-200 and radios. \$8,000. Contact John Forrester, Parker, Colorado, 303-841-8651 evenings.

FORSALE___KR-1, 25% complete; fuselage and spars signed off by FAA; 35 HP VW engine, (unused and not. built up), w/Slick Magneto and prop hub; all metal available w/many extra fasteners; fiberglass, foam, canopy, seat, and ten year set of newsletters/ photos included. \$1,400. Call 517-792-6715 after 6 pm. Harold Brown, Saginaw, Michigan, 48603.

WANTED...I am building a KR-2 and need parts. (307) 687-1227.

WANTED...Needed to complete KR-2: Sling seat, propellar, misc. VW engine accessories, (anybody know of a vacuum pump for VW?), forward deck, cowling, Nav/Com radio with VOR, turtle deck. Also **FOR SALE** lots of AN-3 bolts and 2 fuel tank sending units. Barry Burgess, 5535 West End Blvd., New Orleans, LA. 70124, 504-488-6563.

FOR SALE___KR-1, Signed off and has flown. Revmaster 2100D, dual mags,

electric start, radio, wing tanks, retractable gear, wheel fairing. \$5,500 or trade for boat or terms. Glenn F. Solomon, 147 S. Woodrow, Battle Creek, Mi. 49015. 616-963-6330.

WANTED___Partially completed KR-2, any stage. Roland Suter, PO Box 4027, Woodland Park, Co. 80863. 916-921-2826.

FOR SALE OR TRADE___A75 Cont., OSMOH complete with all accys, GA prop, 56x58, will swap for Revmaster, HAPI, Etc. Consider buying Revmaster, HAPI outright. Call 207-498-2095 after 6. Mark Jones.

FOR SALE___Enough Dynel for KR-2. Make offer. Terry Bell, 1008 17th St., Brodhead, Wi. 53520 608-897-4494.

FOR SALE___Reducing my inventory of VW props. Regular price is \$175. If I have your size this is your chance to get one for just \$120. plus UPS charge. Write Harlan Anderson at Rt. 4, Park Rapids, Minn. 56470.

FORSALE___1 Complete set of new Taylor Bird plans by Taylor Aero Industries. Cost \$175.00, sell for 80.00 Clyde Wetherbee, 817 Evans, Waupaca, Wi 54981. 715-258-5191.

FOR SALE___New accessory case and ring gear by Custom Aircraft. Also one starter, chrome aluminum valve covers and a 52x48 prop. Harlan Anderson, Rt. 4, Park Rapids, Mn. 56470.

FOR SALE___1 set. stock KR wheels, tires and brakes with 10 hrs. of use on them. \$50.00 John Forrester 303-841-8651.

The KR NEWSLETTER, PO Box 4113, Englewood, Colorado, 80134 is published monthly by John Forrester. All back issues are always available at the following rates: 1-12 issues: \$1.00 each, 13-24: .75, 25 or more: .50 each. The **KR NEWSLETTER** is an independent source of builder assistance and is no way connected with Rand Robinson. Copyright 1984.

KR

NATIONAL FLY-IN AUGUST 25/26 SALINA, KANSAS

THE 1984 NATIONAL KR FLY-IN WILL BE HELD THIS YEAR AT THE SALINA MUNICIPAL AIRPORT.

THE AIRPORT IS VERY ANXIOUS FOR US TO USE THEIR AIRPORT FOR THE FLY-IN THIS YEAR AND ARE REALLY TURNING OUT TO HELP US. THE SALINA MUNICIPAL AIRPORT IS LOCATED ON THE WICHITA SECTIONAL AND HAS A VOR ON THE FIELD, (Salina VOR-115.3), AND HAS **13,300'** RUNWAYS THAT ARE WIDE ENOUGH TO ALMOST TAKE-OFF ON WIDTH-WAYS. THERE IS A TOWER ON THE FIELD, (119.3), BUT IT IS ONLY OPERATIONAL MONDAY THRU FRIDAY, 8:00 TO 5:00, SO WEEKEND ARRIVALS WITH RADIOS SHOULD MAKE ANNOUNCEMENTS REGARDING TRAFFIC. NO-RADIO AIRCRAFT ARE WELCOME—JUST BE SURE AND KEEP AN EYE OUT FOR OTHER TRAFFIC.

THE AIRPORT HAS AGREED TO VACUMN A SPECIAL AREA FOR US TO PARK OUR KR'S IN. THERE WILL BE AN AREA AVAILABLE FOR THOSE WHO WANT TO CAMP OUT AND FOR THOSE WHO PREFER SOME LUXURIES, THERE ARE MOTELS CLOSE TO THE FIELD WITH COURTESY CARS. FLOWER AVIATION IS THE FBO ON THE FIELD THAT WE WILL BE USING. THEY HAVE AGREED TO FURNISH COURTESY CARS, FUEL, SERVICE, AND THEY WILL BE CATERING BOX LUNCHES FOR THOSE WHO WOULD LIKE ONE OR THERE IS ALSO A RESTAURANT ON THE FIELD.

BEECHCRAFT HAS A MAJOR ASSEMBLY PLANT LOCATED ON THE FIELD AND ALTHOUGH IT IS NOT 100% CERTAIN YET, IT LOOKS LIKE THEY WILL OPEN THE PLANT ON SATURDAY FOR US AND TAKE US ON A TOUR OF THE PLANT.

THE FLY-IN SITE WAS ALSO SECLCTED BECAUSE IT IS CENTRALLY LOCATED AND SHOULD BE EASY FOR ANYONE TO GET TO FROM ANYWHERE IN THE U.S. THIS IS THE OPPORTUNITY FOR FLYING KR'S TO SHOW-OFF IN FRONT OF PEOPLE WHO REALLY APPRECIATE THEM AND FOR BUILDERS TO SEE THEM "IN THE FOAM" AND DISCUSS BUILDING. WE ARE PLANNING FORUMS AND FLYING DEMONSTRATIONS SO PLAN ON ATTENDING AND SPREAD THE WORD!!

**** MOTELS** Heart of America 2 miles 913-827-9315
Holiday Inn 3 miles 913-827-5533
Howard Johnson 1 mile 913-827-5511



Experimental Aircraft Kits



- Composite Supplies
- AN Hardware
- Instruments and Radios
- Propellers
- DIEHL "SUPERCASE"
- "THE STING" Tuned Exhaust Systems
- **FAST** ^ AIRCRAFT ENGINES

THIS MONTH'S SPECIAL SALE

*** FAST-FOAM ***

A 2 part, 2 lb. density polyurethane foam. The BEST for fastening & filling foam.

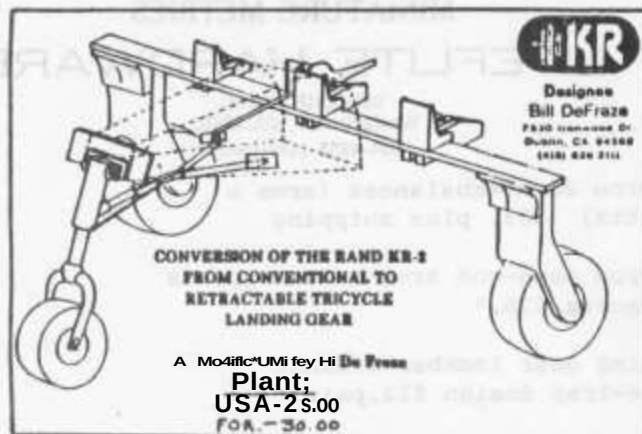
\$22.00 (2-quart kit)

CATALOG \$3.00

**P.O. BOX 4113
ENGUEWOOD, CO 80155**



(303) 693-8239



CONVERSION OF THE RAND KR-1 FROM CONVENTIONAL TO RETRACTABLE TRICYCLE LANDING GEAR

A Mo4iflc*UMi fey Hi De Preen

Plant;
USA-2 s.00
FOA-30.00



**NEW! 11 400 $\times$ 5 6 PLY. RATED
TIME SPECIFICATIONS INFLATED
HEIGHT 11.5 INCH WIDTH 40 INCH
TIME WT 3 IBS. TUBE WT VI LB
LOAD RANGE C -70 P.S.I. MAX**

Thtt tir» fiNt ttw MM gap >»»»»n th« 900x5 air-
craft lire and lha 3 40-3.00x5 go-karl lira. Look*
lika a acalad doon 500x5 FM's KR-1 A 2 • and it
rccommandad by Bort Rutan tor tha VariEta and
Long-EZ Aiao fttta moat othar xparimantala uamg
5 inch hma.

TIME 6 PLY RAT. 25 00 TUBE • 50+ SHIP * HAND.
MKE LAMB. P.O. BOX 3324. QUARTZ HILL, CA 93534

GREATPLAINS

AIRCRAFT SUPPLY CO.

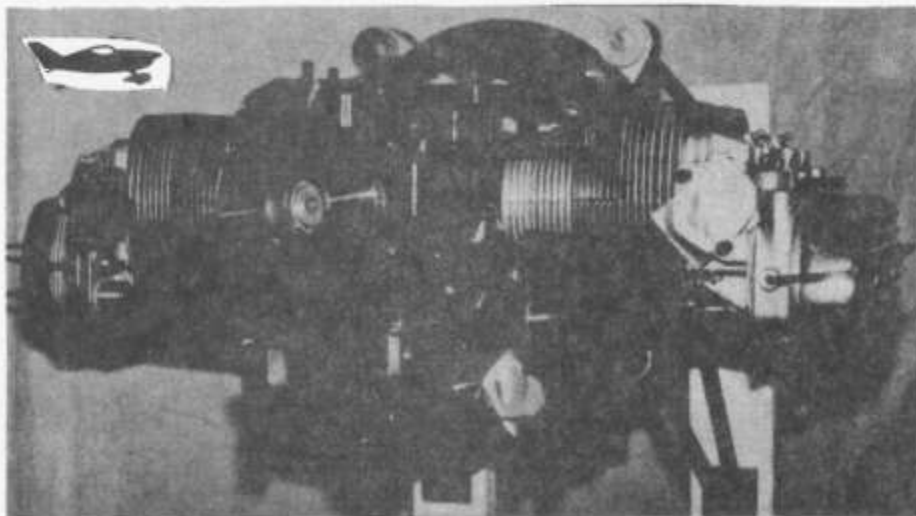
P.O. BOX 1481 312-359-6558

PALATINE, IL.

60078

MODEL 18C \$2395.00

Great Plains Aircraft is proud to announce a new engine program that will save you the homebuilder, \$500.00 to \$1000.00 on the cost of a new VW AIRCRAFT ENGINE CONVERSION. We are offering our Model 18C (1835cc) for the low price of \$2395.00 complete. How? Fly or drive to Chicago and plan on a 2 day visit. While you are here, we will assemble the engine of your choice, using your labor and our knowledge, supervision, tools and parts. After the engine is assembled we will test run it to insure its proper operation. You'll leave with a new engine, plus the knowledge and experience gained from assembling your own powerplant. Be sure to tell your fellow EAA members and friends about the lowest priced engines around. All of our other engines are available at substantial savings also. Contact us for further information or make your reservation **TODAY!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!**



FEATURES:

C
A
T
A
L
O
G

\$
1
.
0
0

INTAKE MANIFOLD
POSA CARB
FORGED 69MM CRANKSHAFT
NEW DUAL BY-PASS UNIVERSAL CASE
SLICK MAGNETO AND IGNITION HARNESS
CHAMPION REL37B SPARK PLUGS
REMOTE OIL COOLER AND LINES
DIEHL SUPER ACCESSORY CASE
20 AMP ALTERNATOR/REGULATOR
STARTER/FLYWHEEL/MAGDRIVE
HIGH VOLUME OIL PUMP
LOWER CYLINDER SHROUDS
BALANCED RODS/PISTONS
TEST RUN
WEIGHT 159.5 Ibs.

ENGINES AVAILABLE FOR ALL VW POWERED HOMEBUILTS

MINIATURE METRICS LJTEFLITE HARDWARE

7801 14th Street
Westminster, CA 92683
894-4875 (unlisted)

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Heim joints & spacers \$26.*

Landing gear lockbar SPRINGS
mouse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates
drilled, ready for Camloc \$54. *

Upper elevator pulley
bracket \$15*
Assembled

Rudder, elevator
horns & hinges &
back-up plates \$55.*

Aileron bellcranks &
horns complete
Assemblies (24 pieces)
\$87. *

"Lower elevator pulley
brackets \$28. assembled*

Rudder 'pedal mount blocks
\$30. *
Control stick assembly per
plans w/mike switch \$75.*

Aileron pulley brackets
assemblies \$30.*

*postpaid items

Quality...all material is aircraft aluminum/steel as specified
in the KR Construction Plans Book. S.A.S.E. more information.

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLORADO 80155-4113
ISSUE #109 JULY 1984

FIRST CLASS MAIL
U.S. POSTAGE
PAID
DENVER, COLORADO
PERMIT NO. 2677



ISSUE NO. 110 AUGUST 1984



KR NEWSLETTER

RATES
USA \$12.00 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand/Robinson Engineering.

OSHKOSH IS OVER for another year and once again the KR's showed even better construction quality than last year. As more builders become accustomed to working with fiberglass, we are seeing some VERY good workmanship.

This year's crop yielded 2 KR-1's and 8 KR-2's. (Many of these KR's are making their repeat performances at Oshkosh—where are all you guys with your new airplanes?)

Homer Sanders and Steve Bennett both made repeat appearances this year with their KR-1's. Homer now has over 150 hours and Steve is still the highest time KR flying with over 1200 hours.

Tim Firestone, N38TF, made his 2nd appearance this year with his Type IV powered KR-2.

John Stolzfu, N540KR, also made his 2nd appearance this year with his much modified KR-2. John's unique canopy, which gives it a Beechcraft look, was the subject of much interest this year by more than just KR builders. Jack Cox and John went up for some air-to-air shots and we can look for an in-depth article on this KR in an upcoming Sport Aviation issue.

Brian Henaman, N4263Q, was back for his 3rd appearance this year in his KR-2, "Bandit". Brian and his KR-2 have become a regular sight at just about every major fly-in anywhere in the country over the last few years and the airplane still looks like it was just finished.

John McClain, N717J, made his first appearance this year with his new KR-2. John's KR has the gull-wing style canopy that is becoming more and more popular. He used the stock KR canopy and cut it to make the side doors and flat-wrapped Lexan for the windshield.

John Rush, N81RV, also made his first appearance this year. Unfortunately he was able to only stay 1 day, so most did not get to see this KR-2.

Jack Fyfe, N327KT, made his 2nd trip to Oshkosh from Anchorage, Alaska this year with his KR-2. Jack spent, last winter

installing a new instrument panel, console, and new paint. The result is one of the most beautiful KR's flying. Seems Jack got a little lonely flying down last year so this year he convinced another KR pilot to come with him.

Joe Fechner, N37686, flew down with Jack this year for his first trip to Oshkosh. Joe's yellow KR-2 is also immaculate and it caught the eye of the Smithsonian Institute who asked to film it in flight—to show in the National Air & Space Museum.

Joe and Jack flew from Oshkosh to my home field outside Denver and sadly the same dangerous wind-shear that caught me a few months ago also caught Joe when he landed. After a smooth touch-down, the wind shifted and picked up the KR, turned it 45 degrees and slammed it back onto the runway. The aircraft then went off the runway and hit the runway lights, also collapsing the gear. Other than some scratches, Joe escaped uninjured, but the KR suffered major damage to both wings, the gear, engine cowl and prop.

The call then went out to local KR and Vari-Eze builders and thanks to a lot of people we were able to repair the aircraft in 4 days and Joe was able to continue his flight home to Alaska.

Our hanger was the spot on the field for everyone to come watch during rebuilding and it really amazed everyone how sturdy the KR was and how easy it was to repair major damage. She is one tough bird!

Dan Diehl, N4DD, came screaming into Oshkosh on Sunday, complete with his new Pre-molded wing skins. Dan had not been sure if he would get the rebuilding done in time to make it this year or not. On Tuesday before Oshkosh, the aircraft did not have any wings, turtle-deck, or engine cowl. With some late-night work, Dan had the aircraft ready for a quick 10 minute hop Saturday night. All seemed well, so Dan then stayed up until about 2:00 pm that night painting the bird. Sunday morning he rolled her out and headed for

Oshkosh! The aircraft is now powered with a new 2100cc engine, without turbo this time, a lighter turtle-deck, a small sling seat for their new baby, (congratulations to Dan & Alicia), disc brakes that Dan made himself, a lighter engine cowling and of course the thing we've all been waiting to see, his pre-molded wings.

The wings are truly beautiful, being made in female molds with upswept tips built in. The wingspan is longer, (23 feet), and fuel tanks may be installed by the builder if desired.

Dan reports that his cruise speed is the same with the new wings, (about 170 mph), climb rate is noticeably better, and stalls are gentle with a little more control in the stall.

The long-awaited wing skins are now available for purchase by builders and Dan already has orders placed for several sets. Price has initially been set at \$800, but may have to be raised slightly later depending on actual production expenses. Dan is also planning on offering pre-molded tail skins shortly. Contact Dan at 918-299-4444 for more information.

IF YOU WANT to try something a little different in making fiberglass parts and panels, try this.

It works very well for skins on the tail surfaces and is excellent for parts such as an instrument panel or other flat or slightly curved surfaces.

You will need a piece of glass plate that is a few inches larger than the part you are going to make.

Draw the outline of the piece with a felt pen on the glass. Cut all layers of cloth that will be applied and any core material if used.

Now spread a thin layer of epoxy on the glass plate and lay on fiberglass cloth. Proceed as per normal lay-ups adding epoxy and cloth as needed.

If you are making a part such as an instrument panel, you will want to add some sort of a core material such as foam, balsa wood, etc. This is now laid onto the glass lay-up and if you are making a sandwich type part, spread epoxy on the top of the core material and lay-up cloth as required on top of core.

If part is left to cure as is, the side on the glass will be smooth and will require little or no fill for finishing. If you are making a skin for the tail, etc., once cured the skin is trimmed for fit and epoxied onto the prepared foam

spars as if it were a wet lay-up. If doing this it is recommended that peel-ply be used to completely cover the exposed top surface of the lay-up when done on the glass plate so it will be ready for gluing onto the foam and spars. Be sure and provide some pressure over the entire surface when gluing skins onto foam structures.

Now if you want smooth skins on both sides and/or very high strength in your core-type lay-ups, we can do a very easy vacuum-bag type lay-up.

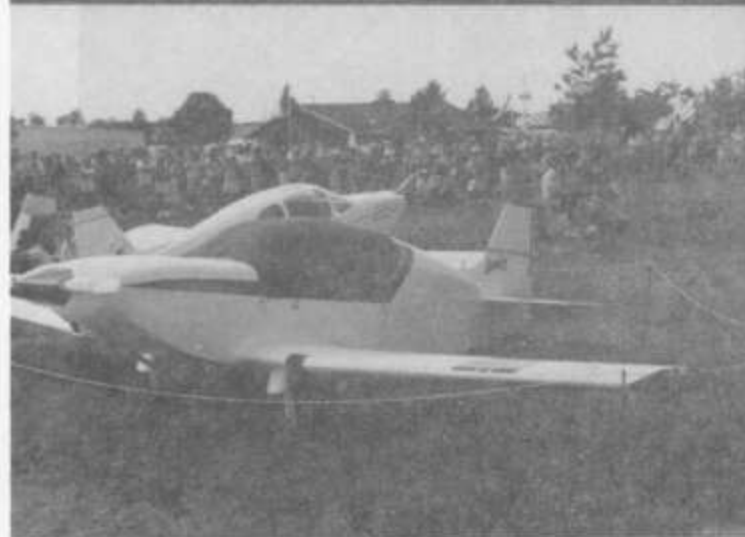
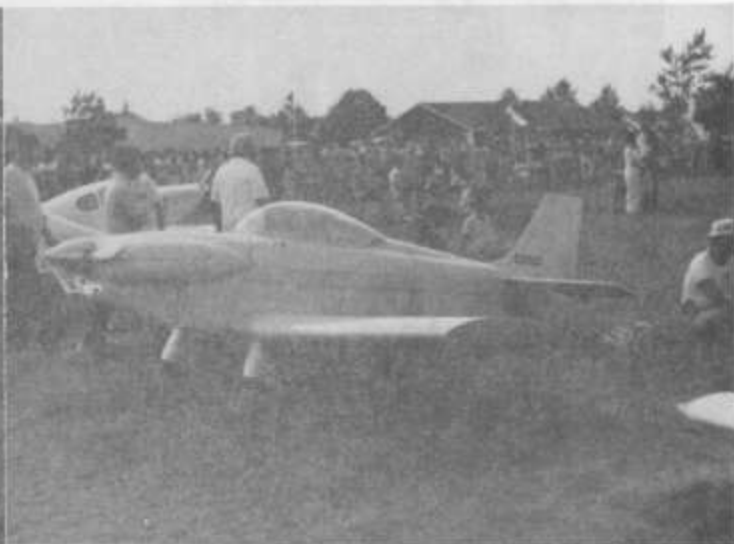
Lay a piece of smooth plastic sheet over your lay-up on the glass plate and seal edges of plastic to glass plate with tape or caulking cord. Be sure it is airtight.

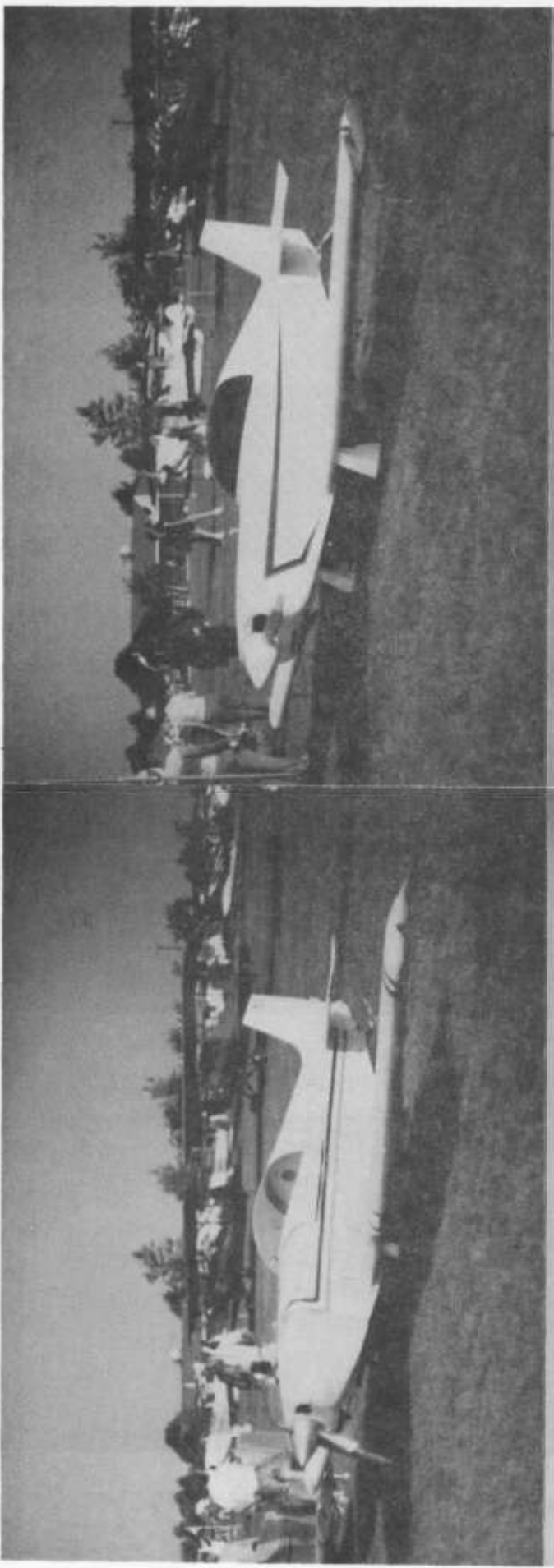
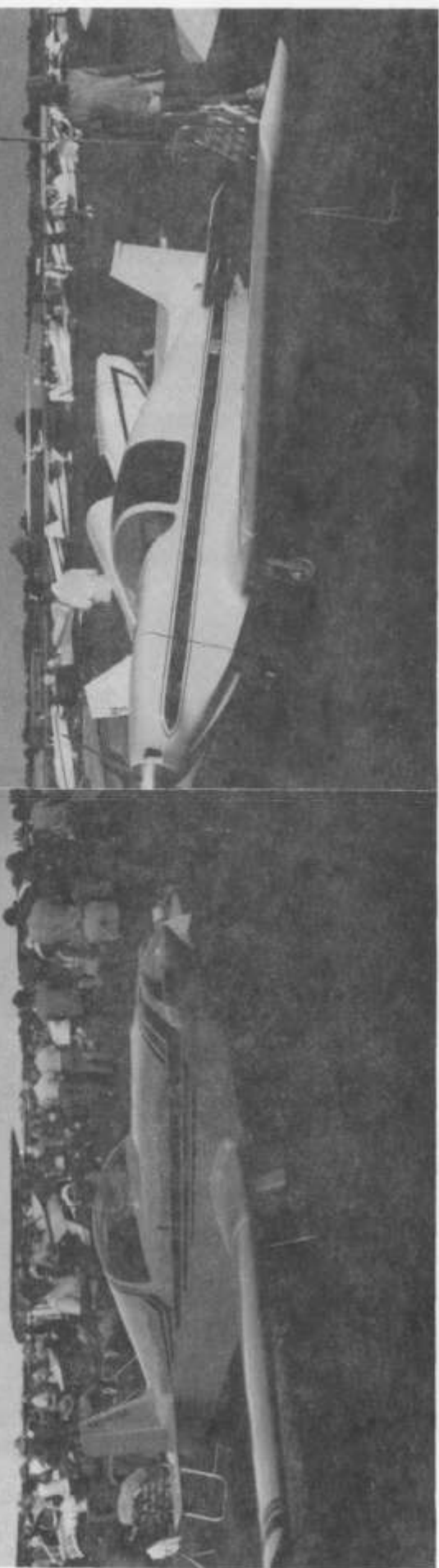
The two best vacuum systems are of course a vacuum pump made of this or I have found that an old automotive air conditioner evacuation pump works very well. You can also use a regular vacuum cleaner, but I highly recommend that you keep your hands off your wife's Hoover in the closet. Not only do they usually get upset when you begin hauling their things out to the garage, continued use will probably burn up the vacuum cleaner because it is designed to use the air it sucks up for cooling the motor. Check your local used vacuum cleaner store for a cheap one.

Hook up the hose from whatever source you are using thru the plastic and seal tightly. Be sure the plastic is smooth over the lay-up and turn on the vacuum. If it is sealed well it should pull tight in a few seconds and will exert quite a bit of force onto the part.

If you are using a vacuum pump, you should leave it running until the part has cured. If using a vacuum and it seems to be getting too hot, you can turn it off if you can maintain the seal for the plastic. I have found that the quick-release fittings used for air compressor hoses work well if adapted to the larger hose on a vacuum cleaner. This allows you to disconnect the hose and maintain vacuum.

The **KR NEWSLETTER**, PO Box 4113, Englewood, Colorado, 80134 is published monthly by John Forrester. All back issues are always available at the following rates: 1-12 issues: \$1.00 each, 13-24: .75, 25 or more: .50 each. The **KR NEWSLETTER** is an independent source of builder assistance and is no way connected with Rand Robinson. Copyright 1984.





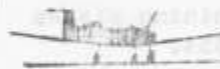
MARKETPLACE

FOR SALE—KR-1, 25% complete; fuselage and spars signed off by FAA; 35 HP VW engine, (unused and not built up), w/Slick Magneto and prop hub; all metal available w/many extra fasteners; fiberglass, foam, canopy, seat, and ten year set. of newsletters/ photos included. \$1,400. Call 517-792-6715 after 6 pm. Harold Brown, Saginaw, Michigan, 48603.

WANTED...I am building a KR-2 and need parts. (307) 687-1227.

WANTED...Needed to complete KR-2: Sling seat, propellar, misc. VW engine accessories, (anybody know of a vacuum pump for VW?), forward deck, cowl, Nav/Com radio with VOR, turtle deck. Also FOR SALE lots of AN-3 bolts and 2 fuel tank sending units. Barry Burgess, 5535 West End Blvd., New Orleans, LA. 70124, 504-488-6563.

FOR SALE...KR-2 Tinted Canopy: \$60.00.
WANTED... Posa carburetor for VW engine. Tony Toloney, 805-965-7822.



OCTOBER 19-21 ELOY, ARIZONA * ELOY MUNICIPAL AIRPORT 13th Annual Copperstate Fly-In. Sponsored by the Arizona Council of EAA Chapters. For information contact-Ray Backstrom, 7721 N. Soledad Ave., Tucson, Arizona 85741 - 602-744-1487.

FOR SALE...Enough Dynel for KR-2. Make offer. Terry Bell, 1008 17th St., Brodhead, Wi. 53520 608-897-4494.

WANTED...Partially completed KR-2, any stage. Roland Suter, PO Box 4027, Woodland Park, Co. 80863. 916-921-2826.

GREAT PLAINS

AIRCRAFT SUPPLY CO.

P.O. BOX 1481 312-359-6558
PALATINE IL. 60078

NEW DUAL BY-PASS UNIVERSAL CASE	\$239.95
FORGED 69mm 10-10 CRANKSHAFT	\$ 80.00
FORGED 69mm NEW CRANKSHAFT	\$119.95
ROCKER ARM ASSEMBLY	\$ 49.95
ELASTIC STOP NUT KIT	\$ 9.95
85.5 mm PISTON & CYLINDER SET	\$109.95
88 mm PISTON & CYLINDER SET	\$122.95
92 mm PISTON & CYLINDER SET (for 69mm stroke)	\$129.95
SILICONE BRONZE VALVE GUIDES	\$ 2.95
GASKET SET	\$ 6.95
INTAKE MANIFOLD (READY TO BOLT ON) (SP)	\$ 65.95
INTAKE MANIFOLD KIT (SP)	\$ 39.95
4216R SLICK MAGNETO	\$259.95
M2266 SLICK IGNITION HARNESS	\$ 69.50
NEW CHAMPION REL37B SPARK PLUGS	\$ 11.95
OIEHL SUPER ACCESSORY CASE-best buy anywhere	\$415.00
KR MOTOR MOUNT FOR ABOVE	\$115.00
DRAGONFLY MOTOR MOUNT FOR ABOVE	\$125.00
TUNED EXHAUST FOR KR'S	\$195.00
STUBY EXHAUST SYSTEM KIT	\$ 24.95

GPASC MODEL 16 G ENGINE	\$1995.00
GPASC MODEL 17 G ENGINE	\$1995.00
GPASC MODEL 18 G ENGINE	\$2149.00

FOR FRIENDLY, COURTEOUS SERVICE-HIGHEST QUALITY PARTS & LOW PRICES, REMEMBER GREAT PLAINS AIRCRAFT SUPPLY CO.

CATALOG 1.00

WANTED WANTED WANTED WANTED FLIGHT REPORTS, CONSTRUCTION TIPS, ACCIDENT REPORTS ON KR AIRCRAFT

Your input and ideas are what keep the KR Newsletter interesting! Your idea may be simple to you, but someone else may not have thought of it. Photos always wanted. Help other builders with your ideas.



NEW 11 400*5 ft PLY RATED
TIRE SPECIFICATIONS INFLATED
HEIGHT 11.5 INCH WIDTH 40 INCH
TIRE WT 3 LBS. TUBE WT 1/2 LB
LOAD RANGE C-70 P.S.I. MAX

This two 1100 MM ana gap Pat»asn »* SoteS aw craft tir* and trw 3 40-3 00x5 go-kail t.r. Looks lika a icalad rto»n 500*5 Fits KA-I A 2 • and is racommandad by Sort Ruts* tor lha VariEta and Long-EZ Alao fits moat othar ampanmsntaa) uamg S inert rims.

TIRE 6 PLV RAT. 24.00 TUBE 6 50* SHIP a HAND MIKE LAMB. PO. BOX 3304. QUARTZHNJ. CA«S34

MINIATURE METRICS LITEFLYTE HARDWARE

7801 14th Street
Westminster, CA 92683
894-4875 (unlisted)

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Heim joints & spacers \$26.*

Landing gear lockbar SPRINGS mouse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates drilled, ready for Camloc \$54. *

'Upper elevator pulley bracket \$15*
Assembled

Rudder, elevator horns & hinges & back-up plates \$55.*

Aileron bellcranks & horns complete Assemblies (24 pieces) \$87. *

'Lower elevator pulley brackets \$28. assembled*

Aileron pulley brackets assemblies \$30.*

Control stick assembly per plans w/mike switch \$75.*

Rudder pedal mount blocks \$30. *

Quality...all material is aircraft aluminum/steel as specified in the KR Construction Plans Book. S.A.S.E. more information.

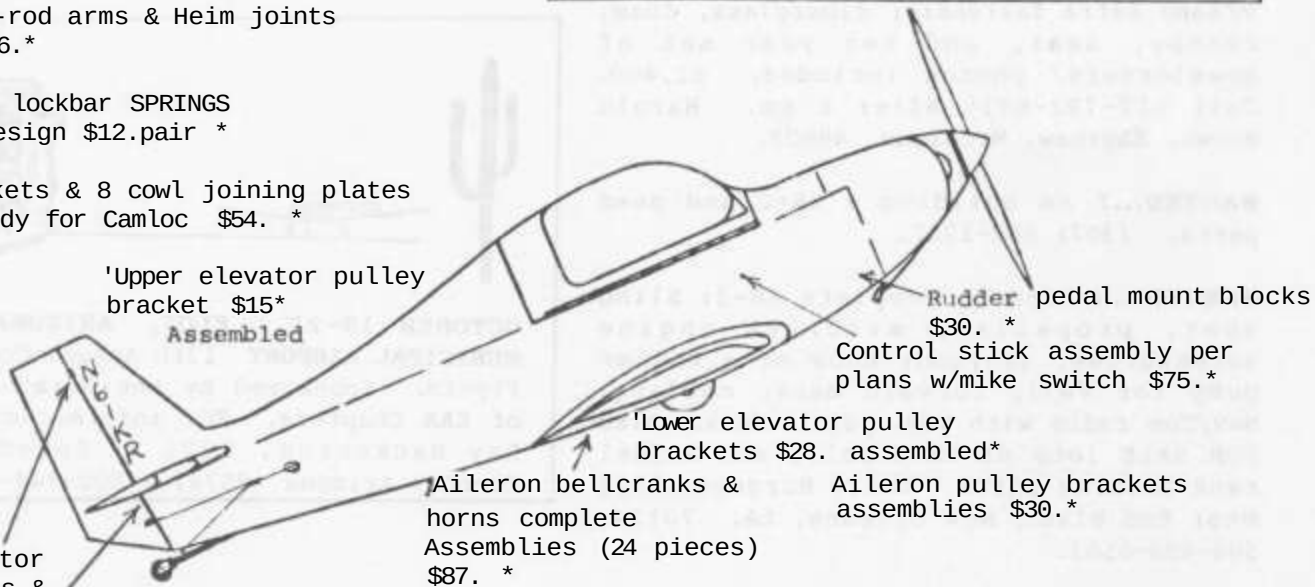
*postpaid items

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLORADO 80155-4113
ISSUE #110 AUGUST 1984

FIRST CLASS MAIL
U.S. POSTAGE
PAID
DENVER, COLORADO
PERMIT NO. 2677



Planning to purchase the Rand-Robinson #4 Aluminum Extrusion Kit? Let us save you time and money. Miniature Metrics will pick up the kit from Rand-Robinson, perform necessary machining and return to Rand-Robinson for shipping. Parts will be cut, milled, drilled and shaped. Send us a S.A.S.E. for more information.



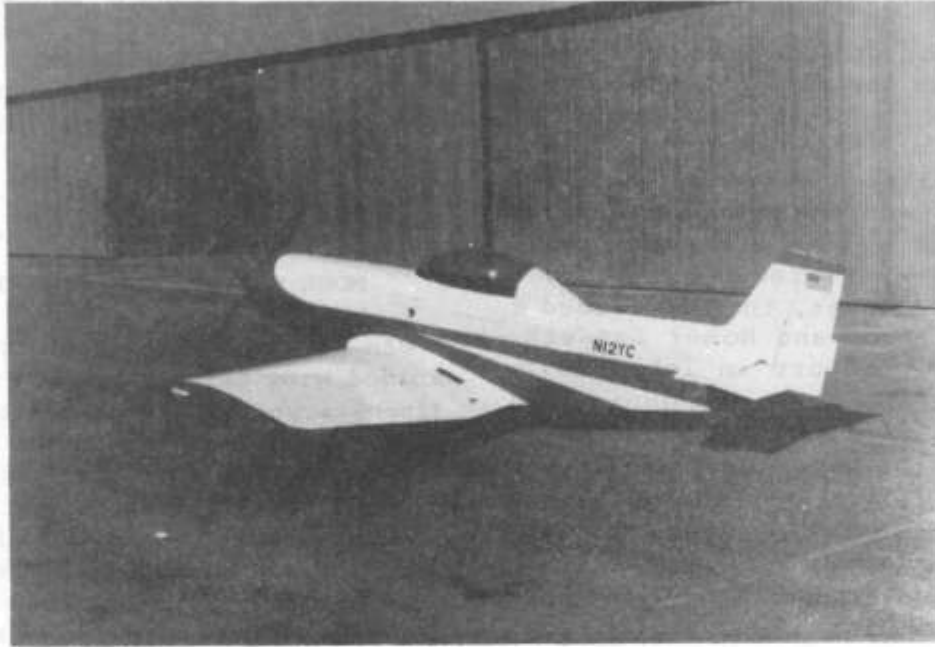
ISSUE NO. 111
SEPTEMBER
1984



KR NEWSLETTER

RATES
USA \$12.00 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand/Robinson Engineering.



Dear KR Builders:

I have inclosed picture of my KR-1, N12YC, just finished and signed off by the FAA on August 21, 1984.

Equipped with HAPI 1835cc engine, Terra 720 com., and Whelen Strobe/Nav light combination. Weighs 535 pounds empty which had me worried, but it flys like a dream and stalls at 48 mph.

Used the HAPI gear modification and 2 layers of Rutan glass on the wings.

Haven't put enough time on it yet to give you any specs.

Took me 2 1/2 years of on and off time to finish and worth every minute.

Hope to see you all at some of the future Fly-Ins.

Sincerely,
Bob Campbell
501 Phoenix Ave.
Modesto, Ca. 95354

THE KR NATIONAL FLY-IN was held as scheduled in Salina, Kansas and considering the fact that Mother Nature didn't want to cooperate, we had a good turn-out.

My attempt to fly from Denver to Salina on Friday night before the Fly-In had to be cancelled about the time I reached the Kansas state border. We had departed about 9:00 p.m. with a weather report stating that thunderstorms were widely scattered and "navigable". About 10:00 p.m. I turned on the landing light to see if we could see any rain and it looked like we were flying in a ground blizzard. Luckily it was smooth air because it wasn't raining, it looked more like I was flying inside a car wash! A quick call to Flight Watch stated that rain was still light and scattered! I was sorely tempted to use some differant terms concerning their reports. Fortunately we made it back to Denver, in heavy rain all the way and left again Saturday morning.

We landed in light rain in Salina Saturday morning to find 2 KR's and about 30 builders already there. As the day wore on more builders showed up and 4 more KR's were able to get into the field. We had reports of several KR's scattered throughout the mid-west on fields waiting for weather to clear, but they never were able to reach Salina. By Saturday night we had over 200 builders, 4 KR-2's, 2 KR-

1's, and 1 KR-2 in the "boat-stage" that was trucked in.

Sunday morning we woke to find some of Kansas's famous 30 mph wind blowing. Ever notice how all the runways in Kansas run north and south? That's the way the wind always blows, so we were lucky that it was blowing right down the runway. Some pilots had planned on giving some builders rides, but with the wind, that had to be cancelled. It did present some FAST high-speed passes down the runway when we left!

MY KR-2, N4531Y, now has a new home. Kris and Greg Hendreckson in Mt. Zion, Illinois promised to give her a good home.

Although the restricted hours had not yet been flown off yet, the FAA issued a waiver for a flight and Homer Sanders, (see KR-1 flight report in issue 107), came out and flew it from Denver to Illinois. Sure felt good when he called that night from Illinois to report all was well! A 1,000 mile right from the start can make you nervous and although there were no problems, Homer said he doubted he would want to do it again.

SO HOWS MY NEW bird? Well all the wood-work is completed, spars are installed, tail is complete and the retractable, tri-gear is being welded together and being installed now.

This new gear is working out very well so far and sure is simple to build. The main wheels fold inward and the nose wheel folds backwards. The gear legs are spring-loaded, telescopic resulting in a simple, strong, and lightweight gear. I'm also using Rosenhan disc brakes and Lamb tires for the mains, and the new Azulite graphite wheel for the nose wheel. Nose wheel steering will be installed.

Now for the question I keep being asked. Will plans be available? Yes. As soon as the gear is completed I will have plans available for it and possibly may have the assembly available completely welded as a bolt-on set-up. Cost for complete gear kit would probably be about \$800.

I will announce it when ready, so please don't swamp me for information yet. Let me finish it first.

1985 OSHKOSH DORM ROOMS

Linda Bennett has informed me that she is again getting rooms for KR builders at the dorms at the University of Wisconsin for Oshkosh '85.

If you want a room, send Linda a check for \$17.00 made payable to the Univ. of Wisconsin. Linda's address is 758 N. Williams Dr., Palantine, 111. 60067.

DEADLINE IS NOVEMBER 1st, SO HURRY!

Linda has done this for us for several years now and deserves a big thanks for her help!

MORE NEAT THINGS FROM DAN DIEHL

Dan reports that sales on the new pre-molded wing skins are going well with 2 to 3 sets a week being delivered. If you are planning to use these skins I suggest you contact Dan before you build your outer wing spars. There are a couple of modifications that have to be done to the spars if you're using the pre-molded wing skins. (Those of you who have already built your outer spars, don't worry, you can still modify them easily for use in the skins).

I'm using these skins on my new bird and should have them by the time this newsletter is done. I'm really looking forward to using them.

Now for more good news. Dan now has the molds ready for TAIL SKINS! That's right, now you can get all the tail group skins premolded also. As with the wings, these are vacuum-bagged with a sandwich core for very high strength and a perfectly smooth finish.

Final price won't be determined until Dan has had a chance to make a production run to determine production costs, but he expects them to be around \$600 for the full set.

When you consider the extra strength you get with a sandwich constructed skin, still maintaining light weight, the tremendous amount of construction and finishing time you save, these are truly a bargain.

Contact Dan at 1855 N. Elm, Jenks, Oklahoma 74037. 918-299-4444.

KR DESIGNEES

Over the years, KR Designees have provided a tremendous amount of assistance to KR builders around the world. Without them there would not be near the amount of completed KR's that we now have.

Below is a list of the current active KR Designees who are ready to help builders over any problems or questions they have. I would also like to put out a call to those of you who would like to be a KR Designee. The tremendous number of builders has created a need for persons willing to assist other builders.

Requirements are as follows:

1. MUST HAVE BUILT AND FLOWN A KR.
2. Active in KR functions.
3. Willing to assist other builders.

Please contact me if you are interested.

CURRENT KR DESIGNEES

Steve Bennett
758 N. Williams Dr.
Palantine, 111. 60067
312-359-6558

Ernest Koppe
335 Lynn Lane
Sapulpa, Ok. 74066
918-227-2988

Dan Diehl
1855 N. Elm
Jenks, Ok. 74037
918-299-4444

John Forrester
9394 McShane Ct.
Parker, Co. 80134
303-841-8651

Steve Alderman
825 S. Pratt Parkway
Longmont, Co. 80501
303-651-1733

Leon Coetzee
10 Lark Str.
Meredale 2091
Johannesburg
Rep. of South Africa

PLEASE MAKE A NOTE

Please make a note somewhere regarding my phone number. When I moved earlier this year our number changed. Although noted several times in the newsletter, great numbers of builders are still calling the old number. The people who have the old number have been very good about passing it on, but after 9 months they are getting tired of forwarding calls. The phone number is 303-841-8651.

QUESTIONS AND ANSWERS

Q. I saw in one of the back issues of the newsletter that a company called Aero Trading Co. in New Zealand was going to produce a tri-gear for the KR-2. Is it now available?

A. As far as I can determine, Aero Trading Co. never delivered any tri-gear kits for KR's and is no longer in business.

Q. How tight are the bolts supposed to be tightened on the engine mount rubber bushings?

A. They should be torqued to 80 inch lbs., + or - 10 inch lbs. Too tight and they won't allow the bushings to absorb vibration.

Q. What are the maximum temps, allowed for cylinder head and oil on the VW engine in a KR?

A. Oil temp, maximum is 215 degrees F. With a standard VW oil cooler installed, mine never got over 180 degrees even on hot days. Your cylinder head temp sender should be installed on cylinder #3, as this runs the hottest, with red line at 450 degrees F. Normal level flight should give you a temp, in the range of 300 to 375 degrees F.

The KR NEWSLETTER, PO Box 4113, Englewood, Colorado, 80134 is published monthly by John Forrester. All back issues are always available at the following rates: 1-12 issues: \$1.00 each, 13-24: .75, 25 or more: .50 each. The KR NEWSLETTER is an independent source of builder assistance and is no way connected with Rand Robinson. Copyright 1984.

FLIGHT TEST REPORT

A follow-up report to December, 1983 Flight Test Report.

PARTICULARS: Aug 11, 1984 at New Smyrna Beach Airport, Florida. KR-2
N15RN built, owned, and flown by Richard Neate, Port Orange, Florida.
WEATHER: Clear skies, 90°F, light winds, 80% humidity

KR-2 FACTS: Empty Wt: 580 pounds. Gross Wt for flight: 820 pounds.
Engine: Revmaster 2100 cc Volkswagen. These were flights
number 5 and 6 in the test program, mainly aimed at solving a
tendency to roll left, a warm cylinder head temp (CHT), and
verifying the accuracy of the airspeed indicator.

CRUISE:	RPM	MPH	CHT	APPROX.	
				% POWER	OIL TEMP (°F)
	2800	112	350	72	210
	2900	117	370	63	210
	3000	125	380	56	215
	3100	131	385	49	215
	3200	141	390	44	215

STALL:	FLAP SETTING	MPH (IAS)
	13°	49
	26°	46
	40°	43

(All stalls were gentle with a clean, well-defined break.)

ROLL RATE: Left roll 90+ °/sec Right Roll 45+ °/sec
(It's hard to get much force to the right with a center stick)

TOP SPEED: 160 + MPH @ 3500 RPM, CHT 420°F, Oil Temp 220°F

CLIMB: All at 3200 RPM:
Airspeed: 90 MPH CHT: 450°F
Airspeed: 100 MPH CHT: 420°F Rate of Climb: 750 Ft/Min
(I saw no need to climb at full power and thus raise CHT to
near maximum levels (500° F).)

HANDLING

QUALITIES: The airplane still has a slight left roll tendency at high speeds,
but no noticeable tendency at lower speeds. N15RN is pitch sensi-
tive, but now I feel very comfortable with it. As far as yaw control-
lability, I find the airplane is somewhat roll insensitive to rudder
movements and more yaw insensitive to rudder movements than most
other airplanes. Overall, I now feel very comfortable with flying
my KR-2. It is easy to control at all speeds, not difficult to
takeoff or land, and surprisingly easy to handle on the ground.

COMFORT: Despite the hot day, N15RN was comfortable at 2000 feet because
of air leakage around the canopy and the landing gear bar. The
seats are very comfortable and the 2" wider-than-plans cockpit
is very roomy for one and adequate for two people.

TEST

RESULTS: The left roll tendency has been nearly solved with trim tabs.
The high CHT problem was completely solved by redoing the baffling and
by increasing the cowling exit area. The airspeed indicator was
checked by doing a series of low altitude speed course runs and
it seems to indicate just a little fast, but more tests are needed to
confirm this.

MARKETPLACE

FOR SALE....KR-2 plans - latest revised edition purchased 3/84, including KR Newsletters. \$95.00 James H Yost, 289 Deltona Blvd., St. Augustine Shores, Florida 32086. 904-797-3314.

FOR SALE....1835 VW engine, 40 hours TT, complete firewall forward. \$2,000. Steve Ernst. 303-443-3044.

FOR SALE....KR-2, N15RN. Custom trailer, Revmaster 2100 with starter, oil cooler. 160+ mph top speed, cruise 140+ mph @ 3200 rpm. \$7,000. Rich Neate, 904-761-7261, Evenings.

FOR SALE—Wing attach fittings, per plans, radii ground professionally. \$100 post paid. 1328 Canal Ave., Long Beach, Ca. 90813 Paul Venne.

WANTED....Low time HAPI engine. Glen Hollis, Rt. 1, Box 33, Bloomfield, Mo. 63825.



NEW! 11 400x5 8 PLY RATED
TIRE SPECIFICATIONS INFLATED
HEIGHT 11.5 INCH WIDTH 4.0 INCH
TIRE WT. 3 LBS TUBE WT. V2 LB
LOAD RANGE C -70 P.S.I. MAX
 This tire fits between the 500x5 aircraft tire and the 340-3.00x5 go-kart tire. Looks like a scaled-down 500x5. Fits KR-1 A 2+ and is recommended by Burl Rutan for the VanEre and Long-feZ. Also fits most other experimental* using 5 inch rims.
TIRE 6 PLY RAT. 25.00 TUBE 6 50+ SHIP A HAND
MINX LAMB. P.O. BOX 3324, OUARTZHILL, CA 99534

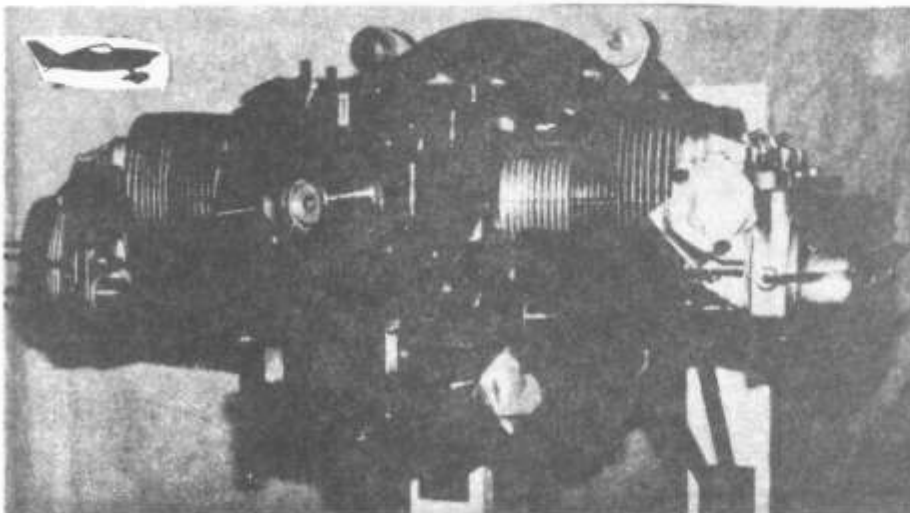
FOR SALE....Parting out KR-2. Have all misc. fittings, hinges, bellcranks, instruments, etc. Steve Ernst, 1300 30th St., Apt. Bl-32, Boulder, Co. 80303 303-443-3044.

GREAT PLAINS
AIRCRAFT SUPPLY CO.

P.O. BOX 1481 312-359-6558
PALATINE, IL. 60078

MODEL 18C \$2395.00

Great Plains Aircraft is proud to announce a new engine program that will save you the homebuilder, \$500.00 to \$1000.00 on the cost of a new VW AIRCRAFT ENGINE CONVERSION. We are offering our Model 18C (I835cc) for the low price of \$2395.00 complete. How? Fly or drive to Chicago and plan on a 2 day visit. While you are here, we will assemble the engine of your choice, using your labor and our knowledge, supervision, tools and parts. After the engine is assembled we will test run it to insure its proper operation. You'll leave with a new engine, plus the knowledge and experience gained from assembling your own powerplant. Be sure to tell your fellow EAA members and friends about the lowest priced engines around. All of our other engines are available at substantial savings also. Contact us for further information or make your reservation **TODAY!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!**



FEATURES:

C	INTAKE MANIFOLD
A	POSA CARB
T	FORGED 69MM CRANKSHAFT
A	NEW DUAL BY-PASS UNIVERSAL CASE
L	SLICK MAGNETO AND IGNITION HARNESS
O	CHAMPION REL37B SPARK PLUGS
G	REMOTE OIL COOLER AND LINES
	DIEHL SUPER ACCESSORY CASE
\$	20 AMP ALTERNATOR/REGULATOR
1	STARTER/FLYWHEEL/MAG DRIVE
-	HIGH VOLUME OIL PUMP
0	LOWER CYLINDER SHROUDS
0	BALANCED RODS/PISTONS
	TEST RUN
	WEIGHT 159.5 lbs.

ENGINES AVAILABLE FOR ALL VW POWERED HOMEBUILTS

MINIATURE METRICS LITEFLITE HARDWARE

7801 14th Street
Westminster, CA 92683
894-4875 (unlisted)

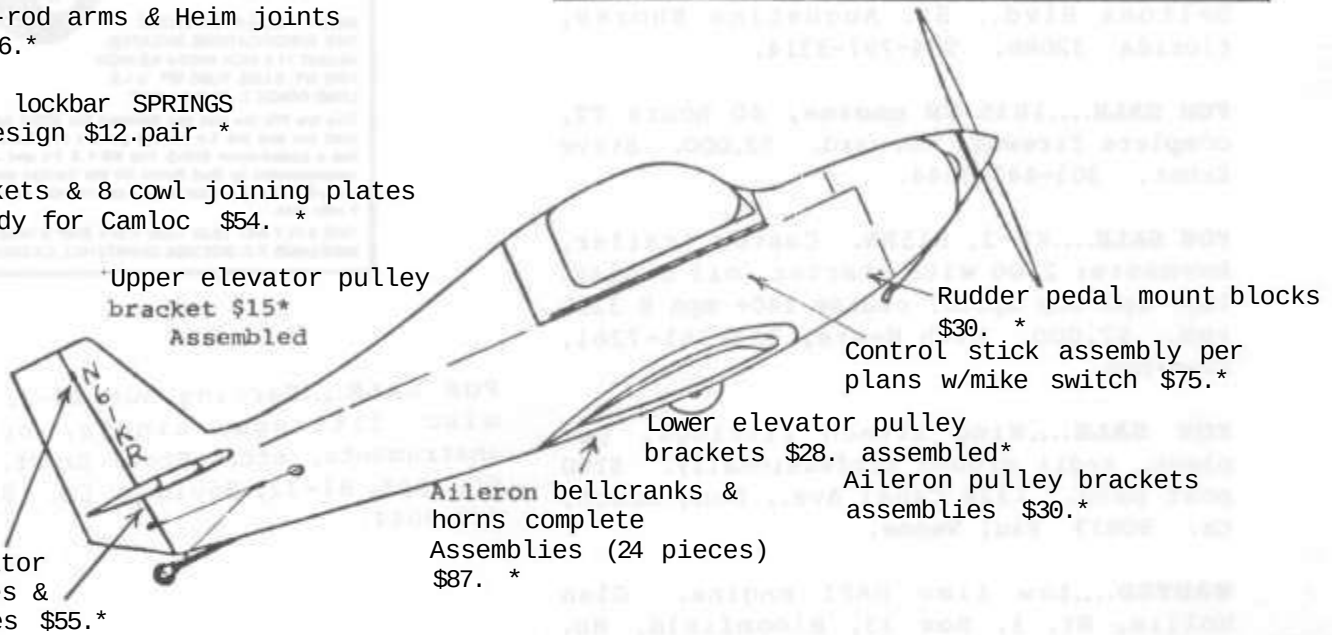
Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Heim joints & spacers \$26.*

Landing gear lockbar SPRINGS mouse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates drilled, ready for Camloc \$54. *

Planning to purchase the Rand-Robinson #4 Aluminum Extrusion Kit? Let us save you time and money. Miniature Metrics will pick up the kit from Rand-Robinson, perform necessary machining and return to Rand-Robinson for shipping. Parts will be cut, milled, drilled and shaped. Send us a S.A.S.E. for more information.



Rudder, elevator horns & hinges & back-up plates \$55.*

Aileron bellcranks & horns complete Assemblies (24 pieces) \$87. *

Lower elevator pulley brackets \$28. assembled*

Aileron pulley brackets assemblies \$30.*

Rudder pedal mount blocks \$30. *

Control stick assembly per plans w/mike switch \$75.*

*postpaid items

Quality...all material is aircraft aluminum/steel as specified in the KR Construction Plans Book. S.A.S.E. more information.

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLORADO 80134-4113
ISSUE NO. 111 SEPTEMBER 1984

FIRST CLASS MAIL
U.S. POSTAGE
PAID
DENVER, COLORADO
PERMIT NO. 2677



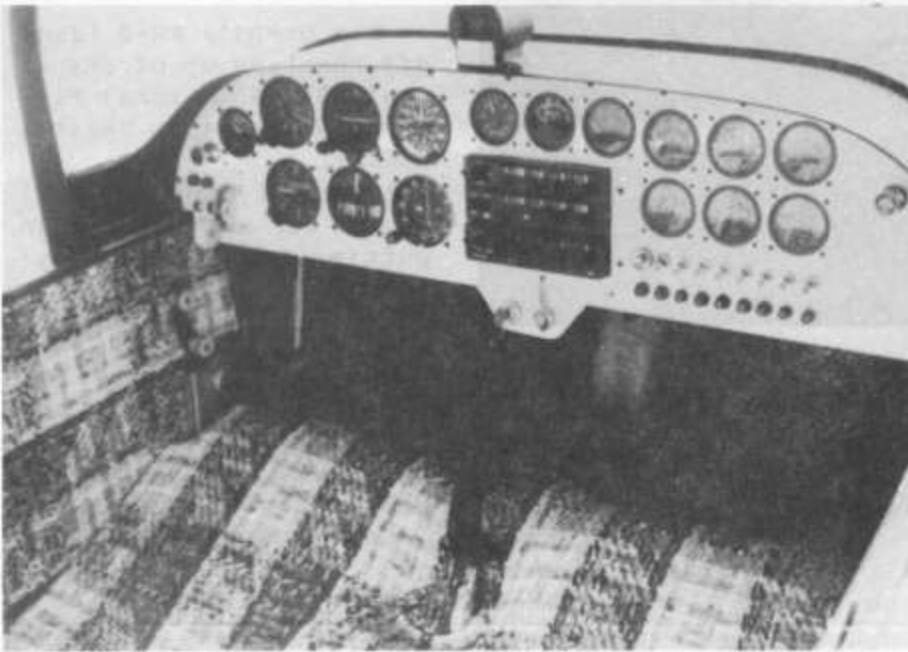
ISSUE NO. 112
OCTOBER
1984



KR NEWSLETTER

RATES
USA \$12.00 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand/Robinson Engineering.



MIKE LAMB'S NEW KR-2 IS REALLY SHARP!



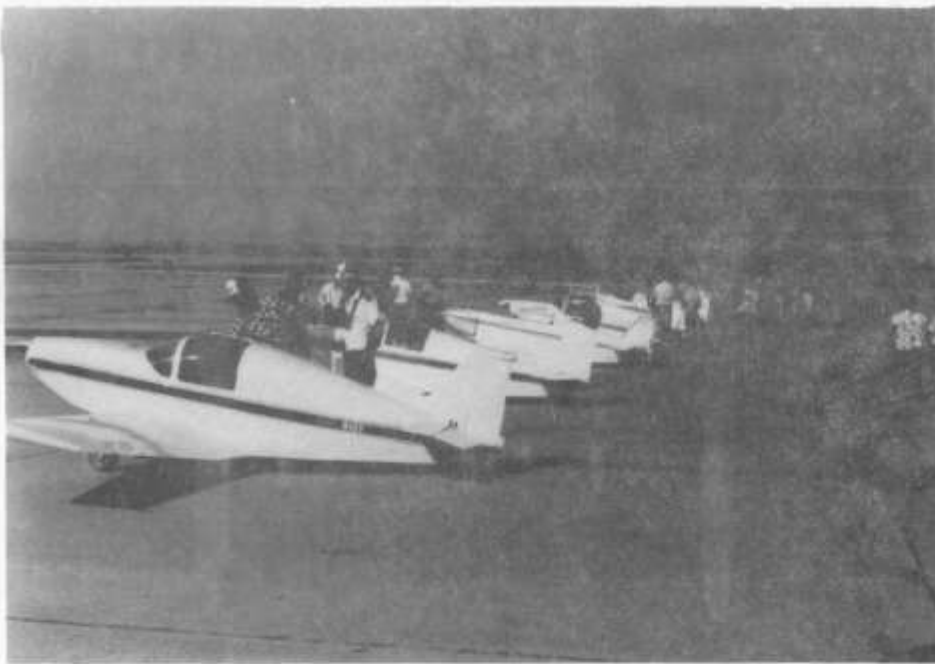
Mike has promised us a flight report shortly.

THE SEPTEMBER ISSUE of the Newsletter is still at the printers as I write this months issue. Obviously things have gotten backed up.

I have contracted with a new printer and hopefully we can get the newsletters back on schedule. I realize how much you all look forward to each issue and would also like to thank everyone who sends in articles, flight reports, etc. Without your input there would not be a KR Newsletter.

Have you sent in a picture or article for the newsletter? We don't care if you aren't an artist--rough sketches are fine. I can redraw them if necessary. Pictures can be color or black & white. Your input and ideas will help someone else.

One area we all don't like to talk about is accidents, but they are important. If you have had an accident, please write a article about it, including causes and solutions. They may save someone else from having the same problem.



Dan Diehl's KR-2 leads off the line up of KR's at the 1984 KR National Fly-In held August in Salina, Kansas.

A special thanks to Bill Ficken for all his help in putting together the Fly-In this year.

QUESTIONS AND ANSWERS

Q. How much speed will I lose with a fixed gear on my KR-1?

A. Depends upon how good a job you do fairing the wheels, gear legs and fuselage junction, but most seem to lose about 10 to 15 mph with the fixed gear.

Q. I see Safe-T-Poxy has a new epoxy called Safe-T-Poxy II. Is this acceptable for use on the KR?

A. This is an improved version of the original Safe-T-Poxy and is the best. I have found for glass work. It is thinner than the original and results in better flow and wet-out of the cloth. You will use less epoxy and thus get lighter parts. DO NOT USE IT FOR WOOD STRUCTURES! I talked to Burt Rutan about, this and he said although he had used it with some success on wood, he found that they had to heat the wood a lot to get the epoxy to flow into the wood and don't recommend it for wood use. By the way, if you are using the original Safe-T-Poxy and want to switch to the new, they will mix together without any problems.

OVER THE LAST few months I have received several inquiries regarding the availability of KR Belt Buckles. These were available for a few years, but the company making them went out of business and disappeared, taking the KR mold with them. Mold charges are quite high and we would need to have assurance that a minimum number would be sold to be able to justify the expense again.

If you are interested in purchasing a buckle please let me know. Cost will probably be about \$8.00. If enough builders want them, I will have a new mold made and the buckles will again be available.

2-BLADE, 3-BLADE & 4-BLADE ADJUSTABLE PROPS AVAILABLE

K.P. RICE has informed me that Prop's Inc. now has ground adjustable props available for VW, Continental, and Lycoming engines. Prices are not available yet. Contact them at 714-545-3575 for more information.

The **KR NEWSLETTER**, PO Box 4113, Englewood, Colorado, 80134 is published monthly by John Forrester. All back issues are always available at the following rates: 1-12 issues: \$1.00 each, 13-24: .75, 25 or more: .50 each. The **KR NEWSLETTER** is an independent source of builder assistance and is no way connected with Rand Robinson. Copyright 1984.

Dear John:

I saw you at Oshkosh, but never had the chance to greet you in person. I'm a KR-2 builder and am doing a couple of somewhat unusual things which you might wish to know about.

The basic change is to the wing. I'm working with a knowledgeable engineer to utilize the "Eagle 1" airfoil described about 9 months ago in "SPORT AVIATION". At the same time, I'm extending the wing 3 feet and using the "Diehl" wingtips. However, this won't be an "add-on", it will be designed in from scratch. We've redesigned the spars so they run all the way to the tips. The spars use tapered spar caps which are beefier on the inboard, but fairly skinny out at the tips. These should be stronger, yet the built-up spars have come out to about standard weight.

The wing-attach mechanism will be a quick-release device instead of the usual bolt attachment. The wing attach plates are made longer than standard, to carry more stress. The former bolt holes, for the removable bolt, will be replaced with a stainless steel taper pin. The pin is extended and retracted to the bolt holes with a bellcrank arrangement operated by a lever which mount flush with the wing surface. The device has positive locking in operation. If it works as planned, it will simply mean lifting one handle on the top of each wing and presto, the entire wing is released. Incidentally, we're using tapered pins and tapered holes to ensure an absolutely tight fit with no tendency to grind out the holes with normal wear and tear.

The above features might be of interest to Newsletter readers. I'll keep you posted and may send some rough sketches.

While I have your attention, I'd like to share a couple of construction ideas which helped me quite a lot during the building of my KR-2, (60% complete to date).

I used to build model planes, and since the KR is really just a big model, I stole a technique from modeling to build the fuselage sides. Basically, I build both sides AT ONCE, one ON TOP OF THE OTHER. A layer of wax paper between them keeps the glue from sticking them together. This technique guarantees the two sides are exactly identical. But the major advantage is time; when the table saw is set up to cut the 5/8" square pieces at the correct angles, you can cut two pieces at the same time, one for each fuselage

side. This way, you don't have to re-set the table saw again when you build the second side. I saved much time by this method. Incidentally, it also saves time in that you have to set up all the nails, (or other braces), for the sides only one. You're doing both sides at once.

I used a very simple "jig" to assemble the sides into the "canoe". When people hear the term "jig", they often shy away for fear it will involve a complex technique. Not so! The simplest kind of jig would be three rectangles made of 1 x 3 scrap lumber screwed together. Each rectangle mounts at a point in mid-fuselage, and the width of the rectangle is made to the width of the fuselage at that location. The rectangles are mounted plumb and square directly on the center line of your work table, (see rough sketch). The fuselage sides are then just bent around there and held in place with braces until the sides are glued together. This makes a 100% true fuselage, less bracing in needed, and the work goes lots faster.

Here's a controversial one! I am building my wings out of the fuselage, on a separate table, in a jig. I believe I will get a guaranteed true wing, with the correct washout. This again steals from model-building techniques. To be able to do this at all requires a way to remove the wing from the fuselage, and to reassemble it to the fuselage after construction. You can't, obviously, slide the wing back into the fuselage spar slots. Here's what I'm doing. I completely installed the center spars in the fuselage except that they aren't glued. Turning the fuselage onto its top, I cut a slot through the bottom of the fuselage so the spars can be lifted out, rather than slid out through the sides. When the wing is finished, I'll just drop it back into the spar slot. I'll replace the lower longerons, which had to be cut to make the spar slot, by gluing a new 5/8 square sub-longeron alongside the one I cut, with a healthy overlap, scarf, and plenty of reinforcing glass cloth.

Once the wing is separated in this manner, I can mount the spars on a work table and be sure they are jugged perfectly into the correct dihedral, washout, etc.

This technique was worked out by my good friend Charlie North, who is a licensed A & P, and who feels the end result will be a stronger, more accurate finished product. I'll keep you posted on its success.

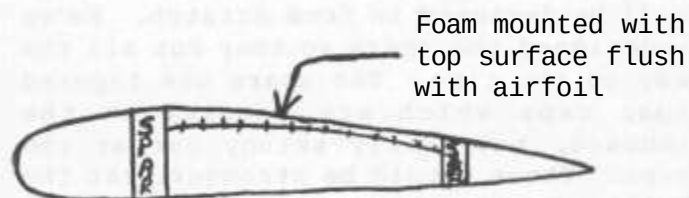
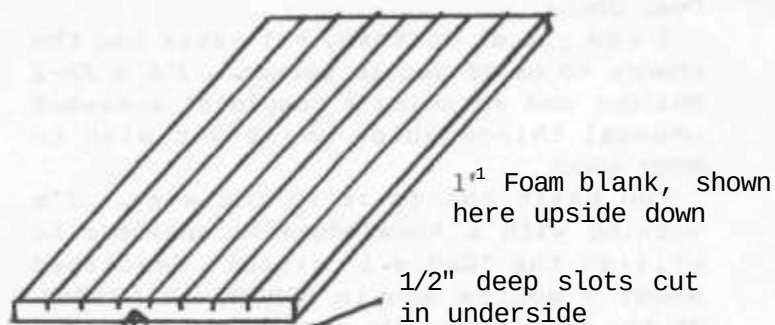
If you aren't too bored by this time, here's one more model-building idea I'll be using on the wing. This will replace the foam installation method from the plans, which requires lots of sanding and the potential for a wing surface that isn't 100% flat.' Using 1" foam, make span-wise cuts into the inner side of each foam piece, about 1/2" into the foam. These cuts have to be spaced so they are located proportionally along the inboard and outboard ends of the foam. The cuts allow the piece of foam to be curved. The foam is then glued into the wing so that its upper surface is flush with the airfoils and spars. If this is done carefully, the upper surface will conform perfectly and require no sanding. After it is glued, foam ribs can be glued in under it to provide full support before glassing. I've attached another rough sketch to illustrate.

Hope all this is of interest. I'll keep you posted as I proceed.

Bill Thomas

9 Pine Acres Drive

Canton, Connecticut 06019



A: Equal to width of fuselage at that station.

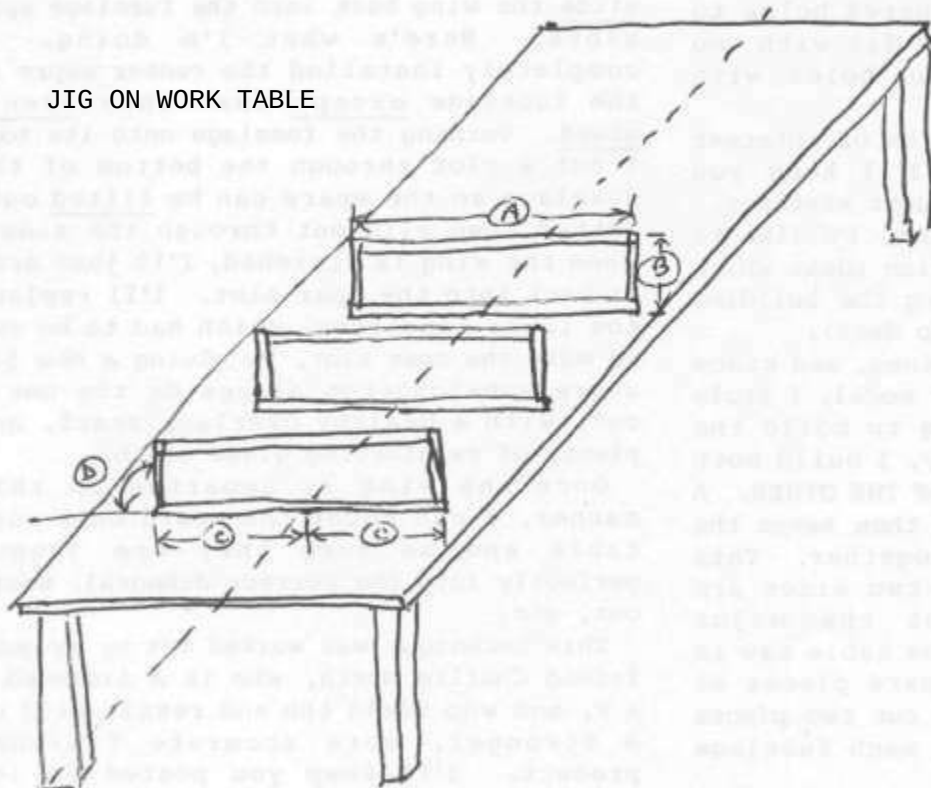
B: Equal to height of fuselage at that station.

C: Center the frame on the centerline of table.

D: Mount each frame 90° to the work table.

Just "wrap" the sides around this jig, secure, and the cross pieces can be glued in place to hold the fuselage together.

JIG ON WORK TABLE



MARKETPLACE

**General Aviation
Parts & Supplies**

**Experimental j
Aircraft Kits**



- Composite Supplies
- AN Hardware
- Instruments and Radios
- Propellers
- DIEHL "SUPERCASE"
- "THE STING" Tuned Exhaust Systems
- **FAST** "AIRCRAFT ENGINES"

THIS MONTH'S SPECIAL SALE

**** KR TAILWHEEL ****

4130 STEEL IMPROVED DESIGN FORK &
"DIEHL" TAILWHEEL. PERFECT FOR
NEW OR RETRO FIT. NORMALLY \$36.00

NOW ON SALE FOR: \$29.95

CATALOG \$3.00

P.O. BOX 4113
ENGLEWOOD, CO 80155

303-841-8651

FOR SALE__KR-1 Plans, Newsletters, Jan 1979 to November 1981. Includes book binder. \$40.00. Art Hartman, 33775-A Robles Rd., Dana Point, Ca. 92629 714-493-8797.

FOR SALE__KR-2, N49ML, Mike Lamb is selling his recently completed tri-geared KR-2 in order to finance his new project. See front cover of this issue for pictures. This is a beautiful, 1st class aircraft! \$12,000. 805-943-1063

WANTED__164 cu. in. Corvair head set. Have smaller displacement heads to trade. Paul Venne, 1328 Canal Ave., Long Beach, Ca 90813. 213-421-3192.

WANTED__I would like to borrow or purchase a set of plans for a trailer to haul my KR-2 on. Ralph Elmer, 110 Oakcrest Dr., Rochester, NY 14617.

FOR SALE....KR-2, 95% complete, 0 time Revmaster 2100, (installed and running), 0 time Warnke 3 blade adj. prop. All instruments new and certified, Instruments include all required for night VFR, \$6,000 Canadian funds, FIRM. Write or phone Doug Hoffman, 4444-32 Ave., Edmonton, AB, Canada, T6L 4W7 406-461-8328.

PROPS INC.

WHY BUY YOUR PROP FROM US

Because;

- You may never have to buy another prop — we will repair and renovate our props for **one half** the original cost as long as the structure is sound.
- We will build into your prop only what you need — You select
 - type of wood (birch/maple or mahogany)
 - blade finish (wood grain or polyurethane enamel)
 - blade treatment (fiberglass and/or steel-composite leading edge)
- We have a long history of building very high performance, high quality and extremely durable propellers.

HOME BUILTS - ULTRA LIGHTS • WINDMILLS • PROPELLER CLOCKS

Repair and Renovate - Upgrade Performance and Durability - Repitch

Send a self-addressed stamped envelope for the history of Props Inc., Guide to propeller selection, how our repair policy saves you money, price list (prices start at \$95).

(Dealer Inquires Invited)

PROPS INC.

2020 S. Susan "0", Santa Ana, CA 92704
(714)545-3575

NEW* 11 400HS • PLY RATED
TIRE SPECIFICATIONS *#LATED
HEIGHT 115 INCH *#TM 4.0 INCH
TIRE WT 3 LBS. TUBE WT * LB
LOAD RANGE C -70 P.S.I. MAX.

Tr... between the 500x5 air-
cran Ura and the 3 40-3.00*3 0o-kart tira. Looku
iik* a lia>artto«n 500*5 FMa KR-1 ft 2'a and >>
reomnwfidad by Burl Rutan for the VanCta and
Long-EZ Alao lita moat other aaparimantala uang
5 inch rima.

TIRE • PLY RAT. 25 00 TUBE • 50* SMH» ft MAMD.
IMCE UUTB. P.O. BOX 3324 QUARTZ TdLL CA«534

MINIATURE METRICS UTEFLITE HARDWARE

7801 14th Street
Westminster, CA 92683
894-4875 (unlisted)

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Heim joints & spacers \$26.*

Landing gear lockbar SPRINGS
mouse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates
drilled, ready for Camloc \$54. *

'Upper elevator pulley
bracket \$15*
Assembled

Rudder, elevator
horns & hinges &
back-up plates \$55.*

Aileron bellcranks &
horns complete
Assemblies (24 pieces)
\$87. *

"Lower elevator pulley
brackets \$28. assembled*

Aileron pulley brackets
assemblies \$30.*

Rudder 'pedal mount blocks
\$30. *
Control stick assembly per
plans w/mike switch \$75.*

Quality...all material is aircraft aluminum/steel as specified
in the KR Construction Plans Book. S.A.S.E. more information.

*postpaid items

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLORADO 80134-4113
ISSUE NO. 112 OCTOBER 1984

FIRST CLASS MAIL
U.S. POSTAGE
PAID
DENVER, COLORADO
PERMIT NO. 2677



ISSUE NO.
113-114
Nov-Dec
1984

©1980 KR NEWSLETTER



KR NEWSLETTER

RATES
USA \$12.00 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand/Robinson Engineering.

WITH **THE** END of 1984 fast approaching and plans for 1985 begin taking shape, I would like to take a moment to look back on this last year.

1984 was a year of terrific ups and downs for our close family of KR builders. We've had some of the best KR's ever built take to the air this year and have had many new KR's begin construction.

It was a year which brought some fantastic new ideas in construction and who will forget. Dan Diehl's appearance at Oshkosh this year with his rebuilt. KR-2 and the super-slick wings. His example of an almost total rebuilt in just a few days and beautiful work inspired many a builder who was there to see it.

Jack Fyfe and Joe Fechner became the first to fly 2 KR's, side-by-side, from Anchorage, Alaska to Oshkosh, splitting up in Oshkosh to separately fly around the "lower 48", planning to reform in Denver.

Joe's unfortunate accident, and near destruction of his KR-2 when landing at Denver could have ended this trip, but with an immediate gathering of volunteers providing hanger, foam, epoxy, fiberglass and lots of work, Joe's KR-2 was back in the air for a test flight in just 4 days!

In fact, Joe was just lifting off Runway 28 for the test flight as Jack was landing on Runway 16, having just flown in from the mid-west to meet Joe for their return trip to Alaska.

It was a year with exhilarating moments such as watching KR Designee Steve Alderman in his newly finished Turbo'd KR-2 flying off my wing as we flew to the Rocky Mountain EAA Fly-In. I think Steve's smile could be seen by people on the ground as he performed some HIGH speed passes for the Fly-In.

But it was also a year of tragedy for some of the family.

Wes Evans was killed in the crash of the only O-200 powered KR early in the year when he hit some Interstate power lines and in the early spring, Keith Smith died when his KR-2 went down in the mountains

of Utah. We should always remember that although it is easy to feel as though we're living life to the fullest when we fly our aircraft, that same life can be just, as easily taken thru carelessness, incapacity or neglect.

1984 saw the first flight of my own KR-2, providing tremendous thrills, but also saw a heart-breaking crash when I got caught in wind-shear during take-off. N4531Y, since repaired, is happily flying in Illinois now as 1984 also saw the start of my new O-200 powered, tri-gearred bird.

The last year has not always been a easy one for the KR Newsletter and I want to thank everyone for their support and assistance. It makes it a lot easier when people support, you in the hard times and has enabled me to get back on track for the coming years. **THANK YOU!**

I would like to wish all of you Best Wishes for the Holidays and hope you will join me in a small prayer for our KR family in the coming year.

REVMASER AVIATION has done some extensive testing regarding baffling of the VW engine and has furnished us with this valuable information. Much Thanks to them!

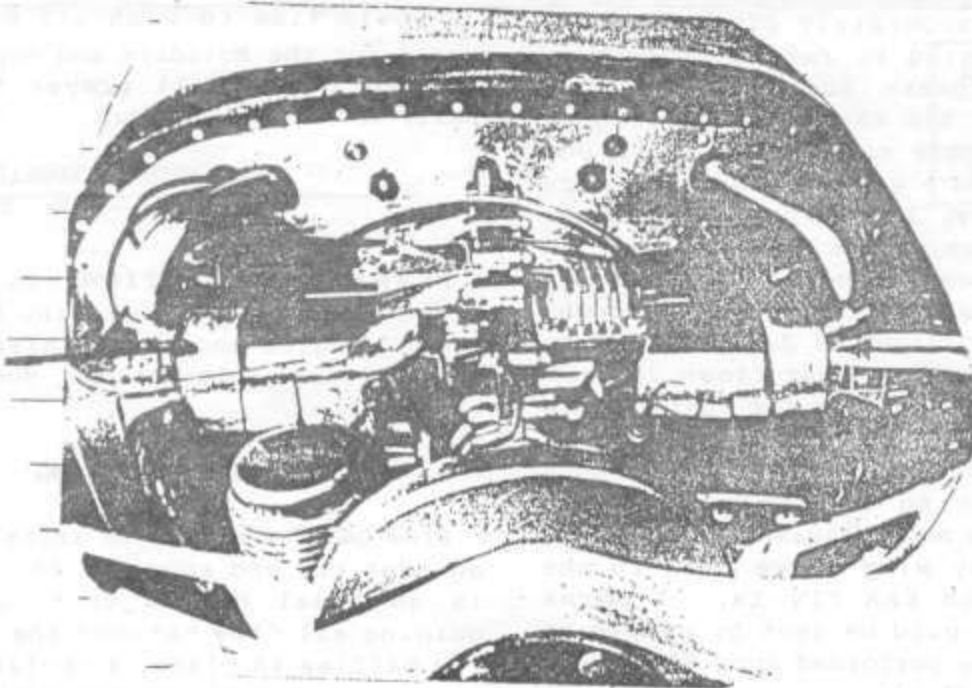
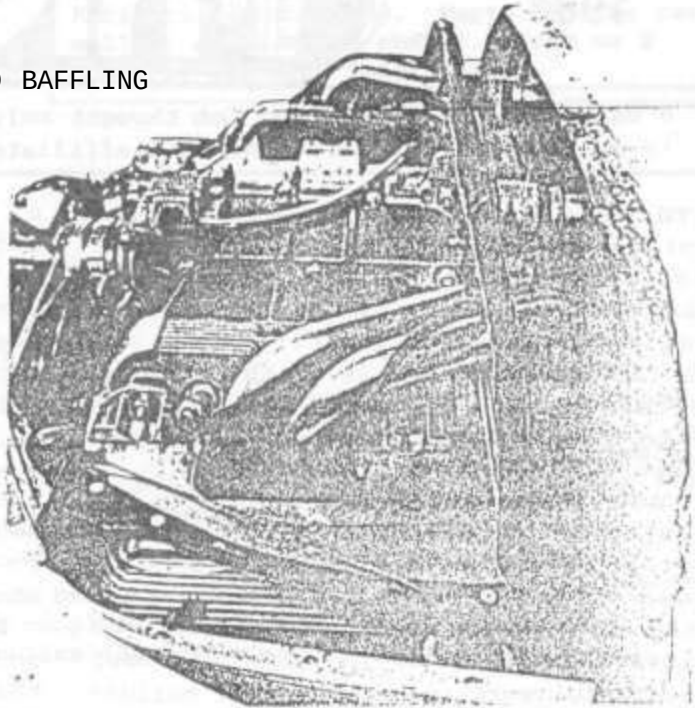
ENGINE BAFFLING

Flow baffles are to be installed tightly against the end edges of the fins. This is an ideal baffle configuration for guiding all flow between the fins. With the baffles in place, a rectangular flow passage is formed between each set of two adjacent fins, the fin base surface and the baffle. These rectangular passages extend around each side of the cylinder head and the cooling air absorbs heat as it flows within them.

There are four flow baffles made of soft aluminum .032" thick.

TYPICAL PRESSURE COWL AND BAFFLING

View of engine face
high pressure side



Formed aluminum fin flow baffles

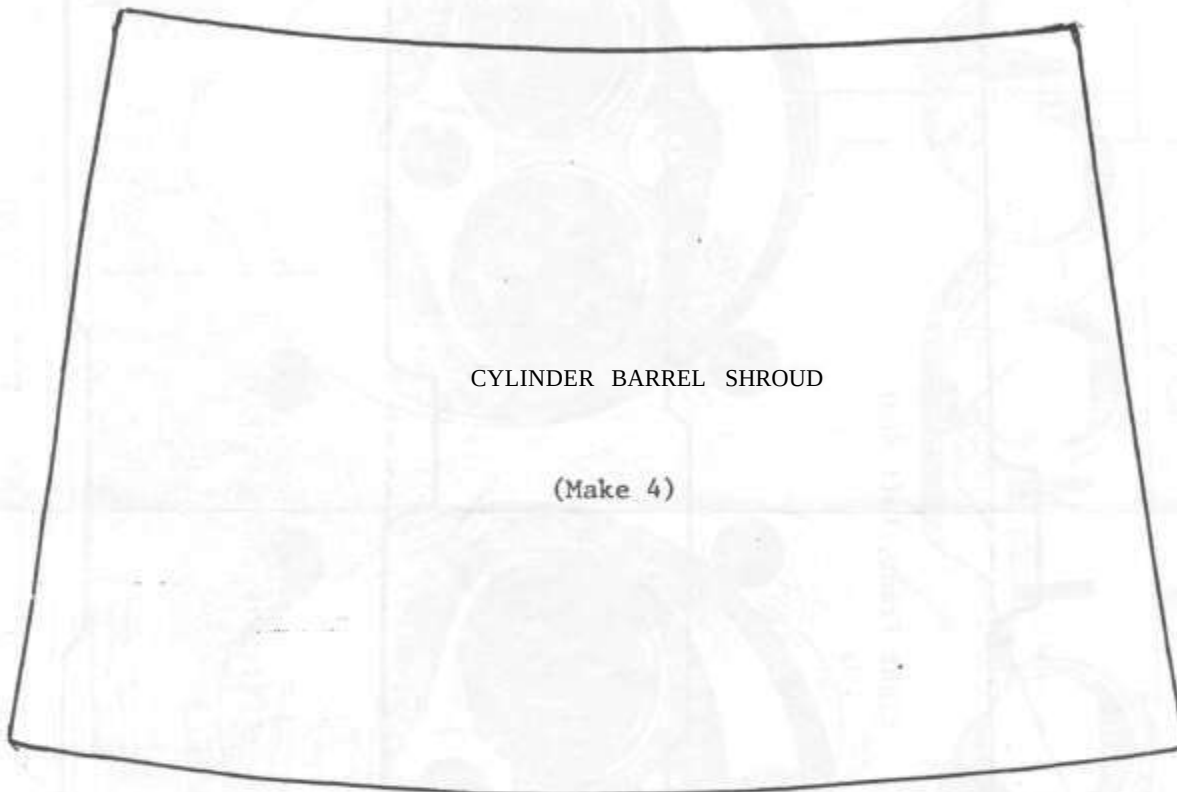
Make bend at dotted line
as indicated

Right Front, Left ear

Left Front, Right ear

YLI DER H AD SHROUD
(2 per cyl. head)

The KR NEWSLETTER, PO Box 4113, Englewood, Colorado, 80134 is published monthly by John Forrester. All back issues are always available at the following rates: 1-12 issues: \$1.00 each, 13-24: .75, 25 or more: .50 each. The KR NEWSLETTER is an independent source of builder assistance and is no way connected with Rand Robinson. Copyright 1984.



MARKETPLACE

FOR SALE___1 Landing Gear complete including wheels, brakes, etc. Wing spars and Center section spars for KR-2. All wood, (except plywood), all aluminum stock, (less bellcrank material). \$650. Loren Garnet, 303-751-1981.

ATTENTION KR BUILDERS...Wing spar attach drill jig, use in the same manner as the jig in your KR plans. Use on KR-2. \$9.50 + \$1.50 postage and handling. Send orders to: Jon S. Aldridge, 1347 S. Pennsylvania, Springfield, Missouri 65807.



NEW 11 400*5 6 PLY MATED
TIRE SPECIFICATIONS INFLATED
HEIGHT 115 INCH WIDTH 40 INCH
TIRE vrr 3 ins Tuec *rr w LB
LOAD RANGE C -70 PSI MAX
Tht (* lift* tha MM e«9 bab»aan tha M0*5 air-
craft itr» and tha 3 400.0015 oo-kart lira Look*
»k« a tcalad do»n 500.5 F*» KR-1 A 2 • and >»
faccinmar*d«d BT Bwt Rwttwi tor Mw VariCn and
Long-tZ Alao rW« most othar aKpanwnantala uaM«g
S inch rvna.
TIRE • PLY RAT 29.00 TIMU • SO* SHIP A HAMD
MKCLAM0.P O »OX33a4 OoARTZMHX CA«534

CYLINDER BARRER



STUD HOLE



STUD HOLE

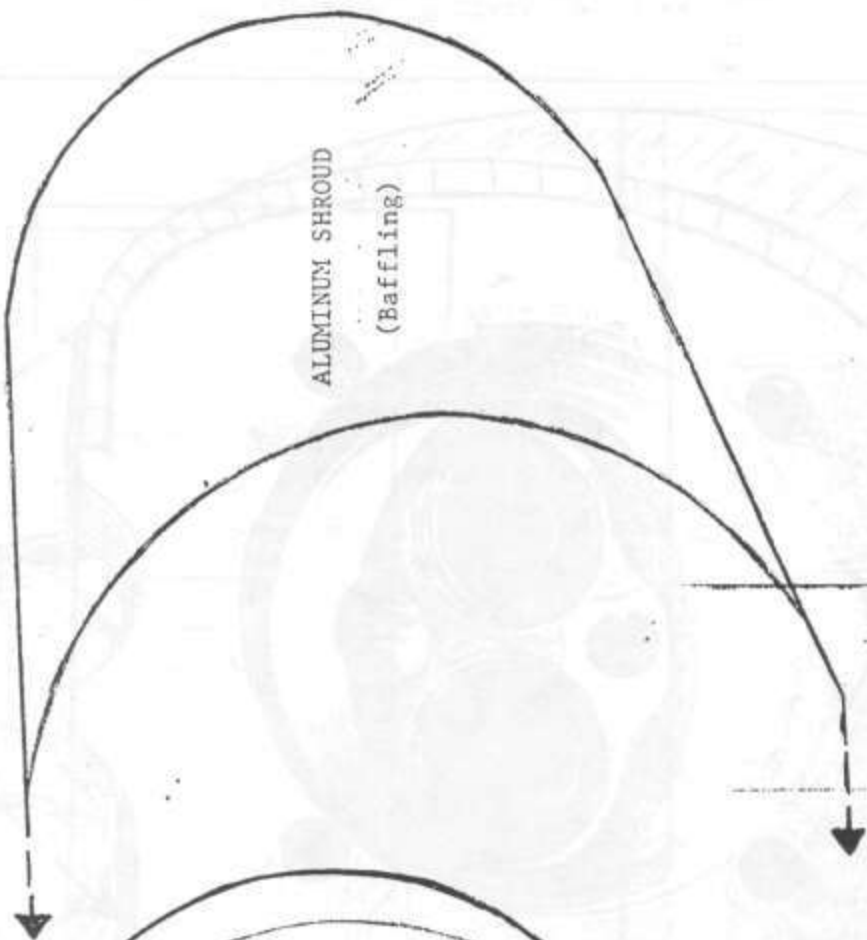


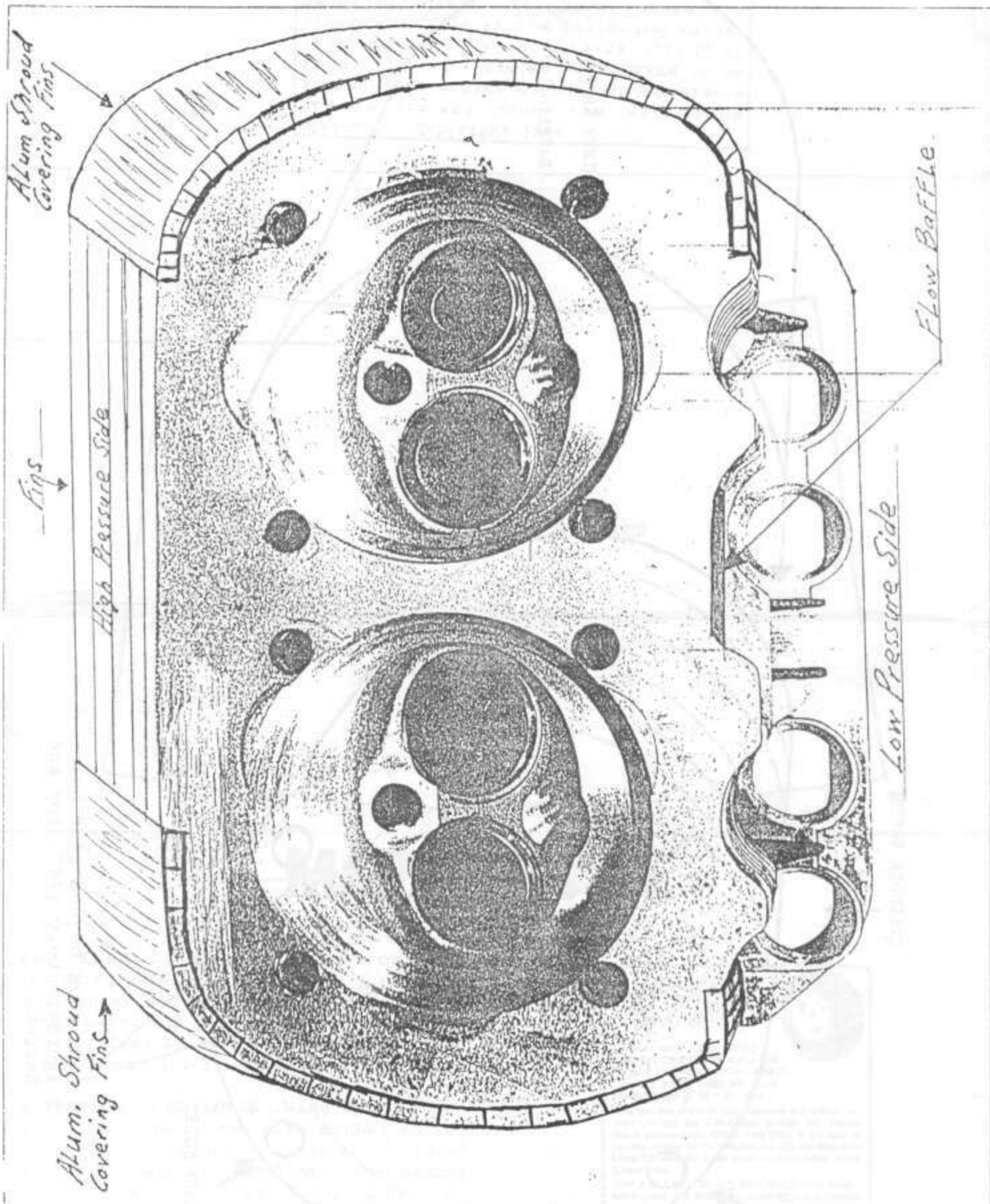
STUD HOLE



Alum goes beyond stud hole
approximately 1/4", top and
bottom.

ALUMINUM SHROUD
(Baffling)





Revmaster Aviation

Revmaster has successfully completed its testing of their new 75 hp cylinder heads and lower induction pipe system and we are now taking orders for this package.

The new heads feature larger stainless steel valves, improved seat material, larger ports, and combustion chamber modifications to unshroud the valves.

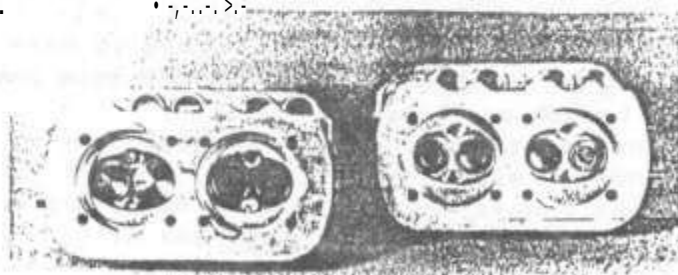
The new lower intake manifold is required to flow the extra air that the engine can now use. The compression ratio remains the same. Flight tests indicate that you may expect the following:

1. At least a 10 mph increase in both cruise and top speed.
2. At least a 200 fpm increase in rate of climb at all gross weights.
3. Improved mixture distribution between the cylinders.
4. Equal or better cooling.
5. At least equal fuel economy at the same cruise speeds.

A special price has been established until January 1, 1985, of \$650.00 exchange. After that date, the price for this option goes to \$750.00. Anyone who is flying will be given priority over other orders.

A core charge of \$250.00 has been established. What this means is that you need not send in your old components until after you have received the new ones. This way your aircraft will not be down while waiting for delivery of this option. The core charge will be refunded within ten days of receipt of the original components.

A complete set of installation instructions will be included with each package. These instructions will also be available to anyone who wishes to avoid the core charge by sending in the old heads and manifold first.



MINIATURE METRICS LITEFLITE HARDWARE

7801 14th Street
Westminster, CA 92683
894-4875 (unlisted)

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Heim joints & spacers \$26.*

Landing gear lockbar SPRINGS mouse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates drilled, ready for Camloc \$54. *

'Upper elevator pulley bracket \$15*
Assembled

Rudder, elevator horns & hinges & back-up plates \$55.*

Aileron bellcranks & horns complete Assemblies (24 pieces) \$87. *

Lower elevator pulley brackets \$28. assembled*

Aileron pulley brackets assemblies \$30.*

Rudder pedal mount blocks \$30. *
Control stick assembly per plans w/mike switch \$75.*

Planning to purchase the Rand-Robinson #4 Aluminum Extrusion Kit? Let us save you time and money. Miniature Metrics will pick up the kit from Rand-Robinson, perform necessary machining and return to Rand-Robinson for shipping. Parts will be cut, milled, drilled and shaped. Send us a S.A.S.E. for more information.

Quality...all material is aircraft aluminum/steel as specified in the KR Construction Plans Book. S.A.S.E. more information.

^postpaid items

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLORADO 80155-4113
ISSUE #113-114 NOV.- DEC. 1984

FIRST CLASS MAIL
U.S. POSTAGE
PAID
DENVER, COLORADO
PERMIT NO. 2677



Issue no. 115

JANUARY

1985



KR NEWSLETTER

RATES
 USA \$12.00 Yr
 CANADA \$15.00 Yr U.S.
 OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand Robinson Engineering, Inc.



FLIGHT REPORT

KR-1 N31SB
 Sam Bailey, 914 West Fourth
 Pratt, Kansas 67124

After looking at many different types of aircraft at the EAA convention at Oshkosh each year, I finally settled on building a KR-1. We have owned a two place Grumman American Yankee for more than 12 years, so it was easy to decide on building a KR-1 over a KR-2.

In February, 1982, my wife and I flew the Yankee to California to sightsee, visit some friends and to do some more investigation of the KR-1. We stopped by Rand-Robinson and were able to talk with Janette Rand and Tom Criss. I purchased the plans and after our visit, knew I had selected the right aircraft. My wife is also a pilot and so on the way back to Kansas, I was able to study the plans. While she was unpacking our bags, I was busy ordering and picking up materials. I started building in March of 1982. I worked steady for several months until I

got the fuselage wood structure completed before I took a short vacation from it. When I started back, I worked on it two or three evenings a week, weekends and holidays, not letting the KR get in the way of our family, friends and anything we wanted to do. I mostly worked on it instead of watching TV. I was fortunate to be able to do all of the building in our garage. This meant that I was able to spend more time on building and less time on travel to and from another location. Also, this meant that I could spend a few minutes before going to work, and at lunch time doing alot of measuring, planning and thinking. In order to build the wings, we had to make some different arrangements such as moving the freezer from the garage to the basement. For a while we stored the canopy in a spare bedroom on the bed, (my wife was certain other people had canopies on their beds, but not one that belonged to a KR).

By the summer of 1983, I was able to taxi the airplane without the wings in the backyard. I was anxious to run the engine and to get a bit of feel for the power so

I have about 40 hours on my KR-2 now and love every minute I'm flying. It kind of grows on you. The more you fly it, the better you like it.

My main concern and reason for writing this letter is this. Remember all the questions about the firewall being strong enough at the attach points? I had the same questions and went ahead and beefed and radiassed my corners with marine plywood and fiberglass and I might add, have never had any trouble.

A very good friend of mine, just recently completed his KR-2. His plans were one of the first sets that Ken sold. It was built strictly by the book, with the exception that it had a Revmaster 2100D. He also owns and regularly flies a twin engined aircraft. His experience in taildraggers was very limited and most probably contributed largely to this problem. But never the less; on his first-flight, everything was ok until the landing. He came in too slow, flared too high, (6 to 8 feet by his estimates), and pancaked on the left gear and left wingtip. Fortunately, no injuries, only the KR and the gentlemen's pride.

The "G" forces broke the engine mount and firewall clean from the front of the aircraft. The vertical stringers split-down the middle, (see photo). The glue joints held, the wood just split. I feel the KR builder might benefit from this information and possibly, (at their own discretion), incorporate a a gusset, similiar to the one shown in a recent SPORT AVIATION installed in a KR.

I am an A & P mechanic, employed by one of the largest commuter airlines in the southeast. I would be willing to partcipate in the KR Designee program. I work from 11:00 pm to 7:30 am Wed. thru Sundays.

In addition to the KR, I have restored a '41 Taylorcraft and stay very current with general aviation aircraft. Also have a shop on the Naples Airport."

Jay Nottingham
3100 North Road, #156
Naples, Florida 33942
813-775-5281



This is not the first incident of this type of problem in a KR involved in an accident. I have pictures of some other KR's in which the firewall broke away from the airframe upon impact and have personally inspected 2 KR's which experienced the problem. IT SHOULD BE STRONGLY EMPHASIED THAT ALL THESE AIRCRAFT WERE CRASHED FIRST AND NOT AS A.RESULT OF THE FIREWALL FAILURE. The breakage does however point out a potential weak spot in the airframe. See KR Newsletter Issue #99 for a good drawing for a firewall strengthening brace.

I tied it to the lamp post on the patio to make certain that, it would not get away from me. The engine was quiet enough that the neighbors were nice and did not call the police.

My engine was built up by my brother, Darrell Bailey, who owns Precision Dynamics, Inc., Box 1636, Lamar, Colorado 81052. Precision Dynamics is a small company that builds Formula Vee racing cars using VW engines. He along with his VW Dynamometer was able to build a high torque balanced engine that sounds like a "Singer Sewing Machine." So I need to give him credit for alot of the performance I am receiving in my KR.

My son, Jay, helped when I got to the finishing and painting stage. He is a perfectionist in this area which helped me get an excellent finish.

After 31 months of building, we moved 31SB to the airport. It took an afternoon to install the wings, hook up the ailerons and check and re-check all points of the aircraft. A few days later the FAA gave it a 40 hour restricted airworthiness certificate and said to "have at it." And so I did!!!!

I started the taxi run slow, working into raising the tail, then slowly working in to a faster stage to nearly lift-off. I practiced that for several runs and when I felt I had that under control, I lifted the KR-1 off several feet setting it back down before getting too far down the runway. After feeling comfortable with this I thought tomorrow, if the weather permits and being it is Sunday, I will fly it. The next morning was clear, warm, with gusty winds to 26 mph. I didn't think that was too bad for I had experienced gusts to 25 mph while taxiing.

I filled the tank with fuel and while taxiing down the long runway, I will have to admit that there were a few butterflies but I knew the KR and I were both ready for its maiden flight. With full throttle on take-off, I climbed to 1000 feet and stayed near the airport leaving the gear down until I was used to the way it handled. After about 20 minutes of making turns and getting the feel of things, I retracted the wheels and started the real tests. I climbed to 5000 MSL where it was smooth and gave it full throttle and was surprised again to see 175 mph indicated. Later on I will use a stop watch and time it both ways across our Kansas mile section lines and see how accurate my

airspeed indicator is.

After *that short test* I descended to pattern altitude and then made some touch and goes to get used to its handling.

All went well so I retracted the gear again and made some low flights down near the runway hoping my family and friends could get some in-flight pictures. After about an hour of flight testing, I brought it in for a full stop landing. I had about an hour of hanger talk with my family and all the hanger bums and people who had stopped by. Then I went to the air again for more testing and playing around before I realized that it was past lunch. My wife has always said that I would rather fly than eat, which is nearly true.

I have had over 3300 hours of flying in a Cessna 210, Cessna twins, our Yankee and other singles, but I would have to say I have not had the thrill of flying like I have had in the few hours of flying my KR.

I would make these suggestions from my experience to other KR builders: keep it light, make things fit, get a good smooth finish and it will be rewarding. Mine is.

RECORD TIMES?

KR Designee Steve Alderman seems to be trying to set some records with flight time in his newly completed KR-2. Finished in September, Steve got a waiver after one week of flying time to take it to it's first Fly-In and got the trophy for "Most Recent Flight".

He then proceeded to fly off the 40 hour restriction in only about 2 weeks. By the end of December he had already accumulated over **130 Flight Hours** with several out-of-state trips.

The only thing which seems to have slowed him down is the fact that he now has the bird torn-down for the addition of flaps, some upholstery and a slick paint job.

FIREWALL FAILURE

"Dear John:

I have been meaning to contact you for sometime. I talked to you by phone awhile back about insurance being unavailable for our KR's. It is now available from several companies and very reasonable if you shop around.

POSA SAFETY NOTICE

POSA Carburetor Throttle Attach Brackets

Aircraft using the POSA carburetor should be checked for the following, especially concerning the REVMaster installation.

The oil cooler on the REVMaster engine is attached to the bottom of the engine case with soft aluminum to prevent possible distortion and breaking which could result in leakage. **UNDER NO CIRCUMSTANCES** should it be used to attach the throttle cable bracket. The throttle cable bracket should be **BOLTED INDEPENDENTLY** to the engine case, (repeat), **NOT THE OIL COOLER**.

The high vacuum on the POSA carburetor associated with low power during approach and landing sucks the slide against the carb base, causing it to stick. When this occurs a great deal of force may be required to open the throttle. This force may be too great for the bracket to withstand if pop riveted or attached to the soft aluminum. If the bracket is pulled loose, loss of throttle response results. Since the REV-FLOW carburetor has its own built-in cable clamps, it is not affected unless the integral brackets are bypassed. Several incidents have occurred as a result of throttle cable brackets being insecurely mounted.

Incidentally, it is a good idea to check the method and security of the throttle cable bracket for all aircraft.

KR DINNER AT SUN-N-FUN

The annual KR Dinner at Sun-N-Fun Fly In will be held Wednesday, March 20, 1985 at the Foxfire Restaurant. This is at the I-4, U.S. 98 exchange where several of the major motels are located.

Virgil Salisbury has again volunteered to assist in putting it together and he has asked that anyone who is planning to attend the dinner to PLEASE contact Virgil in the next few weeks to let him know. It seems the restaurant insists on knowing how many to expect and want a deposit. Virgil has agreed to cover the deposit if he knows how many are coming. Plan on about \$12.00 per person, plus tip, payable at the dinner.

Also, be sure and sign up at the Wick's booth at the Fly-In when you arrive so Virgil can double check the numbers.

Virgil's address is:

Virgil Salisbury
5445 SW 89 Pi.
Miami, Florida 33165

FLIGHT REPORT

KR-2 N4439Z
Kevin Nish, 7475 Western Ave.
Buena Park, Ca. 90620
714-739-5632

Background: KR-2, N4439Z, built and flown by Kevin Nish. 39Z was built to plans, (exception: 2" wider cockpit), and used all available pre-molded parts, including fuel tank. Construction began October 1, 1982 with first flight on April 22, 1984. The airframe presently has 42 hours, with flight restrictions lifted on October 17, 1984.

Equipment: 39Z is powered by a Revmaster 2100D and a Great American 52 x 47 prop. She has an Escort 110, with headsets and the toe-brake kit, (worth the money). Empty weight is 558 lbs.

TakeOff/Climb: Climb rate at 770 lbs gross is about 900-1000 fpm, which drops to 550-650 fpm at 910 lbs. gross. Takeoff is quite simple, although with a crosswind a distinct weathervane tendency is evident. This was somewhat disconcerting the first time, but with an eye on the windsock it can be predicted and compensated for. Best rate of climb is approx. 80 KIAS, but it doesn't drop off much at 90 KIAS.

Cruise: 39Z cruises most comfortably at 3,000 - 3,100 rpm for a true airspeed of 140 mph, and burns about 3.4 gph. Top speed is 155 mph, but nose and vibration make continuous operation at this speed fatiguing. The aircraft is also jumpy in rough air, which requires getting used to.

Landing: Contrary to popular opinion, a KR-2 is not difficult to land. It can't be, since I flew it with NO tailwheel time, (probably not wise), and only 100 hrs. total time. I originally used a 80 KIAS approach speed, which resulted in long landing, and many bounces and go-arounds. (My willingness to abort a bad approach or landing at the first bounce made up for my lack of tailwheel time). Now that I'm more comfortable with the

aircraft I use 70 KIAS on approach and use up only 1500'-1800' of runway, (and bounce a lot less).

Problems: I have had a few minor, (and avoidable), problems thus far. The exhaust was too close to the belly, charring the belly plywood and causing smoke in the cockpit, resulting in a quick return to the airport. Another exciting event occurred at 7,500 feet one fine morning when a routine instrument scan detected a "0" reading on the oil pressure gauge. The electric sender had failed. This device has failed twice, at approximate 20 hour intervals, so I'll have to go to a direct reading gauge. At

34 hours, the #3 exhaust valve stuck open, requiring head removal and reworking, (done by Revmaster without charge or complaint). The cause was determined to be carbon build up on the valve guide, a result of 1) poor engine baffeling, 2) insufficient valve clearance and 3) wrong grade of oil. These problems were corrected, and the aircraft was refinished, (originally flown with primer, rough fiberglass and little sanding). 39Z now cruises with CHT of 300 and oil temp. at. 160-170 degrees.

(Kevin and N4439Z are based at Chino Airport, California and is willing to assist builders in the area.)

MARKETPLACE

WANTED....I am building a KR-1 and need an engine, firewall forward and a canopy for KR-1, also tube engine mount and a altimeter. George E. Colgate, 128 Woodland Rd., Southborough, MA 01772.

FOR SALE...KR-2, award winner at 1981 KR Fly-In at Pope Valley, Calif. 1835cc engine with aluminum cylinders, full electrics, Alpha 200 radio, wing tanks, spoilers, white imron paint, empty weight 567 lbs. Has heel brakes, ready for installation, may be bought with trailer if desired. \$8,000. Further info on request. Robert Perry, Helena, Mt. 406-227-8046.

FOR SALE...Misc parts for KR-1 and KR-2.

1. Warnke ground adjustable prop hub \$50.00 - needs new blades.
 2. Alternator and regulator for VW with mount for prop hub drive. \$35.00
 3. Throttle cables. \$10.00 each
 4. Heater or mixture control cables. \$5.00 each
 5. Mag to crank adaptor & drive. \$20.00
 6. 1 Roll Dynel. \$25.00.
- Call Robert Perry, Helena, Mt. 406-227-8046.

FOR SALE...KR-2 parts. Allergy forces sale. Complete Fuselage kit, all hardware and gear, R/R premolded turtledeck, canopy assy, cowl for Rev. 2100. Fuselage sides completed and joined. Enough wood and foam to finish. Latest plans and workbook, all KR Newsletters. \$3,093

invested. Will negotiate. Call Al at 714-626-0562.

FOR SALE...KR-2 project. 95% wood work completed, on gear, have rudder pedals and wing attach fittings. \$700 will trade, Rajay Turbo Charger \$200. Tom Glaeser, 3 N.E. 63 Terr, Kansas City, Mo. 64118

FOR SALE...KR-1, fuselage and spars FAA signed off. Almost everything necessary to finish, (i.e.-foam, cloth, canopy, all metal parts, (mostly finished), tires, etc. 2100cc Revmaster engine with alternator and starter in original box, (its worth \$3600) - All of this of \$3,100 Cash. (Exactly what I have in it - receipts furnished). Call 404-227-4228. Bill Holt, Griffin, Ga. You pick-up • will not crate or ship.

COMPOSITE AIRCRAFT NEWSLETTER IMPORTANT NOTICE

Several months ago I announced the start of COMPOSITE AIRCRAFT NEWSLETTER. To date there has not been enough interest to justify a first printing. I need to have at least 100 initial subscriptions to justify printing. THIS WILL BE AN INTERESTING NEWSLETTER FOR COMPOSITE AIRCRAFT. KR Newsletter subscribers may subscribe for only \$10.00 per year. The project will be cancelled & funds returned if I don't have enough people by the end of February, 1985. PO BOX 4113, Englewood, Colorado, 80155 303-841-8651. Thank You.

MINIATURE METRICS

LITEFLJTE HARDWARE

7801 14th Street
Westminster, CA 92683
894-4875 (unlisted)

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Heim joints & spacers \$26.*

Landing gear lockbar SPRINGS mouse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates drilled, ready for Camloc \$54. *

'Upper elevator pulley bracket \$15*
Assembled

Rudder, elevator horns & hinges & back-up plates \$55.*

Aileron bellcranks & horns complete Assemblies (24 pieces) \$87. *

"Lower elevator pulley brackets \$28. assembled*

Aileron pulley brackets assemblies \$30.*

Rudder pedal mount blocks \$30. *

Control stick assembly per plans w/mike switch \$75.*

Quality...all material is aircraft aluminum/steel as specified in the KR Construction Plans Book. S.A.S.E. more information.

*postpaid items

Planning to purchase the Rand-Robinson #4 Aluminum Extrusion Kit? Let us save you time and money. Miniature Metrics will pick up the kit from Rand-Robinson, perform necessary machining and return to Rand-Robinson for shipping. Parts will be cut, milled, drilled and shaped. Send us a S.A.S.E. for more information.

KR NEWSLETTER

PO BOX 4113

ENGLEWOOD, COLORADO 80155-4113

ISSUE NO. 115

JANUARY 1985

FIRST CLASS MAIL

U.S. POSTAGE

PAID

DENVER, COLORADO

PERMIT NO. 2677



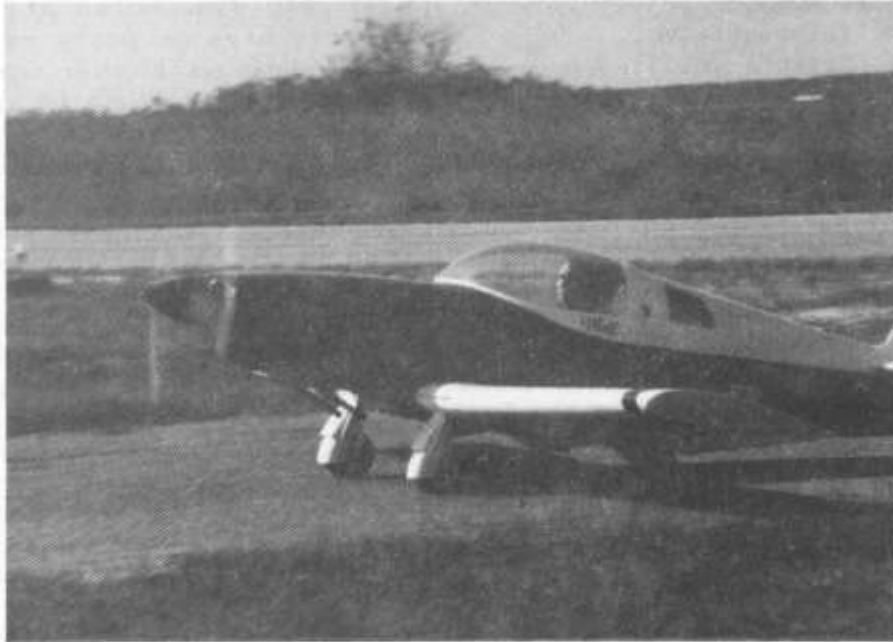
Issue no. 116 February 1985



KR NEWSLETTER

RATES
USA \$12.00 Yr
CANADA \$15.00 Yr U.S.
OVERSEAS \$20.00 Yr Funds

A basis for ideas and food for thought only. Use of any of the idea material is at the user's discretion. Not affiliated with Rand Robinson Engineering, Inc.



FLIGHT REPORT KR-2 WALTER HOSTER

401 Park Ave. Marmora, N.J. 08223

I completed my KR last July but decided not to try to fly it until after Oshkosh. Around the middle of August I took it to the Woodbine Airport in N.J., hoping to do some taxi tests. I had no luck getting the engine to sound right, so after a couple days I brought it home.

I kept it in my garage with the wings off and every day rolled it out and tied it down and worked on the engine. I went thru every setting on four of the five needle valves for the POSA carb, (I didn't try the leanest), but no matter which needle I used, at full throttle the engine would load up and quit. I called Patrick at HAPI engines and he suggested I return the carb and he said that when they tested a new batch of engines they would take an adjusted carb and send it to me. I finally got another carb in November, installed it and the engine sound fine.

The FAA inspector ok'd it with no mechanical changes, (just additional placards). I don't, like to taxi fast, I

consider it dangerous, so I pushed in the throttle and it lifted off very quickly. I leveled off about two feet high for a couple seconds. Everything felt good so I went up and around the pattern. It flew great, but I couldn't slow it down for the landing. If I glided level it indicated 90 and if I lowered the nose it immediately showed 100 mph. I was pretty anxious to get down so I landed anyway. When the weight got on the tailwheel it loosened the steering cables and I had trouble keeping it straight, managed to take out a couple runway lights and damage a flap and poke a hole in the bottom of the "boat".

After repairs were made I have flown it about eleven times and have about 4 hours total. My airspeed seems to read high, it takes off between 60 and 65 and seems to want to stall around 70 and indicates 125 mph at 2600 rpm. I have no trouble landing and turning off a 1100' section of runway.

My empty weight is 570 lbs. with radio, nav w/glideslope, loran, gyros, cabin & carb heat and a 16 gallon aluminum tank. My problem is the FAA inspector wants to

limit my gross to 900 lbs. and so does Jeanette Rand which means I have a one-place airplane. The plane flies very nicely on very low power settings so I don't feel that another 115 lbs would bother it that much. I would appreciate knowing how other KR Builders have gotten around this problem.

AL ROSS

6202 W. Fairmount Ave.
Phoenix, Arizona 85033

Dear John,

Sorry I missed you at the Convention, but I did especially enjoy the KR's and the KR Forum. I am concerned about the epoxy dissolving in gasoline problem though. Enclosed is an article describing my solution that other KR builders may be interested in.

My KR-2 is in the finishing stage. The fuselage is painted and I am working on filling and sanding the wings. Power is a Revmaster 2100D with an almost-constant-speed Warnke prop. I don't have a lot of time to spend on it but I hope to fly this year.

Shortly after I became sensitized to Rand's epoxy, Rutan's epoxy and Safe-t-Poxy, I read in the newsletter about Dow Corning D.E.R 324 and Versamid 140 combination. This epoxy works fine and I have almost completed my KR-2 with no further epoxy reactions. However, at the '84 Convention, the question was raised of whether an epoxy fuel tank will stand up to automobile gasoline. Jeanette's answer was that the versamids seem to be subject to some of the additives in automobile gasoline.

My solution was to coat the tanks with Randolph fuel tank sloshing compound. This is a rubber-cement-like material made of the express purpose of sealing pinhole leaks or seams in metal tanks. It adheres to most, anything including epoxy, and is completely impervious to gasoline. The problem was how to completely cover the inside of the tanks.

The wing tanks were relatively easy. They were suspended by two loops of nylon rope so they could be shaken back and forth easily and still rotated to insure wetting all sides. A full gallon of sloshing compound is required in order to have enough volume to splash adequately. It is then drained out and used again. Be sure to plug all openings including the

vents, and remove the inlet screen. Open the cap for a few seconds after the first couple of shakes, as considerable pressure will build up. I coated my tanks a second time after letting it harden for a full day with forced air circulating through.

Since the header tank couldn't be turned upside down or shaken, I used a paint pot to spray the compound inside the tank. For a nozzle, a piece of 1/4 inch copper tubing was flattened on the end and (4) .040 dia. holes drilled 90 degrees. Thirty five or forty psi will put out a spray that, will cover the inside with lots of splash. Be sure to use a valve in the output hose for control. Spray what's left of the gallon into the tank and let it drain. The compound is almost epoxy colored and very difficult to see inside the tank, so do it at least twice to be sure.

I offer this as a solution to what. I consider to be a very serious problem. Perhaps someone else will come up with something better and let the rest of us know.

I do appreciate the KR Newsletter with all the info and tips.

REMINDER. If you plan to attend the KR Dinner at Sun 'n Fun, please contact Virgil Salisbury, 5445 SW 89 PI., Miami, Fl. 33165 and be sure to sign up at the Wicks booth.

FOR SALE....Misc. parts for KR-2 or KR-1.

1. Warnke ground adjustable prop hub. \$50.00 Needs new blades.
 2. Alternator & regulator for VW with mount for prop hub drive. \$35.00
 3. (2) throttle cables \$10.00 each.
 4. (2) heater or mixture control cables \$5.00.
 5. magneto to crank adaptor & drive \$20.00
 6. (1) roll Dynel \$25.00.
- Robert Perry, Helena, Mt. 406-227-8046.

Great Prop Hubs



99.⁹⁵

for VW
Full 38 Prop Pikrt-8620-
Gold Cadmium Plated Bolt
Washer-Cotter Pin-Front Plate

GREAT PLAINS

AirCRAFT Supply Co.
Box 1481 Palatine Ill. 60078
312-359-6558

From: David L. Feiger
P.O. Box 581
John Day, Or. 97845
(503) 575-0766

Digital-proportional Elect.
Servo Devise To Operate
Trim Tabs.

Tested and proven in my KR-2 N39426 with over 60 trouble free hours to date. The parts: (1) R/C "servo tester" electronics provides digital-proportional control of (2) a R/C servo which provides the muscle to move the trim tab. Control is provided by a (3) 5K ohm R/C "trim control" pot buried in the top of the stick: handle (thumb wheel). Electrical power (5 v. DC) is provided by a (4) Radio Shack: 5 v. regulator (drops the 12 v. aircraft voltage).

Parts List: (1) 1 dual one-shot integrated circuit, Radio Shack SN74123 or 3N54123; 1 resistor 1 watt 4.7K ohms; 1 resistor 1 watt 2.2K ohms; 1 capacitor 100uf at least 6 v.; 1 capacitor 100uf at least 6 v.; 1 capacitor 250uf or larger, at least 6 v.; 1 perf. board 1"x2" to assemble parts on.

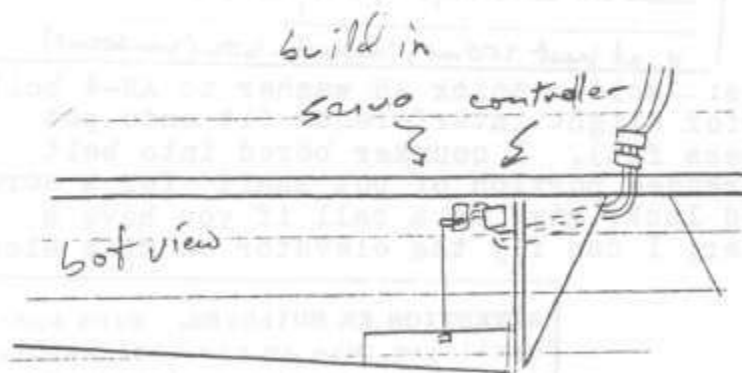
(2) 1 "heavy duty" R/C servo, 39 in/oz torque or stronger, be sure it has a sturdy gear train.

(3) 1 5K ohm R/C "trim control" pot (suggest the R/C 'unit because of its high quality and small size, any 5K ohm pot will work).

(4) 1 5 v. 1 amp voltage regulator 1C, Radio Shack #7805.

Also, on-off switch on panel (between 12 v. buss and 5 v. regulator) and a 1 amp fuse between 5 v. regulator and the electronics to save the electronics in case the voltage regulator goes bananas.

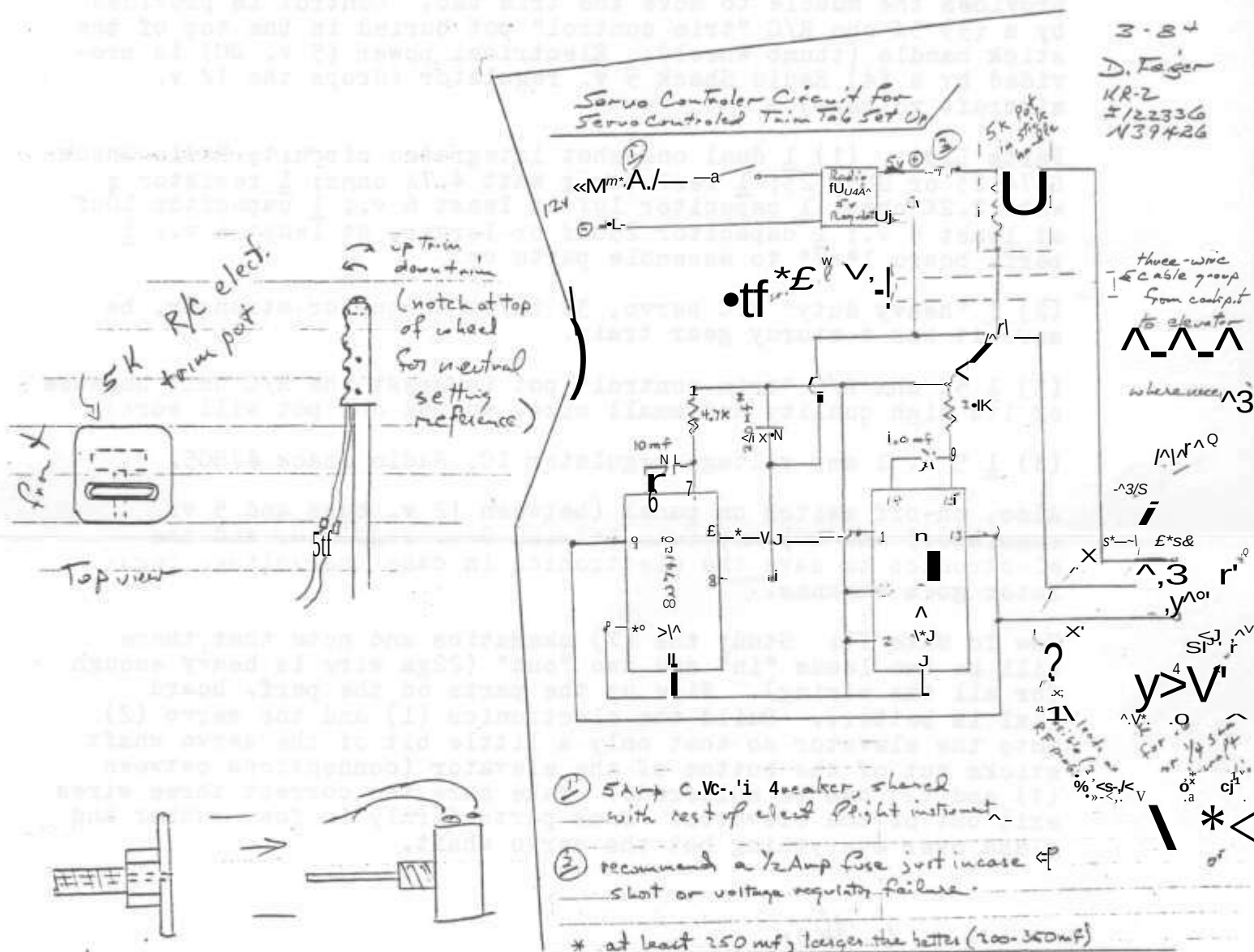
How To Make It: Study the (1) schematics and note that there will be two leads "in" and two "out" (22ga wire is heavy enough for all the wiring). Wire up the parts on the perf. board (1x2 is better). Build the electronics (1) and the servo (2) into the elevator so that only a little bit of the servo shaft sticks out of the bottom of the elevator (connections between (1) and (2) can be soldered). Make sure the correct three wires exit out of the elevator. Pack parts firmly in foam rubber and glass over everything but the servo shaft.



use R/C control horn
& f l * k * L { of size
suitable for .60 engine
power airplanes

cont.

To make the stick handle I clamped two pieces of 3/4" walnut together and center bored to desired depth and control stick diameter. Then shaped outside and inletted inside at top to hold pot and thumb wheel assembly. Also, path for two wires.



Thumb wheel-pot details: -solder thick AN-washer -to AN-4 bolt, then center-bore bolt for. slight interference¹ fit onto pot shaft (finger tight press fit). I counter bored into bolt head so it fit over threaded portion of pot shaft for a more compact assembly. Good luck, give me a call if you have a question on this critter, I can fly the elevator on trim alone.

ATTENTION KR BUILDERS. Wing spar attach drill jig, use in the same manner as the jig in your KR plans. Use on KR-2. \$9.50 + \$1.50 postage. Recommended by Miniture Metrics. Send orders to Jon S. Aldndge, 1347 S. Pennsylvania, Springfield, Missouri 65807.

FORSALE—1 Rand Robinson 3-blade prop hub and spinner (12 inch), without blades. \$110.00. Arle Bunch, PO Box 1112, Guymon, Ok 73942 405-338-3244.

FORSALE—KR-2 on gear, center section and outer spars complete, Diehl Engine Cowling, all foam, wing spar attach fittings, aluminum kit, cable & pulley kit. \$450. Rodney Troyer, 1575 Chew Rd., Mansfield, Ohio 44903 419-589-5652.

FOR SALE—"Sticky-Stuff" epoxy dispenser set for Safe-t-Poxy. Brand New in box. \$125.00. John Forrester 303-841-8651.

FOR SALE—KR-1 Fuselage and spars FAA signed off. Almost everything necessary to finish, ie: foam, cloth, canopy, all metal parts (mostly finished), tires, etc. 2100cc Revmaster engine with Alternator and starter in original box. (it's worth \$3,600). All of this for \$3,100 cash. (exactly what I have in it, receipts furnished). Call 404-227-4228 Bill Holt, Griffin, Ga. You pickup - will not crate or ship.

FOR SALE—KR-2 project, 95% wood work completed, on gear, have rudder pedals & wing attach fittings. \$700 or will trade. RayJay Turbocharger \$200. Tom Glaeser, 3 N.E. 63 Terr, Kansas City, Mo. 64118.

FOR SALE—KR-2 parts. Allergy forces sale. Complete fuselage kit, all hardware and gear. R/R premolded turtledeck, canopy assy., cowl for Revmaster 2100. Fuselage sides completed and joined. Enough wood and foam to finish. Latest plans and workbook, all KR Newsletter. \$3,093 invested. Negotiable. Al at 714-626-0562.

FOR SALE....Award winner at 1981 KR Fly-In at Pope Valley, Calif. 1835cc engine, with aluminum cylinders, full electrics, Alpha 200 radio, wing tanks, spoilers, white Imron paint. Empty weight 557 lbs, has heel brakes ready for installation, may be bought with trailer if desired. Further info on request. \$8,000. Robert Perry, Helena, Mt. 406-227-8046.

WANTED...I am building a KR-1 and I need an engine, firewall forward and a canopy for a KR-1, also a tube engine mount and an altimeter. George Colgate, 128 Woodland Rd., Southborough, MA 01772 617-485-7624.

FOR SALE—KR-1, Tri-gear, 75 hp Cont. engine M.O.H., 500x5 wheels, Cleveland brakes, 65 hours total. Ground handling is beautiful, cruise 140, no electric. Picture in KR Newsletter issue No. 93, March 1983, also Sport Aviation, April 1980. \$3,900. Without engine and prop: \$2,400. Jerry Boggs, 1141 St. Agnes Ave., Columbus, Ohio 43204 614-279-4667 after 6:00 pm, No collect calls please.

FOR SALE....1940 Aeronca Chief 65LB, all original, 2359 TT, 270 SMOH. Complete rebuilt 1978, new wings, new glass, Stits Poly Fiber cover, original aluminum cowl & wheel covers. Always hangered. Have all logs & original paperwork. Excellent condition. Asking \$7,500. 414-495-4370.

FORSALE—KR-2 on fixed gear. New 1835 engine. Has Diehl Supercase with electric start & 20 amp alternator. Excellent craftsmanship. Asking \$8,000. 414-495-4370.

FOR SALE—KR-2, N99821. 20 hours TT. In the process of restoring. Has all instruments, electrics, New Great American prop (52x46), also 52x36 Hagy prop, Diehl Accessory case, Posa, 4016 mag, much more, \$2,000 firm or trade. Marlon Phillips, R#2, Box 127, Fillmore, 111. 62032. 217-538-2440.

FOR SALE—Revmaster 2100-D turbocharged with controllable prop, starter, alternator. Zero time on engine. \$3,000. Call 213-592-2371 No Collect calls please. Frank Simons.

FOR SALE—\$600+ worth of KR-2 manufactured parts plus completed "boat" built by cabinet-maker plus frames of horizontal and vertical stabilizers and rudder. All for \$500. Allan Spreen, Box 15280-A ETSU, Johnson City, Tn. 37614 615-928-9238 615-929-9427 evenings.

FOR SALE....KR-2 completed to 95%. Engine 1834cc, Raja Turbocharger, Monet hub extender assembly, 2 props, Genave 200 radio, flaps, dual controls, wing tanks plus many extras. Selling because of permanent injuries from auto accident. 206-535-2677.

MINIATURE METRICS LITEFLITE HARDWARE

7801 14th Street
Westminster, CA 92683
894-4875 (unlisted)

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Heim joints & spacers \$26.*

Landing gear lockbar SPRINGS mbuse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates drilled, ready for Camloc \$54. *

'Upper elevator pulley bracket \$15*
Assembled

Rudder, elevator horns & hinges & back-up plates \$55.*

Tileron bellcranks & horns complete Assemblies (24 pieces) \$87. *

Lower elevator pulley brackets \$28. assembled*

Rudder pedal mount blocks \$30. *
Control stick assembly per plans w/mike switch \$75.*

Aileron pulley brackets assemblies \$30.*

Quality...all material is aircraft aluminum/steel as specified in the KR Construction Plans Book. S.A.S.E. more information.

*postpaid items

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLORADO 80155-4113
ISSUE NO. 116 FEBRUARY 1985

FIRST CLASS MAIL
U.S. POSTAGE
PAID
DENVER, COLORADO
PERMIT NO. 2677



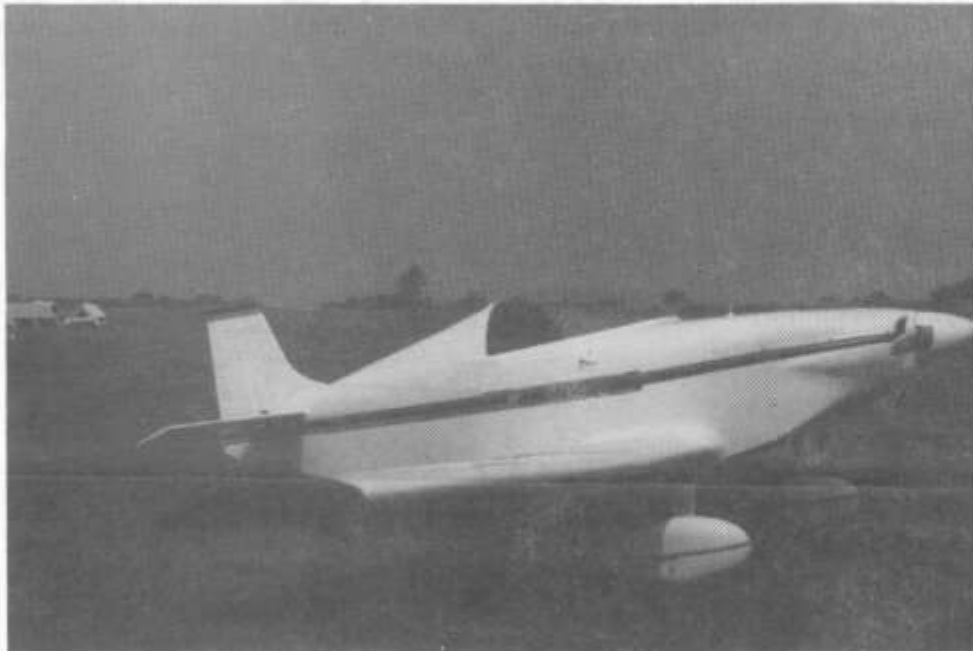
MARCH
1986
ISSUE NO. 117



KR NEWSLETTER

Rates
USA \$12.00 YEAR
CANADA \$15.00 YEAR
OVERSEAS \$20.00 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



This beautiful KR-2 with fixed gear belongs to Bill Rosman, Rt. 2, Box 150, Palmyra, Wis. 53156. Bill sells some **1st class** plans for this gear, (\$20.00) & I've heard nothing but good reports from builders using them. Look for a full flight report soon.

BUILDING A BETTER FUEL TANK

Fuel tanks made of epoxy have been the subject of a lot of discussion recently due to the problems many builders have had with softening and flaking of epoxy in the fuel tank.

I spent some time recently with the folks at Plasticrafts, Inc. concerning this problem. They are one of the oldest companies in the U.S. dealing with epoxies and resins. They manufacture over 50 types of epoxy and resin and operate a large manufacturing concern using these products.

They strongly 'discourage making fuel tanks out of epoxy resin and aren't too excited about using polyester resin for them either. They report seeing lots of problems in this area over the years.

The best resin system for use in a chemical or fuel container is Vinylester and this is what they now recommend. (The Glassair is built using this system.) An

added benefit of using this system is that it wets out better, maintains strength to a higher temp, and cures in just a few hours.

The following article will show you how to easily build a "pre-molded type" fuel tank.

SUPPLIES NEEDED

- (1) 1" x 21" x 81" polyurethane foam sheet (don't use styrofoam-the resin will dissolve it)
- (2) quarts of Vinylester Resin
- (1) tube "Liquid Nails" or other glue
- (1) box toothpicks
- (4) 2" throw-away paint brushes
- (4) 4 yards 6 or 8 oz. bi-directional fiberglass cloth
- (2) quarts of polyurethane varnish
- (1) lb. micro-ballons
- (4) sheets 80 grit sandpaper
- (4) sheets 150 grit sandpaper
- (1) can Paste Wax

STEP 1) Determine size of tank allowing room for instruments (9" min.) and location of radio stack (if desired). Be sure to leave leg & foot room above the rudder pedals. (See Figure 1)

STEP 2) Cut front and rear tank walls out of foam and set in place. Next cut pieces for bottom of tank and step in front end of tank to connect to front wall. Fasten foam in place with glue and toothpicks. Allow to dry.

STEP 3) Cut and fit side walls beginning at bottom, being sure to make a 1" wide lip at the top longeron, (the tank will rest on these lips-see figure 1) Continue to cut and fit sides and top pieces and glue into place. Allow to dry.

STEP 4) If you need to make a cut-out for radio clearance, carefully make that cut-out now and then fit and install foam walls as need to close tank. Allow to dry.

STEP 5) You should now have a "rough-shape" foam fuel tank. Remove from fuselage and using 80 grit sandpaper carefully sand all joints smooth and round off all corners, lips, edges, etc. (This is a VERY important step or the glass won't lay correctly and the tank may leak). Tank should also be sanded so that the foam plug is now about 1/4" smaller overall than the desired finished size.

STEP 6) Make a thin slurry of varnish and micro-ballons and "paint" tank with a thin layer. (Cover every bit). Let dry and apply 2 more coats allowing drying after each layer. Let dry for at least 24 hours at 70 degrees and then carefully sand smooth being careful not to go thru. (If you do, recoat and sand again).

STEP 7) Cut a piece of foam 1" thick, 4" wide and 8" long and taper sides at about 60 degrees. Glue this to bottom, center of tank - against the back, running lengthwise fore and aft. This will be the sump.

STEP 8) Take a broomstick or pipe and poke it carefully thru the sidewalls so that you can suspend the tank and rotate it like a rotisserie. Coat the tank with 2 good layers of paste wax and let dry. Buff very lightly."

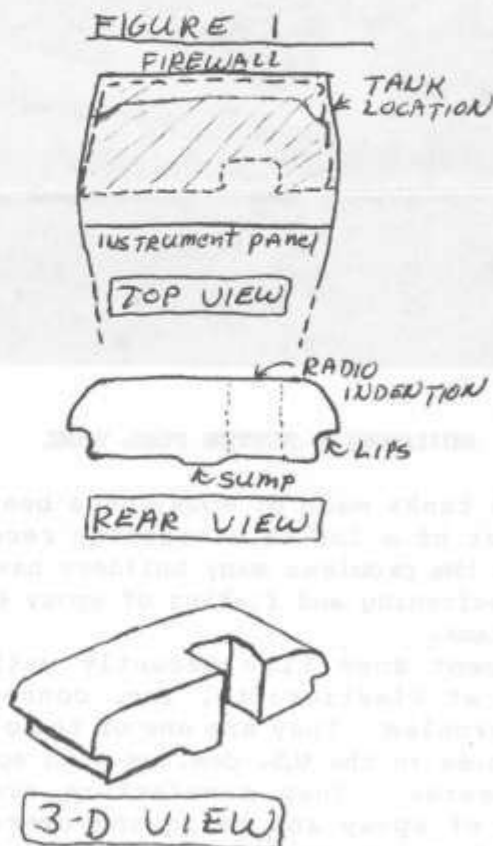
STEP 9) Draft a friend for help. Glass the tank being careful to overlap the seams. (Use the "dry-layup" method. Lay on the cloth dry and then brush on resin). Work quickly and don't spare the resin here. Put 3 layers on the tank and 4 layers around the lip support areas. Do the whole tank in one session and let cure

for at least 24 hours.

STEP 10) Remove the broomstick. Carefully cut the tank in half vertically. Remove the foam. (If you did a good job sealing the foam, it should pop right out). Sand out ALL remaining foam. Install fittings, gauges, filler, etc. at this time.

STEP 11) Secure the halves together and cover seam with 4 layers of glass, 6" wide. Let cure. Glass over the broomstick holes with 3 layers glass and let cure.

You now have a strong, lightweight, perfect fitting fuel tank that will withstand all fuels, agents, and chemicals. GIVE IT A TRY - YOU'LL FIND IT'S REALLY QUITE SIMPLE - AND A LOT CHEAPER.



AT OSHKOSH '84 Jack Fyfe and Joe Fechtner were swamped with people admiring their beautiful KR-2's and pressing them for the story of their flight from Alaska to Oshkosh. This was Jack's second trip down in his KR-2, (the first KR-2 to make the trip - Fred Kellar had already done it in a KR-1). The following is Jack's story of the '84 trip which covered over 9,000 miles, without a doubt the longest trip every taken in a KR.

ALASKAN KR ODYSSEY

JACK FYFE

Anchorage, Alaska

KR-2 N321KT

The winter of '83-'84 in Anchorage, Alaska brought what seemed to be more snow than usual and the same cold air that arrives as the polar high expands - the same expansion that pours cold air and blizzards down into the midwest and eastern states. "Outside", or the "Lower 48", as we call you people.

It was also a time of transition for N321KT - "Katie", named for my two older daughters, Kris and Tammy, who saw the project through from plans to plane. KT flew to Oshkosh, and on to Dayton, Ohio, in 1983, but the flight prompted me to make some changes so that winter saw a new teak instrument panel, a teak console, new rudder pedals and toe brakes, an entirely new main gear including a new spring bar tweaked down 3/8" at each end to erase that straddle leg look that I never did like, new Lamb tires, new re-designed gear legs, replaced throttle, carb heat and mixture controls, and a host of minor changes.

Fred Keller, of Grand Champion and Defiant fame, painted KT the first time. I tried my amateur hand in June and ended with probably about an 8 or 8.5. Drips and runs. But I discovered a technique useful in ridding KT of such warts. Basically I sanded the drip with 600 wet or dry, wetted with hot soapy water and then took it up through wet Micro-Mesh 12,000. Lots of time per drip, but worth - after it's all done of course.

Anyhow, all of that was done with Oshkosh '84 looming on the not-so-distant horizon and spinning closer day by day at an almost awesome speed. Take-off day came so fast that I only had time for one test flight before it was time to go.

As I recall, that flight was on Thursday, two days before we left. "We" included myself and Joe Fechtner, also of Anchorage, who also has a bright yellow, (dubbed Bananna and Daffodil), KR-2. Also extensively worked on over the winter. We left Anchorage International for a routine shake-down flight. Twenty or thirty minutes later, 5 or 10 miles up Eagle River Valley, Joe reports engine trouble. He's turning around. So did I. Fuel contamination brought Joe down at Birchwood airport and I continued back to International from where I drove back to fetch Joe from what I feared to be some sort of 6 o'clock news disaster. In the meantime, Joe had solved the problem by purging the entire fuel system. His return flight to tie-down was uneventful, although apprehensive. My driveback was neither eventful nor apprehensive.

Saturday. Noon. Blue sky with beginning CV's hovering about the area. Weather on route to Whitehorse, Yukon, hours away, was forecast to be OK. Alaska law requires every plane flying within the State to carry certain survival gear. Canadian law has similar requirements, but Alaska requires a gun be carried and Canada bans the gun. Which poses two choices: (1) Carry the gun to the State line, open the canopy and release the ballast, or (2) Skip the gun altogether. We chose choice two. 30 days of food, all the other survival gear, (less gun), tools clothing, toiletries, 36.2 gallons of petrol and my good luck seagull feather put KT about 225 lbs. over Ken Rand's suggested maximum gross take-off weight. Joe was more conservative, he omitted the feather, but his fuel capacity was a tad over 50 gallons. Remember, that stuff weighs in at roughly 6 lbs. per gallon.

My wife Tricia was already in St. Louis from where she was going to drive north to Oshkosh with the two younger kids to greet Mr. Intrepid. So, airport good-byes were scattered among Joe, his wife and three kids.

Our first fuel stop was to be Whitehorse. Most planes leaving Alaska from Anchorage parallel the Alaskan Highway to Dawson Creek, B.C. - a distance of about 1,500 miles. Whitehorse is approximately 1/2 of that. It's an awesome trip that trends north, north-east out of Anchorage along the Chugach Mtns. to Glennallen. Then northeast through the serrated Nentasta Mtns. and across the tundra-swamp-lakes area to Northway, just

inside the US - Canada border. From there, it is southeast to Whitehorse. That 700 miles take you through stunning snow-capped mountain scenery. Not alongside of mountains, but on a winding course through them. They are precipitous, rising 7,000 to 12,000 from the valley floors. The flight takes you over some of the lesser promontories, along crystal blue lakes and down countless rivers.

As it turned out, Northway was our first and not anticipated stop. At 5,500 feet, and five miles out, the engine dropped 1,000 rpm, egt climbed and NOTHING I did changed things, except, moving the throttle, which made things worse. Joe felt it was the same thing he'd had a couple days earlier. Sort of like the spreading of the flu. Only the nearest warm bed a a long way off. Rising - or sinking- to the test, I put KT on the nearly indiscernable numbers and coasted over to re-fueling. Joe followed a few minutes later. We, (Joe did most of the work), cleaned out the gascolator, fuel lines and air filter. The gas, itself, checked out fine but there was a lot of sediment in the gascolator and strainer. It looked like fiberglass filaments and tiny flecks of resin! After that, the 2100-D ran smoothly through all rpms while tied to a fence. Take-off was scary - in the sense that I was waiting for what I just knew would be a 1,000 rpm drop. I circled to 3,000 feet, waited for Joe, and then we both headed down the Alaskan Highway again.

From there to Whitehorse I heard every change in everything, but it was uneventful all the way, in fact, throughout the rest of the trip.

We called in for weather at Burwash Landing at the north end of Kluane Lake, cut across the south end of the lake and followed the only road in sight to the gold rush town of Whitehorse. It was almost a relief to swing around the last ridge and see the twin N-S runways. A straight-in was requested and granted. I was clearing the active to the taxiway as Joe came in. It was too late to go further, so we called it quits after only 750 miles. We also enjoyed that night, our sleaziest motel stop. We both agreed that we'd camp out in a rain storm without a tent before staying there again. Or else keep that Alaska-required survival firearm close

Next morning saw us off for Ft. Nelson,

Ft. St. John and Dawson Creek, but not before Joe learned what happens if you don't replace the oil cap after adding oil! These next 750 miles were as magnificent and beautiful as the first. It sounds trite, but you really do have to see it to believe it. And it was here that we suffered our next little point of interest. Halfway between Whitehorse and Watson Lake, Joe calls to say that his bent-wire oil access door retainer had worked loose, had inched forward and was being grazed by the trailing edges of his prop. We decided to scope things out at Watson Lake, which he felt he could make. I landed first, followed 8 minutes later by Joe. Sure enough, the rounded finger-loop end of the wire had chewed a nice round notch into the trailing edges of his Warnke prop - near the hub but before the edge of the spinner. Not enough to be dangerous yet, but enough to convince Joe to use several lengths of twisted wire lock to hold the access door closed. Joe vented his frustration on the strange, large and malevolent looking bugs, (critters really), that took a liking to his bright yellow plane which they tried in great number to pollenate. Unsuccessfully.

We were caught up to at Watson Lake by another Anchorageite who ties down next to Joe and who flies one of those "store-boughts". A 180 I think. The three of us departed southeast over the adjacent lake. Not far out, a decision had to be made. We could continue to follow, or we could elect to leave the Alaskan Highway on the way to Ft. Nelson. The Highway courses a winding and rising, (to 4,500 ASL), trail past Muncho Lake, Toad River and Summit through the most spectacular part of the entire flight. It's a tortuous route with periodic 90° course changes stitched into the area by absolutely precipitous mountains. It was here, the year before, that I got nailed by thunderstorms, 1 mile visibility, lowering ceilings and ultimately, tree-top flying over Summit. It was scary as hell, happened both coming and going, and prompted me to write "NEVER again" across the sectional map in red magic marker on the way home in '83.

Those red letters were still there in '84 and I told Joe I wasn't going through there no matter how good the weather. (It was good going in last year, too....) Choice 2 take you away from the safety of at least some semblance of an alternative runway and out over absolutely nothing.

It's a little shorter too. All three of us followed the latter option. Our companies continued south while Joe and I used Ft. Nelson to re-fuel.

It's 250 miles mostly south to Ft. St. John, B.C. This part of the trip was serene. Joe was off my left wing and I took a picture of him against the heavy green forest. We eased in the airport as dusk fell, tied down side-by-side, and grabbed a ride to town with a motel owner. A beautiful place after Whitehorse and he even re-opened the restaurant so we could re-fuel ourselves. Afterwards, the owner convinced us to trade some U.S. currency for a roll, (for each of us), of U.S. quarters - his bank would take the currency, but not the coins. The trade screwed up our C.G. but why not make the man happy.

Next day, before leaving for the prairies of southern Canada, we briefly talked with a father-son team flying a 172. Their task for the day - for the whole summer - was to fly a grid cut into 1-mile squares and photograph every farm from 300 feet. Then the ground team would peddle the color pictures to the farm owners.

At Dawson Creek, 20 miles away, we leave the Alaskan Highway. Then Grand Prairie. Then Edmonton, Alberta where we land for fuel. Enroute, Joe is confused about his whereabouts and doubts his compass. I am sure of my position and heading and describe for him how the shadow from his fuel tank vent should be positioned for a proper heading. But he is not convinced that my sun dial approach to navigate has any basis for reliability. We both made it to Edmonton anyhow. Typically, the prairie wind is blowing something like 30-35 knots - flags are straight out and snapping. As we are taxiing back out for take-off, I notice my oil pressure is at zero. I pass my concern to Joe, (He's the engineer on this flight), and he suggests checking to see if instrument power is on. I flip the switch and - Aha! - oil pressure comes right up. Joe had one of the heart-in-the-mouth take-offs attributable to a very strong quartering gale and it wasn't until we passed through 1,000 feet that the air smoothed out a little and we felt more comfortable.

con't. next month, (thunderstorms, hail & a crash almost end this Alaskan Odyssey!).

Carey Anderson has now retired from Pan Am and is in the process of moving from California to Missouri. Parts orders will only be filled during the next couple of months if the parts are on hand. If they have to be made they will be shipped when Carey reopens the full shop in Missouri which is set for June 15th.

Carey's new address will be Route 3, Strafford, Missouri 65757. No phone number yet. Watch the Newsletter for definite dates.

VARI-PROP IN PRODUCTION

A variable pitch, auto-feathering prop for VW's is now available from VARI-PROP, 2263 Crystal Drive, Santa Monica, Ca. 93455. (805) 937-7994. Weight is 14 lbs and price is \$2,250. Carey Anderson took a look at it and reports that it looks very good and operated smoothly.

Thomas O'Donovan ,312-433-3497, needs someone to help him caculate the total air flow through the cowling at low speeds. This information will be used in designing an on-board Halon fire extinguishing system. He plans to offer the system to other builders when finished. Please give him a call if you can help.

FOR SALE__Complete KR-2 retractable main gear; spring bar, main spar attach fittings, Rex Taylor HAPI type positive action gear locks, brake & gear handles, legs, axles, wheels, brakes, tires, cables. Switching to fixed gear. \$300 plus freight. Tom O'Donovan, 538 Old Elm Rd., Highland Park, IL 60035 312-433-3497.

FOR SALE__KR-2, Award winner at 1981 KR Fly, Pope Valley, Calif. 1835 cc VW, aluminum cylinders, full electrics, Alpha 200B radio, ELT, wing tanks, spoilers, roll-over structure, custom made seats, full upholstery, white imron, empty weight 557 lbs, has heel brakes ready for installation, may be purchased with trailer if desired. Airplane: \$8,000, Trailer: \$500. Pictures on request. Robert Perry 406-227-8046. Also have (1) Warnke ground adjustable hub (needs baldes) \$50.00. (1) alternator & regulator for VW complete with mount for prop hub drive \$35.00. (2) throttle cables \$10.00. (1) mag to crank adaptor \$20.00. (1) roll Dynel \$25.00.

MINIATURE METRICS

LJTEFLJTE HARDWARE

7801 14th Street
Westminster, CA 92683
894-4875 (unlisted)

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Heim joints & spacers \$26.*

Landing gear lockbar SPRINGS
m6use-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates
drilled, ready for Camloc \$54. *

Upper elevator pulley
bracket \$15*
Assembled

Rudder, elevator
horns & hinges &
back-up plates \$55.*

Aileron bellcranks &
horns complete
Assemblies (24 pieces)
\$87. *

Lower elevator pulley
brackets \$28. assembled*

Aileron pulley brackets
assemblies \$30.*

Rudder pedal mount blocks
\$30.
Control stick assembly per
plans w/mike switch \$75.*

Planning to purchase the Rand-Robinson #4 Aluminum Extrusion Kit? Let us save you time and money. Miniature Metrics will pick up the kit from Rand-Robinson, perform necessary machining and return to Rand-Robinson for shipping. Parts will be cut, milled, drilled and shaped. Send us a S.A.S.E. for more information.

Quality...all material is aircraft aluminum/steel as specified in the KR Construction Plans Book. S.A.S.E. more information.

*postpaid items

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLORADO 80155-4113
MARCH 1985 ISSUE NO. 117

FIRST CLASS MAIL
U.S. POSTAGE
PAID
DENVER, COLORADO
PERMIT NO. 2677



Issue No. 118
APRIL
1985



KR NEWSLETTER

Rates
USA \$12.00 YEAR
CANADA \$15.00 YEAR
OVERSEAS \$200 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



KR-2 N27JL
David Hillerman
Turlock, California

Cruise: 155 mph
Prop: 52x49 Derrick Ind.
Engine: Revmaster 2100 D
Flight time: 200 hours
Pilot comments: FANTASTIC!

I've had several requests for information regarding Plasticrafts, Inc. and their address after last month's issue.

Plasticrafts is one of the largest-wholesale and retail suppliers of fiberglass, Kevlar, Plexi-glass, epoxies, etc. They manufacture their own brands of epoxy, (trade name is "Plastrix"), and other resins, (over 20 types in all).

They can also make just about any kind of composite part you can imagine in their production facility. They have long been assisting aircraft builders here in Denver and can provide lots of assistance.

Their address is:

PLASTICRAFTS, INC.
600 W. Bayaud Ave.
Denver, Colorado 80223
(303) 744-3701

They also have a catalog available if you write to them and request a copy.

Sun -n Fun was well attended by KR builders and there was a good showing of KR-2's this year. The KR Forum was also filled to overflowing by interested builders.

I had hoped to have pictures in this issue, but they have been delayed. Hopefully they will be ready for May's issue.

Spring is coming back here in the Rockies and once again I'm able to work on my new bird. Progress is coming well with all woodwork completed, fully-balanced tail with electric trim completed, retractable tri-gear installed, (still working on retraction pieces), total torque tube aileron and elevator controls in place. Gee Bee Canopies made a canopy for me that should look GREAT! Computer and 3-axis auto-pilot almost ready for installation. I'm still hoping for a late summer flight. Stay tuned!

ALASKAN KR ODYSSEY
JACK FYFE
Anchorage, Alaska
KR-2 N321KT

PART II

Next stop is Saskatoon where we stayed the night. It's also where we picked up the name "American Bozos". We were watching TV when we get a call, the caller asking for me. Such a call was a surprise, but the way one of our fellow EAA'ers located us was also surprising. He saw the planes tied down and learned from the fuel operator that we were staying in such-and-such hotel. He did not know our names but a call to the hotel quickly gave the caller our names. When we had checked in, we did so with lots of others, also checking in. We could only guess that, somehow, we stuck out in the crowd as non-Canadians and our caller said, "probably like that red-headed clown, "Bozo", hence the name.

Out of Saskatoon the next morning and to Minot, S.D. for customs. Relatively uneventful except that I experienced 1,000 fpm down air over Last Mountain Lake near Regina while Joe missed it by flying east of the lake. Cleared customs, refueled and left for Brainerd, Minn. As we passed over Fargo, N.D. and with the sun getting low, Joe commented that there sure were a lot of motels and hotels in Fargo and perhaps we should stop there for the night. The year before I'd come back thru Brainerd and I really did want to return. I convinced Joe to ignore the setting sun, the Fargo motels, the rain ahead and concentrate on the fact that we'd be 140 miles closer to Oshkosh if we made "my" destination. We flew in with the sun setting, where we were able to photograph our planes under a scarlet-orange color to the high clouds above, enjoyed a good steak dinner and headed for bed in the last available motel room in this quaint tourist-oriented Minnesota Lake country town.

Day number 5 would see us in Oshkosh. We had been riding a high pressure all the way from Anchorage, so we thought, we'd have no problem. Joe took-off first and was ahead of me for most of this last leg. But flying over the relatively non-descript mid-west is harder than Alaska flying - it's easier to get lost here. Not lost like you don't know if you're in

Wisconsin or Kansas, but lost like you're not sure you're over this road or than one over there. The plan was for Joe to proceed me into Oshkosh, but without our major rivers, valleys and instruments to help with navigation, Joe flew a tad off course which lengthened his course and which, 8 miles out, put me a few hundred feet in front of him. The result: I was turning off the active as Joe's tires imprinted the numbers and N37686 and N321KT were the first two KR's to start the KR tie down-line at Oshkosh '84.

Joe and I camped out the first couple nights. Then my wife 2 of the kids arrived and I abandoned the survival tent for a few nights in a farm house. It was a feeling of unexpected melancholy that I felt when I approached our tent spot a few days later and saw Joe's spot was empty. I wandered up the flight line to discover the note taped to my prop. Joe wrote that he had departed, (about 1/2 hour earlier), to visit his grandmother in Milwaukee. I left the next morning after we spent the evening with friends we'd met the summer before.

My next stop was Dayton, Ohio to visit parents, sister and brother. Joe was flying on to Denver for the same purpose; we would re-unite there. Weather said thunderstorms were expected to develop at Dayton and a fast-moving front was approaching Oshkosh. A quick pre-flight and I left Oshkosh ahead of the front. Through the stuff that passes for breathable air around Chicago, (Gawd!, I thought the engine would quit on principle alone). A few hours in the air and KT and I landed in Dayton to the amazed and awe-struck gazes of the parents and sister. Jack made it again in "THAT". And all the way from Alaska at that!

The plan was to visit for 2 days and fly to St. Louis to visit a day with the in-laws. The weather doubled the Dayton stay. On that fourth day I probably called weather 36 times. Finally, in the late afternoon, it was up to marginal VFR, the on-field thunderstorms went somewhere else and they were guessing the weather east of Terre Haute would improve. Refuel, pre-flight, untie, good-bye and up into marginal flying. Stay with west-bound Interstate 70 to reduce the odds of getting lost.

Indianapolis. Still a mile or so visibility. A bi-plane passes altogether too close. Call approach and ask for help across the city so I can pick up 1-70

again on my way to St. Louis. They give the help and 10-15 minutes later, told me to check off my right wing tip - I should see the intersection of 70 and 267. They were correct. At Terre Haute the weather was improved markedly. I stayed with 1-70 and watched the scenery - if that's what Illinois is - pass underneath. I had hoped to make it to Spirit of St. Louis Airport, on the west side of St. Louis, but nightfall dropped in with the message that I should divert to Bi-State Park Airport. That safe haven is in some way attached to my alma mater, Parks College of Aeronautical Technologies in Spirit. Only trouble was: my wife and her relatives were at Spirit with what I assumed would be the brass band, champagne and autograph books. But safety - not to mention FAA sometimes - dictated a different tie-down for the night. The controllers and Lambert/St. Louis helped guide me into Bi-State, which I likely otherwise never would have located among the 16 trillion ground lights. A very accommodating ramp tramp steered me to a tie-down and then called Spirit to tell the entourage about the deviation from plans and drove me to a restaurant where I was to reconnoiter with family. Great people, but I honestly don't understand how they can survive, let alone live, in the chemically soiled "air" of the area. You almost want to wrap your plane up overnight in a Zip-lock bag.

A few days earlier I had learned that Joe, who had flown from Milwaukee to Denver while I was in Dayton, had successfully threaded thru local thunderstorms near Centennial Airport in Denver, only to get smacked around on landing. The result was a crack - or a series of them, broken prop, cowl, Sting exhaust, leading edges of both wings, gear latches broken and gear collapsed and - as it turned out when he was rebuilding the wings - a couple of long cracks in the wing foam. John Forrester, Steve Alderman, and Mike Guthrie, (who flies one of Burt's backward airplanes), all pitched in and did a fantastic job of re-building 686 on the spot. Not show-stopper stuff, but, and more important - serviceable enough to enable him to fly the 3,500 miles back home to Anchorage.

The day after landing at Bi-State Park, I ferried the plane over to Spirit. The next morning, in searing heat, and the usual dispiriting smog, I departed Spirit on my way to Denver, (Centennial Airport) via a fuel stop at Hays, Kansas. The

forecast included thunderstorms to the north and parallel to my flightpath, decaying thunderstorms in front that should pose no problem and developing thunderstorm to replace those. The plan was to prowl along the cells to the north and sneak thru the window between cycles further west.

Climb out was slow, give the 100° and heavy condition of KT. After awhile, things were cooler at 7,500' and I was primarily concerned with following 1-70 west past Kansas City, Topeka, and Salina. I thought of refueling at Salina, but the 90 miles to Hays took me past 1/2 way and besides, that 9,500 feet of altitude seemed too precious to dissolve in a spiral to Salina.

Hays, Kansas was a high spot on the flight. I circled the airport to check the wind, (looked about 20-30 knots), landed, refueled, drank 1/2 can of Orange Crush and prepared to leave. My tailwheel, ever since leaving Anchorage, had been a real problem. No matter how hard I hit the rudder pedals, the stupid thing just did not assist in ground control. Turns beyond 3° or so were accomplished by a blast of rpm on the rudder or by - get this - stepping of KT and lifting the tail around to the desired heading and climbing back in. Try telling tower, at a busy International airport, that you'd like to get out of the plane, 5 or 6 times, just to negotiate a bunch of turns on your way from landing to and back to take-off. (At St. Louis, the controller asked, "isn't that sort of inconvenient?" -- inconvenient, hell; it was a bother, a hassle, and an embarrassment and I told her so). Anyhow, the thought finally, after 4,500 miles, dawned on me to see what the cause of the controllers comment was. Sitting on 105° asphalt, on the outskirts of Hays Kansas, I learned what it was; I'd painted it in a straight ahead position and I'd tightened the nut down so much that, even without the paint, it wasn't going to turn. The remedy was obvious, and completed in about 10 minutes. A little WD-40 and let's go. Unless you've been there, you have no idea what it's like to do a 180 right there and then a 90° onto the taxiway. Heaven should be so pleasant. Maybe WD-40 will be there too.

Weather was forecast to get worse. Those redeveloping thunderstorms that were noted back in St. Louis were on schedule. I missed a few local cells as I flew along 1-70 out of Hays. Somewhere past

Goodland, Kansas I was terrorized by the staccato of hail. 90° to the right took me out of the flak. The thunderstorm that those little bombs came from must have been 10 miles away. Remember learning about that in ground school?

I couldn't locate Centennial Airport as quickly as I thought I should so I called Denver Approach. Once again, Mr. Doppler located me, oriented me, and put me onto the field. On the numbers and I hear Joe calling in with engine trouble! Not wanting to repeat his little snafu, I touched down at 100 mph plus and used most of the useable 8,000 feet of runway. I told ground control I wanted to go to wherever the other KR-2 was and they directed me to Hanger 20, where John Forrester, Joe, his dad, and several others were waiting. An hour - and 2 beers - later saw Joe's engine problem fixed, (wrong timing) and Joe and me being taken to Joe's boyhood home by his father. Steak dinner out with Joe and his parents. Full re-cap of the Olympics, some expected reminiscing and off to bed.

Next morning. Clear, weather forecast good, breakfast with Joe's parents, pre-flight. Cognizant of being in the mile-high city, I jettison into the trunk of the senior Mr. Fechtner, all the "used" sectionals, 1/2 my survival gear and other odds and ends. I think I saved 30 lbs. Rationale: sure, I may need this stuff if I ever go down, but, with it I thought I may very well need it about 250 feet off the end of the runway here; without it, I might still be airborne at that point. Joe agreed and did likewise.

Centennials N-S runway rises 50 feet from north to south. We were takeing-off south and our rate of climb seemed to equal that of the runway! It occurred to us that if we just flew level, without altitude gain, we should have over 5,000 feet beneath us by the time we got to Anchorage.

We hoped to make it into Canada by evening, 1/3 of Colorado, Wyoming and Montana were between us and the border. We slowly climbed out past Denver and headed about straight north up 1-25 past Loveland, Ft. Collins and into Wyoming. At Ft. Collins, 1-25 veers east and 30 miles north we crossed Interstate 80 out of 'Cheyenne. It is 225 miles north to Interstate 90, which we crossed at Gillette, approximately 50 miles south of the Montana state line. The place seems barren of everything. Time passes in slow motion. Absolute desolation. A few

mining operations, a dusty unpaved road here and there, a railroad track linking the mining operations. The hamlet named Bill which existed in the Thunder Basin Nat'l. Grasslands. We assumed Bill was named after the first settler of the area who most likely once lived in Recluse, Wyoming, an equally tiny place just north of Gillette.

Entering Montana, we crossed Powder River. This was historic country and the Powder recalled to memory the days of Custer and Sitting Bull. Our course took us just to the east of Custer Nat'l. Forest and further west, west the Custer Battlefield Nat'l. Monument. The area, from a mile and 1/2 above, seemed stark and through the arid grasslands wound the Powder, Pumpkin, O'Fellon and Tongue Rivers. The Yellowstone dominated to the north. The area was tawny-colored; the sinewous rivers were bordered by the thick green of grass, brush, and trees. It was easy to imagine the mountain men of the 1800's canoeing those waterways, and cutting firewood for the night. There's a lot of space out there for an expanding population.

Miles City airport rests on the north bank of the Yellowstone River. Headwinds aloft dictated a fuel stop before continuing onward. The 20-25 knot surface breeze was right down the north-south runway, to spill over the cliff and down to the river. That's a "be careful" situation. As usual, Joe got there first and was re-fueled before I landed. We had planned to continue directly north out of Miles City to Wolf Point and on to either Moose Jaw or Regina, Saskatchewan. Flight Service suggested that the heavy thunderstorms developing there might interfere, so we decided to turn west and fly to Havre, Montana, (a name Joe insisted on pronouncing "Harvey", which he know irritated me.).

Take-off was easy in the flag-snapping breeze - the tail was of the in ground in less than 50 feet. Havre was 225 miles to the northwest. 90 mile long Ft. Peck Lake was our next and significant checkpoint, roughly 1/2 way to Havre. High winds aloft kept groundspeed to 90 mph. Although it took forever to get to the lake, that speed permitted an extended view of the moonscape of broken volcanic rock that preceded the lake itself. Black, hostile terrain that looked worse than 20 grit sandpaper. The gorge was so steep, and the lake so narrow at our crossing of Crooked Creek, we were

prevented from seeing the water until we were within a few miles of it. State Rd. 2, transversing Montana from east to west slowly came into view. To our left was a very distinct mountainous area surrounded by deep forest on the slopes and rangeland on the flat. It sort of looked like a large oasis in the brown desert. Several Indian settlements scattered themselves among the ridges and valleys.

Havre, (11,000 people), a nuclear business community surrounded by ranches. The County Fair magnet, certainly drew people from the rural surroundings. The place was aliver. Joe landed just before dusk....I was still at 4,000 feet and descending toward my own reunion with the ground when his clipped, "*#@%" portended imminent trouble. The wind had switched 180° and his final was also his downwind. It all came together for Joe in that one word as he cranked a high-speed right turn from runway to taxiway. All's well that ends well, Shakespeare like to say.

We made motel reservations and the Flight Service person was kind enough to drive us into town. McDonalds provided dinner. The oppressive head the the terrible air of Chicago, St. Louis, and Dayton were gone. Here, it was pleasantly warm and the air was almost aromatic. We walked past a quaint 1890's barber shop and enjoyed just being there. It was a pleasant interlude.

Next month the conclusion of the Alaskan Odyssey... almost home, but Mother Nature wants another shot at the KR's!



NEW! 11.400x5 6 PLY. RATED
TIRE SPECIFICATIONS INFLATED:
HEIGHT 11.5 INCH WIDTH 4.0 INCH
TIRE WT. 3 LBS. TUBE WT. 1/2 LB.
LOAD RANGE C -70 P.S.I. MAX.

This tire fills the size gap between the 500x5 aircraft tire and the 3.40-3.00x5 go-kart tire. Looks like a scaled-down 500x5. Fits KR-1 & 2s and is recommended by Burt Rutan for the VariEze and Long-EZ. Also fits most other experimental using 5 inch rims.

TIRE 6 PLY RAT. 25.00 TUBE 6.50+ SHIP & HAND.
MIKE LAMB, P.O. BOX 3324, QUARTZHILL, CA 93534

MARKETPLACE

FOR SALE...KR-2, 50% complete. Excellent workmanship. Plus materials to finish. Call for details. \$750.00 Erwin O. Cruz (404) 974-8436

WANTED... 164 cu. in. corvair heads in good condition. I have 140 cu. in. heads to trade. Also I buy old model airplane engines & parts. Please state price and condition in letter. Paul Venne, 4238 Tulane Ave. Long Beach, Ca. 90808 213-421-3192.

FOR SALE....KR-2 - \$1,400. Fuselage and spars signed off. call for inventory list and more information. Must Sell. 505-887-5703.

FOR SALE 65 hp. Cont., runs well. .015 over, .010 under. With logs, no carb or mags. \$900. 65 hp. Cont. cylinders, .015 over. \$100. 914-744-3183.

CARVE YOUR OWN PROPELLER Don't risk expensive propeller during tests. New method, ridiculously easy, precise. \$6.95 USA, complete. Garth Hess, 881 Emory, Upland, Ca. 91786.

KR-2 PRE-MOLDED WING SKINS - Vacuum bag-formed. Send SASE for free brochure to Dan Diehl, 1855 N. Elm, Jenks, Ok. 74037.

KR CANOPIES KR-1 canopies: \$79 KR-2 canopies: \$95. Oversized versions available for more headroom. Contact The Airplane Factory, Inc., PO Box 24035, Dayton, Oh. 45424.



BON AERO

**BASIC A ISJMS
AIRCRAFT
HARDWARE** FREE CATALOG

BON AERO
7688 SUMMIT RD. PARKER, CO 80134
Dept. SA 303/841-3602

MINIATURE METRICS LJTEFLITE HARDWARE

7801 14th Street
Westminster, CA 92683
894-4875 (unlisted)

Planning to purchase the Rand-Robinson #4 Aluminum Extrusion Kit? Let us save you time and money. Miniature Metrics will pick up the kit from Rand-Robinson, perform necessary machining and return to Rand-Robinson for shipping. Parts will be cut, milled, drilled and shaped. Send us a S.A.S.E. for more information.

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Heiro joints & spacers \$26.*

Landing gear lockbar SPRINGS
mbuse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates
drilled, ready for Camloc \$54. *

'Upper elevator pulley
bracket \$15*
Assembled

Rudder pedal mount blocks
\$30. *

Control stick assembly per
plans w/mike switch \$75.*

Lower elevator pulley
brackets \$28. assembled*

Aileron pulley brackets
assemblies \$30.*

Aileron bellcranks &
horns complete
Assemblies (24 pieces)
\$87. *

Rudder, elevator
horns & hinges &
back-up plates \$55.*

Quality...all material is aircraft aluminum/steel as specifiec
in the KR Construction Plans Book. S.A.S.E. more information.

*postpaid items

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLORADO 80155-4113
ISSUE NO. 118 APRIL 1985

FIRST CLASS MAIL
U.S. POSTAGE
PAID
DENVER, COLORADO
PERMIT NO. 2677



**MAY
1985**

ISSUE NO. 119



KR NEWSLETTER

Rates

USA \$12XX) YEAR
CANADA \$15.00 YEAR
OVERSEAS \$20.00 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



David L. Feiger
PO Box 581 John Day, Or. 97845
503-575-0766
KR-2 N39426

My KR-2 is doing very well! Flies beautifully, 140 mph is probably the best I can expect for cruise -- I built it super tough and heavy, (628 lb. empty weight) it will hold 165 mph at full throttle.

Climbout at 850 lbs. gross, field elevation 3,700', is 700 fpm -- not too bad. Drops down to under 500 fpm at around 1,050 lb. gross weight.

I have a HAPI 60-2 engine, Prop's Inc. 52x45 prop. Also a 4" venturi probably costs a few mph, (powers an artificial horizon - just in case I stray into the clouds). I still have some interior detailing to do, sealing and aerodynamic clean-up to do on the wings, (aileron gap on bottom and drag link cover).

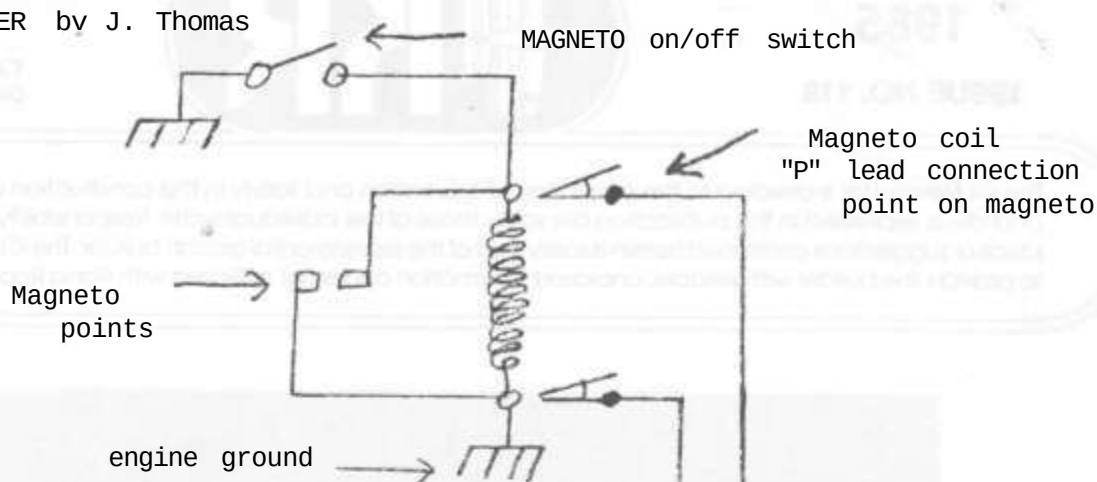
I worked up a digital servo powered elevator trim tab, thumb wheel on top of the stick -- works slick -- I can fly on trim alone. I'll send the work-up on it shortly for use in the newsletter.

I now have over 60 hours on N39426 and have done full powered descents at 200 mph with no sign of flutter. Cabin heat is barely adequate below 20 degrees outside temp. I installed cuffs on the spring bar cut-outs which stop almost all cabin draft.

DICK LAMBERT AT Rand Robinson has informed me that they are about to release a new disc brake system. It will fit existing gear legs with very little modification. I should have full details in the next newsletter.

MAGNETO TIMER by J. Thomas

SCHEMATIC:



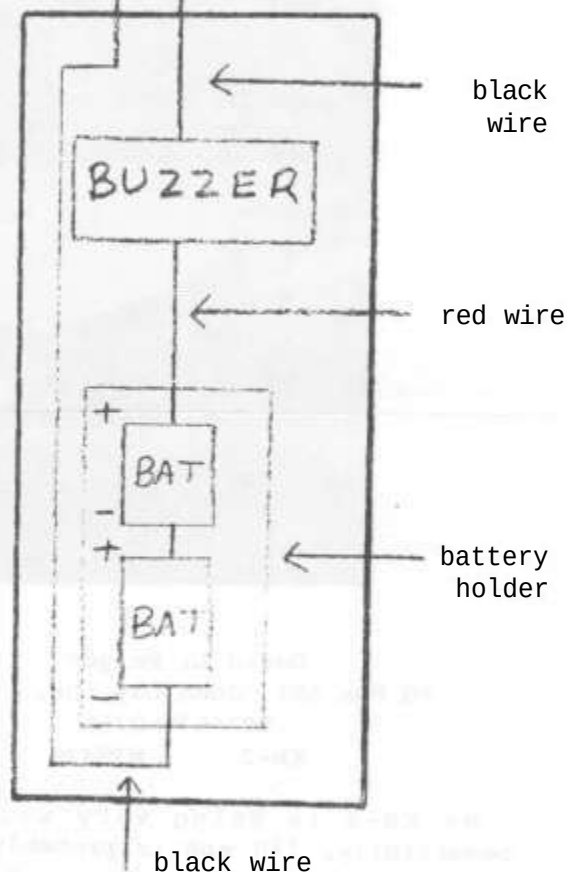
USE:

1. Turn ignition switch to "Both", or disconnect "P" lead to magneto (opens circuit).
2. Hook up test box, one clip to "P" lead, one to ground (polarity does not matter).
3. Time mags. When mag points open, buzzer makes a lower pitch sound; (short leads to hear points closed tone).

Parts list: (Radio Shark P/N)

Buzzer	273-053
Battery Holder	270-385
Clips	270-374A

TEST BOX



Total price with batteries: \$5.37

John Thomas
20540 E. Coolidge PI,
Aurora CO 80011
366-0464
Chapter #301

QUICK TIPS

When installing the cross-pieces during initial construction of the fuselage, don't permanently install the one at the instrument panel location. Simply stick it in now and wait until instrument panel construction to permanently install.

If you are planning to use Birch plywood for your spars be sure and move the fuselage uprights wider apart where the center section spars slide thru. The Birch is wider than Mahogany.

Are you finding your KR a little too pitch sensitive for comfort? If so, try making your control stick a few inches taller. This will require more stick movement for the same control surface movement compensating for sensitivity.

ALASKAN KR ODYSSEY - - CONCLUSION

JACK FYFE

Anchorage, Alaska

KR-2 N321KT

The next morning we spent a half hour trying to thumb a ride back to the airport. No one would respond to the small request from the "American Bozo's", so we walked into the hotel, (not the one we stayed in), and made like we'd just checked out. "We'd like to thank you for a really restful night; is it possible to get a ride to the airport?" The ride was restful

Our course took us past Fresno Lake and on to Lethbridge, Sak. for customs. I took a few pictures of the symetrically aligned grain fields that carpeted the world from corner to corner.

At Lethbridge, after customs, and for the first time in the flight, I couldn't start the engine. Up until now, our start-procedure was always the same. Joe got in his plane, I hand-propped him, (anywhere from 3 to 20 flips), He buttoned down, I returned to KT and the newly installed starter from Revmaster woke up the engine. This time, tho', I became fearful that I'd deplete the battery before it caught. Patience and persistence and a few Anglo-Saxon invectives, and we were back in the air - on our way to Dawson Creek where would return to the 1,500 mile long Alaskan Highway back to Anchorage.

Dawson Creek was still 500 miles away. Our course placed us between Calgary and two beautiful spots we went to while I was still in Law School, Banff Nat'l Park and Jasper Nat'l. Park, both in the Canadian Rockies. Nostalgia time for the older crew member in our flight of two. 300 miles out of Lethbridge we crossed the Yellowhead Highway, an entrancing trail leading west from Calgary to Prince George and south to Kamloops. It's great country from the ground - even greater from the air!

Between the Yellowhead and Grand Prairie, we ran into rain squalls. A point Joe reported when he got thru but, to me, as I approached them, they looked less the begin. But, as usual, Joe was right - they weren't hostile. he reported a tornado, though, at about the same time that I turned back to take a picture of an intensely brilliant rainbow.

Onimous, foreboding clouds formed a wall to the ground from the NW to the SE and

parallel to our flight from Grand Prairie to Dawson Creek. Made me glad we weren't going to Prince George to fly "The Trench" back to Alaska.

Our true destination was Ft. St. John from Lathbridge, about 30 miles north of Dawson Creek, but forecasted high winds inclined us to Dawson Creek for re-fueling. It was a hurried pit-stop because darkness was approaching and it was still 250 miles to Ft. Nelson, out anticipated overnight.

It was a serene, uncomplicated flight north at 6,000 feet. Just as was the flight southward several weeks before. It was sort of like being back home again. As we had done throughout this odyssey, Joe and I chatted back and forth over the Escort 110's - commenting on this, observing that and , "Hey, look at that, down there". We were greeted at Ft. Nelson, by the standard gas attendant who, the year before had given me the key to the store so I could sleep inside, out of the downpour that hit the place that night.

In the car, on the way to town for the night, we listened to members of a search and rescue team who had spent the day looking for a plane that was missing on a flight down "The Trench" from Watson Lake. They were mystified as to why anyone would, in bad weather and lowering clouds, fly up a valley. Another steak dinner at the hotel in a tropical island, (mostly plastic and stained Douglas Fir), setting, a little TV, (perhaps a beer for this one), and we drifted into sleep.

Only to awak to a drab sky soaked with water waiting for a place to rain. In a continuous drizzle, we fueled and pre-flighted. The weather station freed a ballon and by timing the flight announces that the ceiling is at 1700 feet. Joe disagrees - it's got to be at least 4,800 feet, maybe 5,000. (You have to know this guy to understand him - he's never wrong and if he ever was wrong, you'd have to give him 40 seconds so he could alter the parameters - at which he would point out to you that, after all, he was right. He's never had to seed a cloud tho' to support his forecasts of rain). I take off 4 or 5 minutes after Joe. Soon, and in a very matter of fact manner, he says, "Cloud base is at 5,100 feet. Your ballon was wrong." We both went west. The Summit - Toad River - Muncho Lake Region looks absolutely bad. A little to the north, the way we came in, looks better to Joe. He heads west. I circle back down

to the airport where I stay for 3 hours. I talk with weather, talk with a husband-wife team flying from New York to Fairbanks for their 14th annual vacation. Read about Rutan's Voyageur. Nap.....

....And the puddles aren't moving any more, it's stopped raining. Watson Lake reports VFR. It's brighter toward the west. Let's go. A lonely flight without Joe. He's got to be in Whitehorse by now. Maybe on his way to Northway. In encounter very high winds. The couple from New York, in the Mooney, aren't making much better ground speed than I am, which I estimate to be around 50-60 mph! I'm flying gear down and overgrossed - airspeed indicates 120-130. So the breeze is around 60-80 mph. If it has a cross component, it's even higher. The ground slowly, almost imperceptibly, rolls beneath KT and me. I have to lose altitude to fly beneath some clouds - and clear 2 ridges by no more than three or four hundred feet. Rain, heavy at times, adds suspense. I don't like that semi-MVFR in the mountains. The Liard River eases under me as the Alaskan Highway come in from the left and winds its way out of those tortuously, writhing mountains that caused me so much anguish twice last year. I'm glad I chose not to wing thru¹ them this year. The can of pop I drank at Ft. Nelson has begun its trip south and I decided to shorten this part of the flight by landing at Watson Lake to accommodate the Orange Crush. The 25 knot wind is right down the east-west runway and poses no problem; in fact, it helps shorten the landing roll to a couple hundred feet. I learn there that the pilot of the missing airplane had died.

Refueled, I leave for Whitehorse, Yukon Territory. They're reporting VFR with scum in between here and there. The report is accurate. With high terrain all around, the squalls - heavy and opaque at times - blotch the landscape in every direction. I don't like the looks of it. I keep indexing the sectional every several miles so I can report my position accurately if I have to. I stay on 126.7 - the "Mandatory Frequency". These squalls aren't like before. Even in August they are part rain, part snow. They are very cottony, very thick. I go around, rather than through, each one. One after the other, there's not much room, in these confining valleys and passes, to do that, either. Instead of intersecting Fjord-like Tarkin Lake at its mid-point, I turn hard left and fly 35

miles to the south, thru several valleys, cross over a high rain-pelted ridge, and cruise back up the lake from its far-south end to avoid a particularly large rain storm. A 182 out front tells me to hang on - it's gets better where he is. He is over-flying the float plane base on the eastern shore at mid-lake. I press on, the weather does lighten quite a bit - so much so that I can slice off 15 miles by crossing over the mountains at Jake's Croner. Whitehorse Airport mists into view and I settle into a fifteen mile straight in final. And there's 37686 tied down beside a corporate biz-jet. Joe didn't make it to Northway after all! He watches my landing, roll-out and turn-off from the tower. I tie down, note the log book and we head off to dinner and some shut eye. The motel is different this time, so we don't miss the guns we never had.

Ft. Nelson's weather has found us here. It also got here first. Several tents rise out of the grass behind some Vari-Eze's which have been here several days waiting for weather. The enroute and Northway current weather and forecast is abysmal and although Whitehorse certainly is flyable - we wait for next hour's forecast. It is bad too, but Joe senses a change so he pre-flights and departs for Northway. I take his picture against the forested mountains as he flies by. An hour and a half later, I get apprehensive; Burwash Landing lets us know that weather forced Joe down to the ground, so he has turned up a valley in an effort to circumvent the low stuff. A little later, he leaves the valley and heads back to Whitehorse. In the meantime, I reclaimed our motel room and eased back to watch the Olympics. Two hours after Joe returned we're all in the air - Joe, myself and a number of those who had been waiting for better weather. The same thing is happening 300 miles away at Northway. Burwash Landing is the 1/2 way point for everyone and just north of there the clouds bring us all down to 500 feet AGL. The air is alive with pilots asking each other for informal weather reports. One southbound pilot alerts everyone to a 500 ft. tower that doesn't appear on the sectionals.

Northway is clear and beautiful by the time we get there. A twin calls in - she cannot close the passenger door which has popped open in flight and I wave off my long final and let her go in first. The ramp is crowded with aircraft and we wait,

almost' in line, for fuel. A quick pre-flight precludes quick departure. This will be our last leg of the flight. It is about 175 miles back over glacier-made lake country, through the winding valleys of the Nenstarta mountains and out over the flat country near Glenallen. I fly in close to the ridges in the Nenstartas and see herds of mtn. goats or sheep - it's difficult to tell which at this speed while you also assure that there is no one-time only landing in a mountain.

Outside Glenallen, halfway to Anchorage, distinctive Mt. Drum and Mt. Sanford rise nearly 16,000 feet from the flat plateau. Glaciers flow down and out of the two mountains in every direction. Towering clouds greet us as we head into Chichaloon Pass which will take us through the Chugach mts. and into Anchorage International. The clouds are emplaced throughout the pass area which sends its walls of mountains thousands of feet above us on both sides. We're back in our own turf now and know that the trip is over.

I follow Joe onto Runway 32 and we both taxi to our tiedowns. The next day, on the phone, it's, "Do you remember?..... and Let's go again in '86 - this time with a motel in Oshkosh and a rental car.".

ANNUAL KR FLY-IN

We are currently beginning plans for the 1985 National KR Fly-In. This year we will all be meeting at Riverside Airport on the south side of Tulsa, Oklahoma.

Riverside is home base for several KR's including Dan Diehl's KR-2.

The exact date has not been finalized as of yet, but will be sometime late August to early September. More details next month.

NOTICE TO CANADIAN SUBSCRIBERS

Over the last year I have begun to experience tremendous difficulty in the shipment of back issues into Canada. For some reason the Canadian Postal Service seems to lose over 75% of the these shipments. Needless to say, this results in tremendous cost, to the Newsletter and delays to builders.

All back issue orders for Canada will now be sent Registered Mail, Insured; hopefully allowing better service and will facilitate tracing of the shipment should it disappear. Effective June 1, 1985 all Canadian back issue orders for 12 issues

or more should enclose an additional \$12.00 to cover insurance and registered mail costs.

Also a quick note to all Canadian and Foreign subscribers. When making payment to the Newsletter, please use one of the following: Canadian Postal Money Order, U.S. Cash Currency, or a check which states on the face that it is payable thru a U.S. Bank.

Personal checks drawn on foreign banks, stamps, foreign currency, etc. cannot be used for payment. The banks here charge more to convert and collect these items than their original issue amount.

Thank You.

MARKETPLACE



NEW 11 400*5 6 PLY RATED
TIRE SPECIFICATIONS INFLATED
HEIGHT 115 INCH WIDTH 4.0 INCH
TIRE WT 3 LBS TUBE WT 1/2 LB
LOAD RANGE C -70 P.S.I. MAX

This tire fits the Sin Oap between trt< 500M5 aircraft tire and the 340-3.00x5 (jo-ken tire Looks like • scaled-down 500x5 Fits KR 1 a 2s end is recommended by Burl Rutan for the VariEte end Long-EI Meo fits mod other experimental* using 5 inch rims.

TIRE 0 PLY RAT. 25.00 TUBE 6.50 + SHIP * HAND
MINCE LAMB, P.O. BOX 3324, QUARTZ HILL, CA 93534

FOR SALE KR-2 50% Complete. Excellent workmanship. Plus materials to finish. Call for details. \$750. Erwin O. Cruz 404-974-8436.

WANTED KR-2 Canopy. C. Brooks, Rt. 2, Wingert Rd., Greenwood, SC. 29646.

The KR Newsletter is published monthly by the KR NEWSLETTER, PO Box 4113, Englewood, Colorado, 80155, John Forrester, Publisher. All back issues are available at following rates: 1-12 issues; \$1.00 each. 13-24 issues; .75 each. 25 or more;

MINIATURE METRICS LITEFLITE HARDWARE

7801 14th Street
Westminster, CA 92683
894-4875 (unlisted)

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Heitn joints & spacers \$26.*

Landing gear lockbar SPRINGS
mbuse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates
drilled, ready for Camloc \$54. *

Upper elevator pulley
bracket \$15*
Assembled

Rudder pedal mount blocks
\$30. *

Control stick assembly per
plans w/mike switch \$75.*

Lower elevator pulley
brackets \$28. assembled*

Aileron pulley brackets
assemblies \$30.*

Aileron bellcranks s,
horns complete
Assemblies (24 pieces)
\$87. *

Rudder, elevator
horns & hinges &
back-up plates \$55.*

Quality...all material is aircraft aluminum/steel as specific*
in the KR Construction Plans Book. S.A.S.E. more information.

*postpaid items

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLORADO 80155
ISSUE NO. 119 MAY 1983

FIRST CLASS MAIL
U.S. POSTAGE
PAID
DENVER, COLORADO
PERMIT NO. 2677



AUGUST
1985
ISSUE NO. 120



KR NEWSLETTER

Rates
USA \$12J00 YEAR
CANADA \$15J00 YEAR
OVERSEAS \$2000 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



IN LATE MAY I unfortunately contracted a serious infection in my spinal cord. This in turn affected the nervous system and in just a few days the entire left side of my body was paralyzed. This resulted in hospitalization and more tests than I care to remember.

Even after all that the doctors never have come up with a definite diagnosis. I am happy to report however that I am slowly getting better. I can walk again and have regained about 50% control of my left hand. Improvement is expected to continue with full recovery over the next several months.

Naturally I was unable to work on the newsletter during that time and as a result there was no June or July issue printed.

I am now able to begin work again on the newsletter and hope to catch up soon, (I have a stack of mail over 1 foot high!), so please bear with me.

I would also like to sincerely thank all those who called with get-well wishes, the cards and their prayers. It does help!

KR HOTLINE ESTABLISHED

With about 2,000 subscribers to the newsletter, it is many times extremely difficult for builders and subscribers to get thru to me on the home phone, (not to mention my families feelings at having the phone tied-up all the time), so I have now had a 2nd phone line installed just for KR Builders.

Please use this number for all Newsletter contact, builder assistance, etc. Put it up in your shop -- I'll help you thru those rough spots!

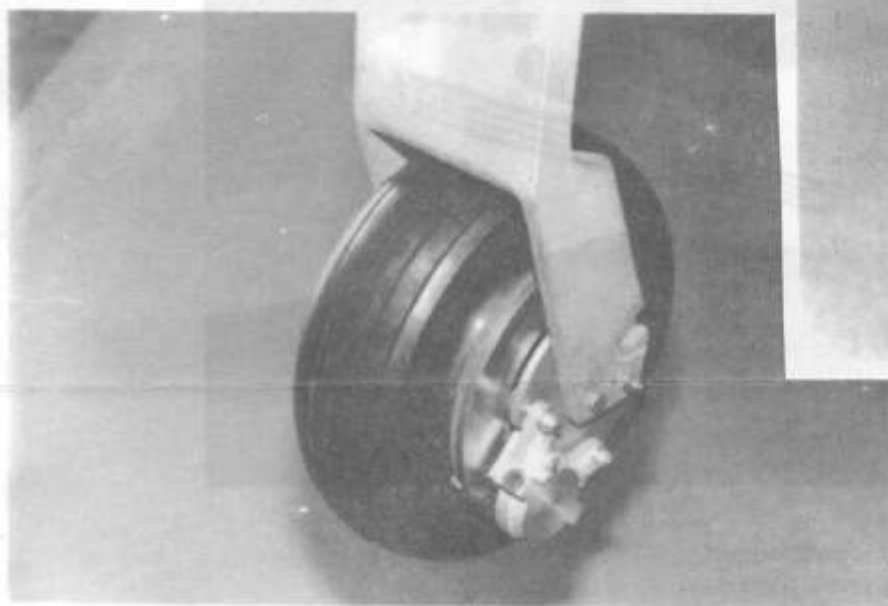
KR HOTLINE
303-841-9379

NEW HYDRUALIC BRAKES AVAILABLE

Anyone who has landed a KR fast and needed to use a lot of braking will surely appreciate the latest brakes available from Rand Robinson.

These hydraulic brakes provide tremendous braking improvement and will fit the original gear casting allowing them to be retrofited to all KR's.

Current price is \$335.00 including tires and tubes and are available direct from Rand Robinson Engineering, Inc., 5842-K McFadden Ave., Huntington Beach, Ca. 92649. 714-898-3811.



(See page 1 for picture of N183DS)

KR-2 FLIGHT REPORT N183DS

Donald Smith

726 Via Del Sol, No. Ft. Myers, Fl. 33903

ENGINE: 1835 Barker conversion, dual port heads, Zenith carb, HAPI starter, alternator, fuel pump - electric back for take-off and landings, HAPI exhaust.

RADIOS AND INSTRUMENTS: Edo Aire RT 563A Nav Com 720/200 with automatic omni, KT76A transponder, Hamilton vertical card compass, electric turn and bank, (2 1/4"), sensitive altimeter, VSI -- 0-2000, EGT, CHT, oil temp, oil pressure, volt meter, ammeter, electric tachometer, adjustable true airspeed, quartz clock.

AIRFRAME DETAILS: 2¹ longer wings with droop tips, gap seal on ailerons, mechanical linkage for ailerons, internal rudder trim, positive gear lock, gap seal on gear retraction, adjustable seat back, provisions for long range tank with electric fuel pump, lighted instrument panel - nav lights wire for landing and strobe, but not installed, insulated and upholstered cabin, good luggage space.

PERFORMANCE: Performance at approximate gross weight of 1,000 lbs. (empty weight 625 lbs.).

Rate of climb: 500 to 800 fpm.
Take-off run: approximately 300 feet.
Landing: approximately 1,000 feet.
Stall speed clean; power on: 50 mph
Stall speed clean; power off: 54 mph
No roll tendency at stall.

Cruise 8,000' 75%: IAS 124 mph
Cruise 10,000' 65% IAS 120 mph
Long range cruise fuel consumption 75%:
3 1/2 gallons per hour.

MISCELLANEOUS: Fuel capacity: 25 gal.
aluminum tank.

Oil temp: 190 degrees cruise, 220 degrees
in climb.

CHT: 275 degrees climb.

Oil pressure, cruise: 38 psi. with
standard oil pump.

50+TT with all restrictions lifted.

Flys GREAT, but I must now sell N183DS to
a good home. For further information
please contact me at 813-656-6184 or write
me at the above address. I will accept
offers over \$6,500.

COMPUTER PARTS ASSISTANCE NOW AVAILABLE

In addition to the Marketplace
classified ads appearing in the Newsletter
I now have a data base for my computer
which is available to any KR Builder to
help you buy, sell or trade parts or
aircraft. This service is FREE to all
subscribers!

Simply call or write me and give me all
the information. Categories are: WANTED,
FOR SALE, TRADE, FOR SALE OR TRADE and
I'll try to match you up with another
builder.

Please let me know when sell your parts
or get your parts so I can delete the
listing from the computer.

**** WANTED **** **** WANTED ****

FLIGHT REPORTS, CONSTRUCTION TIPS,
ACCIDENT REPORTS ON KR AIRCRAFT

**Your input and ideas are what keep the
KR Newsletter interesting! Your idea may
be simple to you, but some-one else may
not have thought of it. Photos always
wanted. Help other builders with your
ideas.**

WARNING

There is an AD on the Bendix 3000 duo-
magneto used on the Revmaster 2100
engines for serial numbers under 2,000.
THEY CAN FAIL! Any competent shop should
be able to do the repairs or contact
Revmaster.

KR-2 COMPETES IN THE CAFE 400

Steve Alderman flew his Turbo Revmaster
KR-2 in the Cafe 400 this year which
marked the first time a KR has completed
this race.

Despite having a little difficulty
keeping on course during the last 150
miles and running the race with some
loss of compression due to some burned
valves, (thanks to a poor valve job done
by a local shop in Steve's hometown), he
still was able to finish in 14th place.

Not bad for a first time out. Good job
Steve!

QUICK TIPS

Having a hard time trying to drill the
axle holes in the gear leg castings so the
wheel will run perfectly true? Try This.

Mark the spot for the axle on one side
of the gear leg and drill 1/8" hole thru
one side of the gear leg only.

Now jig the gear casting so that the
surface which will mount to the spring bar
is perfectly vertical, (this can be done
with a t-square and a level surface).

Next hang a plumb bob string up thru the
1/8" hole and allow the plumb bob to hang
freely and stop swinging. Mark the spot
and you're ready to continue drilling the
other leg thru and enlarge holes to proper
diameter.

This method assures a perfectly straight
tracking wheel in the gear leg every time.

Thinking of leaving off the gear leg
fairings and wheel cavity fairings?

Don't! There is a terrific amount of
drag generated here and the gear fairings
are essential. Make them as smooth and
tight as possible and you'll be rewarded
by a much faster KR.

RECENTLY THERE WERE two KR builders were
killed in separate crashes of their KR-
2's.

Although details are still sketchy, it
seems that both aircraft crashed on their
first flights due to stalling and
subsequent loss of control. One on take-
off and the other on landing.

The KR is a very responsive aircraft and
many builders refuse to believe that they
can't just hop in one and fly away like a
"Witchita Spam Can". THIS IS A HIGH

PERFORMANCE AIRCRAFT AND MUST BE TREATED AS SUCH.

Sure, we've all heard the guys who brag about finishing their KR, making a few taxi runs, and flying away like it was nothing with no taildragger or high performance experience. But get him off to the side somewhere and you'll probably get him to admit to some pretty wild flights at first and possibly a trip or two into the weeds and a new prop or two.

I know -- I've been there.

Prepare properly and you can save a lot of heartache and possibly your life.

1) Most builders spend years building, not flying and you get rusty. You may get away with it in some airplanes, but not the KR. Don't fly it until you are current again.

2) GET SOME TAILDRAGGER TIME! I've heard all the excuses, (no airplanes close by, no time, no money, etc), but that doesn't help when you're in the middle of a ground loop in your beautiful KR. You've spent a lot of time and money to get to this point - don't blow it - make the effort and get some taildragger time.

3) Taxi - Taxi - Taxi. Make a lot of taxi run at varying speeds. Learn to control the KR at all speeds. Find out if it pulls to one side. Learn what happens when you suddenly chop the power at 30 mph (It doesn't continue straight on it's own!). How much braking will it handle. Don't fly till you're ready and never make high speed runs without quite a bit of fuel and EVERYTHING working correctly -- in case you have to fly.

4) If you accidentally push it too hard in a high speed run you've got 2 choices - land (only if there is plenty of runway left) or fly. If you have to fly, don't try to come right around and land - go fly. Stay over the airport and get some altitude. Now take a deeeeeeeeeeep breath and relax. Get the feel of it for awhile before you try to land. Watch your speed on final. It's better to land just a little fast than 100 feet short.

5) Do a good job of construction. Many accidents are because of poor construction. Improper baffling, fuel

line installation, control rigging, etc. Have someone check your work before you fly and if they find something wrong - admit it and FIX IT FIRST!

6) KEEP IT LIGHT AND SMOOTH! Remember, a heavy KR will stall at a faster airspeed and won't climb much better a pregnant goose on a hot day. Same thing if your wings and smooth and shaped properly. This can cause all sorts of control problems. (know that fitting or part is expensive - but if it isn't perfect -DON'T USE IT DO IT OVER. An old-time FAA inspector once told me that he found that most builders will do a better job than factory builders because they always remember that it will be them in the seat someday. Remember that.

QUESTIONS AND ANSWERS

Q. I am about to build my cowling and am wondering about an aircleaner or don't they use any.

A. Several types have been successfully used. Some builders have built a filtered screen into the cowl so that all air is filtered. (I personally feel that this creates too much drag). Another option is to run a hose from the carb. intake up to a small filter, (try motorcycle shop for small filters), located in the rt. cowlings intake. This provides filtered air with lower drag. The other method is the use of ram air with alternate filtered air source. Revmaster sells an excellent set-up for this for about \$40. You don't need filtered air when you're flying and the ram air helps performance. When you're on the ground you simply pull a cable and close the ram air and the carb then draws filtered air.

and an "on-duty" staff ready to assist builders.

You would be able to rent space for the construction of your aircraft which would automatically entitle you to use all of the equipment and staff in your construction. Cost would be about \$100.00 a month, depending on size of space required. Out-of-town builders could come in for intense sessions for quick building of assemblies.

They would like to get some feedback from builders on this proposal. Please write the Newsletter with your comments and I'll pass them along.

RECENTLY I WAS contacted by a group which is proposing to establish a "Total Construction Center" for builders of all types of aircraft. They would like to construct a large hanger facility, equipped with every type of tool needed for construction, an "on-site" parts department offering parts at a discount,



NCW* 11 400*5 • PLY MATED
TIME SPECIFICATIONS INFLATED
HEIGHT 11.5 INCH WIDTH 4.0 INCH
TIME WT 3 LBS TUBE WT 1/2 lb
LOAD RANGE C -70 PSI MAX

This tw« Ms MM MM gxp bxb««n itw 900*5 Mr-
craft IK* and MM 340-3.00«S go-hMt lire. Looks
MM • n«Hd torn* MO*S Fife KM-1 A 2 • and *
RECOMMENDED by Burt MUMM for «h» VanCt* and
LOne-EZ AMD Ms mo* «Mh» «upsnunntai ualMg
9 Mcdi WMS.

TIME • PLY MAT. 25.00 TUBE • SO* SHIM» ft HAND.
MKE LAMS. P.O. •OX3B4. OUAMTZ MMX. CATTOM

MARKETPLACE

WANTED___Premolded parts for a KR-2. I need a canopy frame and turtledeck. Dan Homstad, Hallock, Mn. 56728. 218-843-3423.

WANTED...KR-2 in flying status.. Would like to trade 1973 Pace Arrow motorhome, but will consider cash deal. Ron Goeman, Rt. 2, Box 121, Vermillion, SD 57069 605-624-8286.

FOR SALE—KR-2, 60 hours TT, 0-200 GPU, fixed gear, 720 channel navcom with trailer. \$6,800. 713-288-4394.

FOR SALE—KR-2, 90% complete, 1834cc engine, brand new. Wings covered with Kevlar, strobed position light, RST-572 Navcom, all instruments, prop, fixed gear, \$9,000 invested, asking \$6,500. Glenn Brooks, Rt. 2, Hazelton, Idaho 83335, 208-829-5174.

FOR SALE—KR-2 project, all woodcraft complete and signed off. Also foam, canopy, wing attach fittings, 3-blade prop, spinner, hub, RR turbo system, slick 4018 magneto with harness, RR engine mount for VW case. Will sell all or part. Prices negotiable, Mr. Bates, 1019 Cherokee Rd., Louisville, KY 40204 502-459-9969.

FOR SALE___New engine mount for V.W. Rand Robinson part #31. List price \$125.00. Will sell for \$100.00 or B.C. Dan Homstad, Hallock, Mn. 56728 218-843-3423.

FOR SALE___New 3" aluminum prop hub extension, \$55.00. New dual port intake manifold, \$60.00. Stub exhaust pipe kit, \$20.00. Have HAPI engine and Sting exhaust that I will trade. I also need a used set of KR-2 plans. Bruce Gilinsky, Rt. 2, Box 3010, Royal, Ar. 71968.

FOR SALE OR TRADE...New Revmaster geared starter. \$150.00 or trade for David Clark headset. Joe Fechner, 907-344-8117 evenings.

Headquarters since 1931 for



g AIRCRAFT PLYWOOD

AIRCRAFT PLYWOOD

At your Service

HARBOR SALES CO., INC.

1404 RUSSELL ST.

BALTIMORE, MD 21230

Phone 301-727-0106

FOR SALE—KR-2 plans, unused. David E. Kent, 7345-1 Winthrop Way, Downers Grove, IL. 60516 312-963-9776.

FOR SALE—1948 Navion A, 515 SMOH, annual 10-84, 2 Nav Corns, ADF, transponder, 20 gallon auxiliary tank. Palo Alto tail, good condition. \$10,500 or trade down for KR-2. 305-283-2701 305-626-0481.

FOR SALE—KR-2 plans, new edition, \$75.00 Nick Dunbar, 3833 Tracy NE, Albuquerque, NM 87111. 505-821-0244 Business hours only.

FOR SALE—HAPI engine, single ignition, long block kit, \$1450 plus shipping. Also have latest KR-2 plans, \$90.00. 305-268-3273.

* The KR NEWSLETTER is published month-
* ly at PO Box 4113, Englewood, Co. *
* 80155, 303-841-9379, John Forrester, *
* Publisher. All back issues available *
* at following rates: 1-12 issues; *
* \$1.00 each, 13-24; .75 each, 25 or *
* more; .50 each. Copyright 1985 *

MINIATURE METRICS

LJTEFLJTE HARDWARE

7801 14th Street
Westminster, CA 93683
894-4875 (unlisted)

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Helm joints & spacers \$26.*

Landing gear lockbar SPRINGS
mouse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates
drilled, ready for Camloc \$54. *

'Upper elevator pulley
bracket \$15*
Assembled

Rudder, elevator
horns & hinges &
back-up plates \$55.*

Aileron bellcranks &
horns complete
Assemblies (24 pieces)
\$87. *

Rudder pedal mount blocks
\$30. *

Control stick assembly per
plans w/mike switch \$75.*

Lower elevator pulley
brackets \$28. assembled*

Aileron pulley brackets
assemblies \$30.*

Quality...all material is aircraft aluminum/steel as specified
in the KR Construction Plans Book. S.A.S.E. more information.

*postpaid items

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLORADO 80155-4113
ISSUE NO. 120 AUGUST 1985

FIRST CLASS MAIL
U.S. POSTAGE
PAID
DENVER, COLORADO
PERMIT NO 2677



SEPTEMBER
1985
ISSUE NO. 121

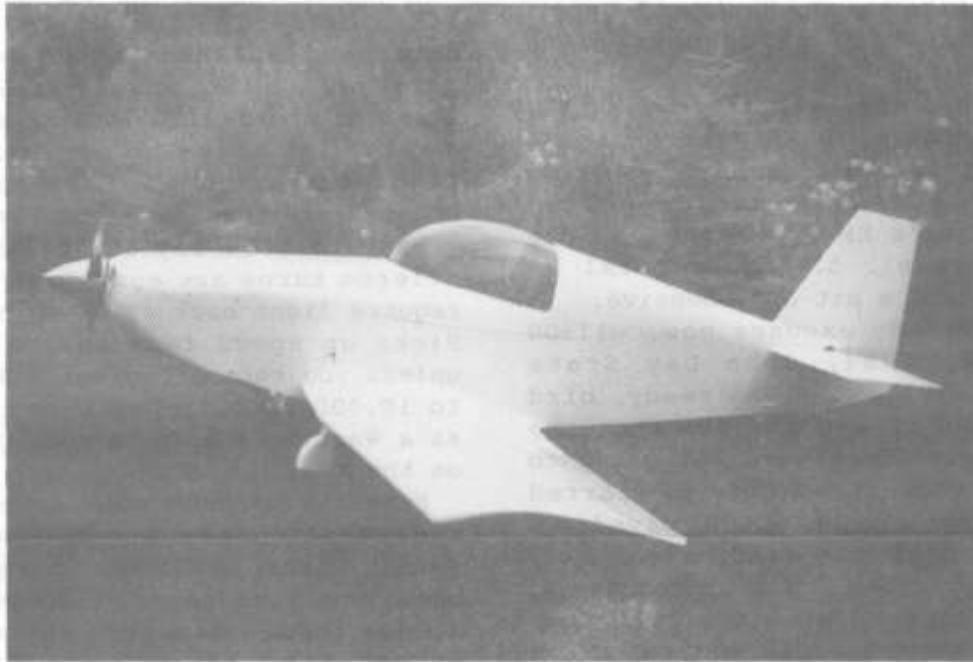


KR NEWSLETTER

Notes

USA \$12.00 YEAR
 CANADA \$15.00 YEAR
 OVERSEAS \$20.00 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



FLIGHT REPORT

KR-2 N39426

David Feiger

PO Box S81 John Day, Or. 97845

CONSTRUCTION: Aug., 1981 • July 1, 1984. Douglas fir structural, British 3/32" mahogany, Safe-T-Poxy on 6 oz. fiberglass, fuselage stretched 2" aft of rear spar, 3 1/2" taller vertical fin and rudder, 1 1/2" greater horizontal stab. and elevator, 21' 8" wingspan, laminated spar caps, Herb Gillelspeie's modifications to firewall, spars and tailfeathers for strength and survivability, MAPI's gear latch modification, R/C servo electric digital proportional electric trim with thumbwheel control on top of stick. Fuel Cap: 7+ gallons in each wing, 11+ gallon main tank. Results: a straight, solid and heavy KR-2, 628 lbs. empty weight. HAPI 1835, 60-2 full electric, basic panel plus venturi powered artificial horizon, (old USAAC unit), full engine monitoring OP, OT, CHT, EGT, MAPI's float bowl

mixture control carb, (throttle and mixture on quadrant, left side cockpit), carb. and cabin heat, NASA vents, white catalyzed acrylic enamel, (complete with a few runs!). FAA signed off for test programs July 10, 1984.

TAXI TESTS: At this point I did not have directional brakes. Started with slow runs and gradually built up to tail lift-off speeds, wore out stock tailwheel trying to control by pinning tail when things got squirrely, new tailwheel and yoke are better. Lost control on a high speed taxi run in late July, bird tried to ground loop, over controlled, after a series of "S's", ran off side of runway, (power reduced to idle), wheels sank in soft dirt and slowly nosed over and shortened my Great American propeller--most embarrassing. A quick call to Tom Criss informed me what I should do: 1) convert to individual heel brakes, 2) let the tail come up on its own and then keep it up, 3) get some taildragger time. Last was hard to do, not a CFI with anything

smaller than a 180 within 150 miles.

After a few rides with local in their taiIdraggers and approx. 1 hour with Ed Nelson, Pinehurst, Idaho in his KR-2, (right seat, hands-on in the air only), I felt minimally ready. Received new Props Inc. 52x46 prop late August, had the heel brakes installed. Did a few "moderate" speed taxi runs to get the feel of handling—now solid, touch of heel brakes straightens it out. Then discovered alum. oxide-urethane paint bonding problem on one blade—sent prop back to manufacturer for repairs—no cost, no hassle—good service. received prop back mid-Sept., but wet weather held me up until late September.

MY CREDENTIALS (or lack thereof): 47, professional forester USFS, all training and time as PIC in Piper Warrior, lifetime total of six rides in taiIdraggers, including Nelson's KR-2, (which was the secret to success), 5.9 hours total as private pilot, and a bit apprehensive.

FIRST FLIGHT: No excuses now. 11:00 am, Sept. 28, 1984, John Day State Airport, elev. 3,700'. I was ready, bird was checked and it was obvious that the half-dozen people there were not going to leave until I flew it. I got in, started up, taxied to runway 09, 3,500' paved, 75 degrees F, E 10-15 mph wind, clear sky, approx. 865 lbs. gross. The apprehension, (read:fear), vanished when the tail came up and I found that I could control it on the main gear at full power, light pressure left rudder.

Held it on until 50 IAS (mph) and felt it was trying to fly, eased stick back and lefted off, easily stabilized it after a couple minor porpoises and flew it to altitude, (6,500'), to get feel, stalls, slow flight and simulated landing approaches. All controls were light. i had detuned the elevator inputs so I did not find the elevator overly sensitive, (1 1/2" greater stick height, elevator cable stick attachments 2 L./4" either side of pivot instead of 3").

About half-way up I retracted the gear and cycled to be sure they would extend and latch in the air. At this time the engine is still tight and have too much prop, (only 2,700 rpm full power, static run-up). Rate of climb gear down 400+ ft/mm @ 80 IAS, gear up yields 500+ ft/mm @ 90 IAS, expect to improve later, this was at no more than 75% power—engine felt like it was lugging.

PRELIMINARY TESTS: Lift-off in under

1,000 feet, electric trim really works--can fly the elevator on trim alone, have to hold slight left rudder on climbout, none during cruise—rudder pressure gets stiff at high speed, stick pressures do not appear to change, (light). Have to hold light amounts of right stick—same at all speeds, believe wings and rigging are true, probably weight off-set, left side, (wheel) is 6 lbs. heavier than right side plus 175 lbs. in the left seat, (simple trim tab should correct).

Weight and balance came out right on, no ballast needed. Stalls clean, power at idle, at 55 IAS, at 45 IAS with 1 or 2 notches flaps and enough power to hold altitude. All stalls are gentle and straight ahead with lots of warning and at a very high nose-lup attitude, nods with light stick shake. Ease ahead on stick and/or more power and its flying again.

Easy to slow fly at 50 IAS, 30+ degree aileron turns are easy down to 60 IAS and require light back stick to hold altitude. Picks up speed fast on shallow desents unless you take off power. Have had it up to 10,000 feet, appears to climb as fast as a Warrior and at no more than 75% power on the KR-2.

Find its tough to come down fast without over-cooling the engine; a power-off spiral works, 1,000 rpm, carb hear, enough back pressure to hold 80-90 IAS yields 1,000+ ft/mm descent. Max speed to date is 160 IAS, approx. 180 TAS at 3,000+ rpm—too much prop. Sheer joy to fly in smooth air, have to slow down to 120 IAS when it gets rough, (for my comfort and peace of mind), still easier to control than a Piper Warrior. Have taken it off at approx. 930 lbs. gross on warm day, 85°F, was a bit sluggish, 300 ft/mm climb @ 80 IAS with gear down, with correct prop and time on engine I expect to load it up to 1050 lbs. gross for flight test and cert, without problems.

LANDINGS: First one: pattern 80 IAS, final 70 IAS, (one go-round just to be sure of alignment and airspeed management), 1 notch of flaps on base leg, 2nd notch on final, 60 IAS at 10-15 ft. over the numbers, (requires a fairly flat approach to keep speed down), power off, held approx. 5 feet off until it stalled on—tailwheel first, then mains, then a few hops, caught it as it left pavement onto gravel, a fast shuffle on rudder and heel brakes straightened it out got it back onto runway for full control down to taxi speed; landing was under 1,000 feet.

Have 14 hours and 17 landings to date. A fast low angle approach with little power, hold far end of runway on top of cowl, (sighting), and it settles on in a perfect 3-point 40 IAS near full stall landing and tracks straight.

If I come in steeper without power and flair to full stall landing, I always hit tailwheel first, then mains and a few hops--a fast shuffle keeps it on the runway and under control.

At this moment it's grounded, discovered bonding problem on prop again, it's back at manufacturer for re-do, including re-pitch to 52x45 at no cost to me, meanwhile waiting for another prop, (spare) to arrive--52x44 maple with metal leading edge.

ENGINE SPECS: 60-80^UF, 3700-7000 ft. ASL: 75-100% power climbout: CHT 400°F, EGT 1350-1400°F full rich. 50-75% power cruise: CHT 350°F, OT 175°F, EGT 1200-1400°F, full control with mixture, adjust for 1300°F. 120 IAS cruise and power desents CHT 300°F, OT 140-160°F, EGT 1300-110°F, OP 60 psi at cruise, 30+ at idle hot.

IMPRESSIONS TO DATE: Beautiful flying ship, easy to fly, do have to manage speed during desents. If I were to do it again I'd use spruce, do the same structural mods and work for 50 to 100 lbs. less airframe weight. I'm not unhappy with the weight I have--am sure that it tracks better when the air gets rough this way--will just have performance penalty when flying near gross weight limit.

1985 ANNUAL KR FLY-IN

The 1985 Annual KR Fly-In will be held at the Riverside Airport in Tulsa, Oklahoma on October 19th and 20th, 1985.

The Fly-In is being held in conjunction with the Tulsa Air Fair and will feature Bob Hoover and the Christen Eagles Aerobatic Team.

Hanger space will be available for all KR's attending and there will be a BBQ for KR builders on Saturday night in the Diehl Aero-Nautical hanger. Limited sleeping bag space is also available for KR builders and pilots at Dan Diehl's shop located across from the airport.

For those who prefer the softer resting of a hotel should contact: Quality Inn 918-321-5201. This hotel is located about a mile from the airport and transportation will be available.

With 4 KR's based on this field and numerous others within short flying range, we expect a very good turn-out.

For further information please contact:

John Forrester
KRNewsletter
303-841-9379

Dan Diehl
Diehl Aero-Nautical
918-299-4444

AIRPORT INFORMATION

Riverside Airport, Tulsa, Oklahoma
ATIS - 126.5
TWR - 118.1
GRD - 121.7

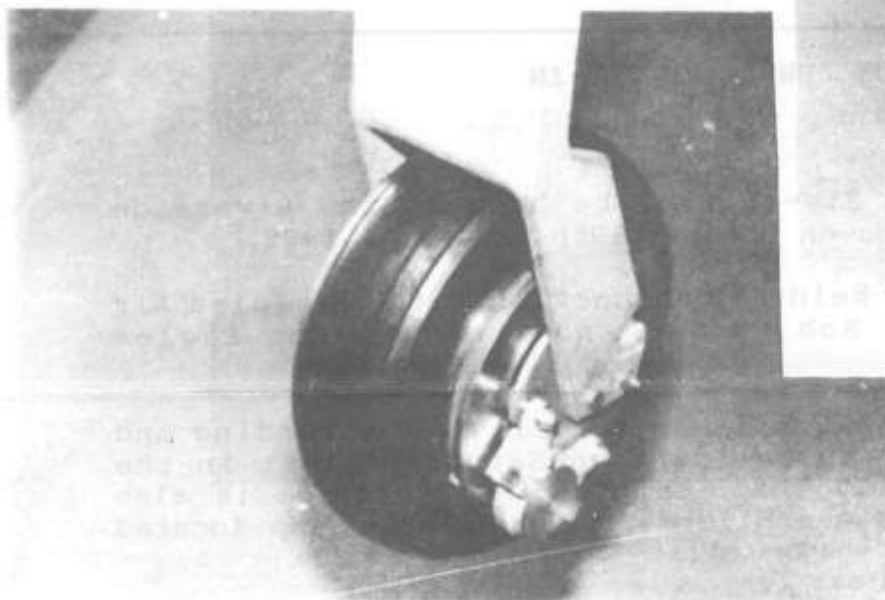
NOTAM: Field will be closed both days from 1:00 pm to 4:00 pm for airshow.

NEW HYDRUALIC BRAKES AVAILABLE

Anyone who has landed a KR fast and needed to use a lot of braking will surely appreciate the latest brakes available from Rand Robinson.

These hydraulic brakes provide tremendous braking improvement and will fit the original gear casting allowing them to be retrofitted to all KR's.

Current price is \$335.00 including tires and tubes and are available direct, from Rand Robinson Engineering, Inc., 5842-K McFadden Ave., Huntington Beach, Ca. 92649. 714-898-3811.



paid advertisement

CAREY ANDERSON IS OPEN AGAIN

Carey Anderson has now completed his retirement from PanAm and his move from California to Missouri.

He has his shop se -up and is again supplying builders with the best machine work available.

You can now reach Carey at:

CAREY ANDERSON
RT. 3, BOX 138-10
STRAFFORD, MISSOURI 65757
(417) 736-2298

UPCOMING ARTICLES

Oshkosh Coverage, Firewall Reinforcement, KR Fly-in Coverage, Rudder Pedal & Brake line installation, Tail Surface Balancing, Better Aileron Weights, plus lots of flight reports, tips, etc!

KEEP INFORMED READ THE KR NEWSLETTER

* The KR NEWSLETTER is published month-
* ly at PO Box 4113, Englewood, Co. *
* 80155, 303-841-9379, John Forrester, *
* Publisher. All back issues available *
* at following rates: 1-12 issues; *
* \$1.00 each, 13-24; .75 each, 25 or *
* more; .50 each. Copyright 1985 *

TRI-GEAR UPDATE

I had originally hoped to have my new tri-gear system available about now, but my illness this summer brought all work to a screeching halt.

Now that I am beginning to see some improvement in my health, I hope to begin work again in the next few weeks, with plans availability in November or December of this year.

The complete gear system, (less retraction linkage), was completed this spring, but during subsequent drop-testing, displayed weakness in the main gear legs. I want this gear to be able to withstand a 4 foot drop at full gross onto 1 gear leg. In trying to save some weight, the main gear was too light, so it is being redone with heavier material. Total gear system now looks like it will weigh about 55 to 60 lbs. installed, which is only about a 5 to 7 lb. increase over the stock gear.

The system uses Rosenhan disc brakes with Lamb tires and steerable nosewheel with a full suspension on all 3 legs. Although original proto-type is manual retraction, it will also be available with electric retraction.

Decisions on whether on not to offer a complete bolt-on system or just plans will depend on response and demand. Plans will be available for \$50.00. Complete system would probably be about \$700 - \$800. It will be an easy retrofit for existing KR's. If you are currently under construction and think you will be wanting to use this gear, please contact me so I can give you some initial construction tips which will make installation of the gear easier.

EPOXY WARNING

Donald Leitch
1695 Ridgewood Dr.
Castlegar, B.C.

On March 14th, I used Devcon 5 mm. epoxy to repair a broken vase for my wife. About 18 hours later I knife trimmed it not being too careful with the trimmings. Later, after lacing up my work boots, I noticed a sharp stab, (from a sliver, I thought), in my left leg. A half hour later I was aware of an overwhelming odor of what smelled like burning wet straw, and within another half hour, I started to

shiver violently from the worst fever I have ever experienced. I had to leave work and get home into a hot HOT bath and bed under the electric blanket, where I stayed for 3 days.

Sometime during the third night, my left leg swelled up and nearly burst! The Dr. placed me in the hospital, and after a series of blood and urine tests, placed me in isolation to try for a cure of some unknown bug. None was found however, and we could only deduce that the sliver that punctured my leg was partly cured EPOXY, and that it caused violent reaction in a system already allergic to epoxies. My high temperature finally subsided after 5 days, but I was unable to return to work for nearly six weeks, and even worse, have been too worried about the situation to get back to flying!

It is now one year since my KR-2 was completed and I thought I had escaped without any adverse effects from EPOXY!

I hope that this note to my fellow composite builders will serve to keep them aware, and healthy!

KR COMPUTER PARTS ASSISTANCE

The KR Newsletter Computer Parts Assistance is available free of charge to anyone wishing to BUY, SELL, or TRADE parts. Simply call or write the newsletter with your request and I'll enter your ad into the computer and help look for a match. 303-841-9379.

FOR SALE___Revmaster R2100 normally aspirated engine. Zero time. D300 Bendix Mags. 12 volt geared starter, oil filter system. 20 amp alternator, rear mounted. Call (714) 626-0562 for details. Alan Watkins.

FOR SALE....KR-2, Revmaster 2100-D: forged crank, geared starter, oil cooler and filter, POSA carb-mixture control, set-screw mod, ball type valve adjust. Positive gear latch. Alpha 200. 170 mph top. 140 cruise at 3,100 rpm. 3.8 gph. 225 TTAE, \$9,000. Further information on request. Dick Holmes, Box 629, Fallon, Nevada, 89406. (702) 423-4770.

FOR SALE....1720 cc VW engine, \$100. R/R 3 blade prop, hub and bolts, excellent condition, \$200. R/R motor mount for VW engine, \$50. Jim Kramer, Osceola, Iowa. 515-342-4450.

CAREY ANDERSON UTEFLITE HARDWARE

Rt. 3, Box 138-10
Stafford, Missouri 65757
(417) 736-2298

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arras & Heitn joints & spacers \$26.*

Landing gear lockbar SPRINGS
mbuse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates
drilled, ready for Camloc \$54. *

upper elevator pulley
bracket \$15*
Assembled

Rudder, elevator
horns & hinges &
back-up plates \$55.*

Aileron bellcranks &
horns complete
Assemblies (24 pieces)
\$87. *

Rudder pedal mount blocks
\$30. *
Control stick assembly per
plans w/mike switch \$75.*

Lower elevator pulley
brackets \$28. assembled*

Aileron pulley brackets
assemblies \$30.*

Quality all material is aircraft aluminum/steel as specifiec
in the KR Construction Plans Book. S.A.S.E. more information.

*postpaid items

KR NEWSLETTER
PO BOX 4113
ENGLEWOOD, COLORADO 80155-4113
ISSUE NO. 121 SEPTEMBER 1985

FIRST CLASS MAIL
US POSTAGE
PAID
DENVER, COLORADO
PERMIT NO 2677



**OCTOBER
1985
ISSUE NO. 122**



KR NEWSLETTER

Rates

USA \$12.00 YEAR

CANADA \$15.00 YEAR

OVERSEAS \$20.00 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



THE KR NATIONAL Fly-In was a tremendous success in spite of the fact that the weather tried it's best not to cooperate.

Although we had 27 KR's committed to attending, the weather which hit that area of the country during the Flyln kept many KR's stranded at various airports thruout the midwest. We did however have 6 KR2's and 1 KR1 that were able to get thru the storms and over 200 builders drove in for the event. Jeanette Rand also came in for the Flyln and presented Dan Diehl an appreciation plaque for his contributions to KR builders. Dan has been a constant source of assistance and inspiration to hundreds of builders and I'm sure that there would not be near the number of KR's flying if it weren't for him.

The weather did allow us breaks from time to time for flying and in addition to getting to watch the KR's making high speed and formation passes, about 40 to 50 builders were treated to their first rides in a KR.

On Sunday the rain moved out completely and we were able to take the KR's out away from Tulsa for some formation flying and photo sessions. I was fortunate enough to take Ron Willocks from KITPLANE magazine up for some photo work and he got some beautiful pictures of 6 KR's stackedup in a vertical line. This picture should appear on the cover of KITPLANE sometime in the next few months. Ron is also building a KR2 and is doing a series of articles on KR's which is appearing in KITPLANE magazine.

The decision was also made to hold the KR Flyln at Tulsa every year at the same time. I will have the exact date soon. Plan early to attend next year.

Jim Passmore, (who's father Bob has a beautiful KR2), videotaped segments of the KR's flying and the forum sessions held and now has copies available. Cost is only \$22.50 postage paid. It is available in either VHS or BETA. Contact Jim at 2302 S. Garnett, Tulsa, Oklahoma 74129 or 9186640428 to order your copy.

Many **KR-2 builders** are now in the process or planning to install an 0-200 engine. In this issue you will find the drawings I have done for a firewall reinforcement for these larger engines.

This is what I am using on my new 0-200 powered KR-2. In addition to these reinforcements I would recommend widening your engine mounts attach points at the firewall. This will better spread the load over the firewall. I am also installing larger gusset blocks around the longerons at the firewall and adding 3/32" plywood skin to the inside of the fuselage from the firewall to the rear spar. I am also increasing the firewall plywood from 1/4" to 3/8".

I am in the process of making a jig for the 0-200 engine mount and once completed I will have mounts available for those who don't want to make their own mount. Should be ready sometime in December.

TRI-GEAR UPDATE

The new reinforced gear leg assemblies and nose gear are complete and have been installed. I have had special springs designed and manufactured for the gear and they have also been installed providing a nice suspension. The retraction system linkages are now being completed and we should have everything completed by December. Technical drawings are now being prepared and should be ready when the gear is completed and tested. I now have indication orders for 15 sets of the tri-gear so we plan to pursue a kit version in addition to the plans.

FLIGHT REPORT KR-2

Gordon Gatenby
23 Bronte Crgs
Bathauhen, N.S.W. 2136
Australia

I have my KR-2 flying and so far have flown 8 hours, having done 9 landings and as many stalls with and without power, with wheels and flaps down and up. The stalls are gentle and well below 40 knots. I can't be more exact but somewhere maybe even around 30 knots the air comes in thru the wheel wells, then the plane shakes, lets a loud moan, stinks of exhaust gas, and then drops or falls gently away about 200 or 300 feet.

I'm using a Revmaster 2100D and a 54" x 52" prop which makes her really jump into

the air and I get to 2,000 ft. quite easily in 3 minutes without heating the engine. I can't tell the revs above 2,900 rpm as I am using a 6 cylinder rev-counter and it reads 33% over, so when she reads 3,500 I know when I am at 1/2 throttle. I have a new counter coming soon.

Wheels up and at 3,000 ft I get an indicated speed of 145 knots.

Cylinder head temp: 450° on climb.

Cylinder head temp: 380°PTO ^{cruise}

Outside air temp: 80°Q, 75°Q @ 3,000

Oil temp: 160°O, with cooler

I am 65 years old and started flying in 1937 and have about 1,000 hours on taildraggers and have flown Gypsy Moths to twin engine aircraft.

I took up flying again 5 years ago, flying Cessna 150's and 172's. The KR-2 is beautifully light to fly. My only criticism is that it takes my wife and I 1 1/2 hours to put the wings on and get ready to fly.

DAN DIEHL'S PRE-MOLDED SKINS

One of the highlights of the KR Fly-In was the chance to view Dan's shop and the molds used for his wing skins. Truly beautiful! It's easy to see why the quality is so good. Dan also now has pre-molded tail-skins available and carries vinyl-ester resins @ \$25.00 a gallon.

The Diehl KR wing skins are vacuum bag molded to insure a good bond between the inner skins and the "Clark Foam" core. The core is made with "Clark Foam" which is used in many aircraft, automotive and marine applications. This core is 1/4" thick. The facings, (inner and outer skins), are one ply each of 6 oz., 7533 bi-directional cloth. The warp fibers, (the ones running spanwise), on the outside facing parallels the leading edge; while the inside facing is applied with the warp fibers paralleling the trailing edge. This "cross-plying" gives good torsional as well as "rip-stop" strength. The skins are "beefed-up" in the areas where the two spars are attached with one extra ply of glass. Because of the inherent strength and stiffness built into the skins, it is not necessary to add more length to the spars.

The skins are slightly longer than the stock wing. The 23 ft. 6 inch span will increase the climb rate and will provide better performance of the the KR, especially the heavier ones at 600 lbs or more. Slight modification of the spar is required. (ed: we will cover these modifications in a upcoming Newsletter).

We recommend you put plywood on both fore and aft sides of the spar and cut the overall height at the tip to 4 15/16". The wing is slightly more tapered than the stock wing. The "plyfoam" web supplied in the kit is quite acceptable as a wing spar extension.

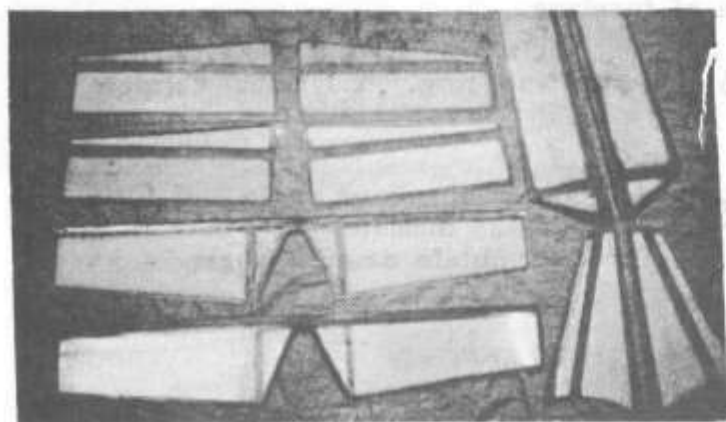
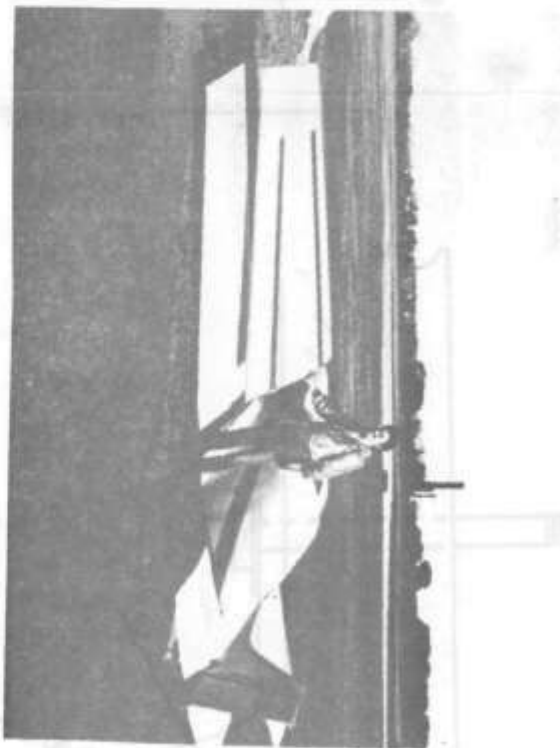
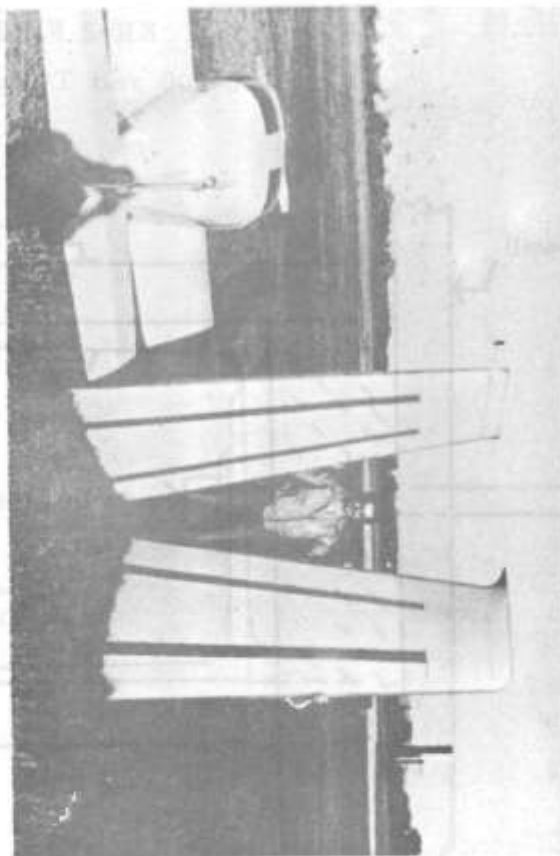
A sheet of "plyfoam" is supplied with the skins and all the ribs are stenciled on it. Simply cut out the ribs and glue them in place. Foam ribs are not used and complete "foaming" of the wing is not done. The only parts required from the Rand kit are the spars and attach fittings.

The skins are made in female molds which leave a mirror slick finish on them. To paint the skins requires only sanding with 180 grit to give the primer some "teeth" to stick to. Two people and one good weekend should enable you to finish a wing.

Also now offered are the pro-molded fiberglass "tail feathers" for the KR-1 and KR-2. They are made with the same technique as the wing skins. They come as a top and bottom half for the elevator and horizontal stabilizer. The vertical stabilizer and rudder are right and left halves. The elevator top and bottom are one piece, right and left. In all there are 10 pieces. They fit the standard KR spars and can be purchased separately. Prices are as follows:

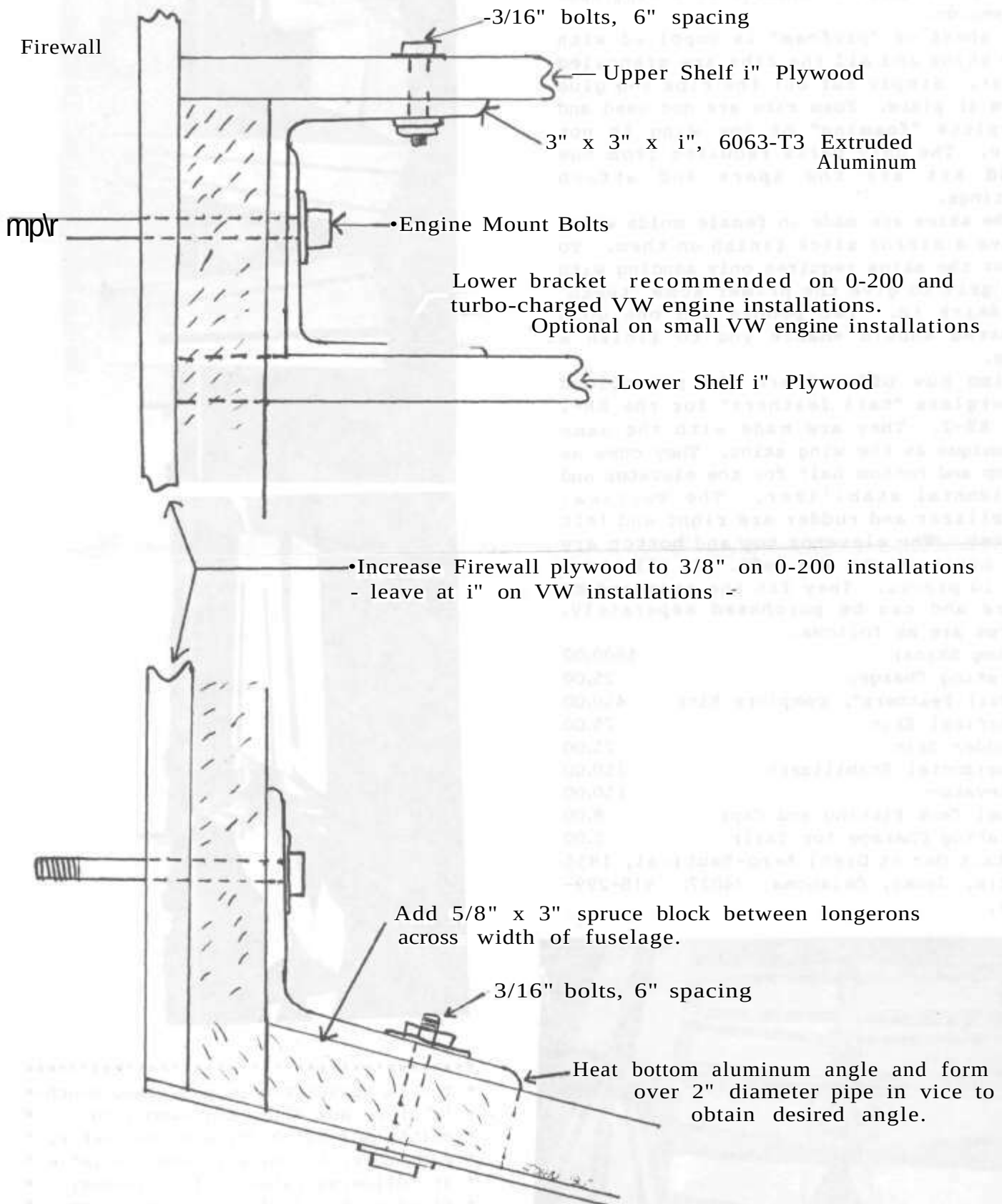
Wing Skins:	\$800.00
Crating Charge:	25.00
"Tail Feathers", complete kit:	450.00
Vertical Skin	75.00
Rudder Skin	75.00
Horizontal Stabilizer:	150.00
Elevator:	150.00
Fuel Tank Fitting and Cap:	8.00
Crating Charge for Tail:	5.00

Contact Dan at Diehl Aero-Nautical, 1855 N. Elm, Jenks, Oklahoma 74037. 918-299-4444.



 * The KR NEWSLETTER is published month-
 * ly at PO Box 4113, Englewood, Co. *
 * 80155, 303-84]-937^, John Forrester, *
 * Publisher. All back issues available *
 * at; following rates: 1-12 issues; *
 * \$1.00 each, 13-24; .70 each, 25 or *
 * more; .50 each. Copyright 1985 *

KR-2 FIREWALL REINFORCEMENT 0-200 and Turbo-charged Engine Installations



NEW HYDRUALIC BRAKES AVAILABLE

Anyone who has landed a KR fast and needed to use a lot of braking will surely appreciate the latest brakes available from Rand Robinson.

These hydraulic brakes provide tremendous braking improvement and will fit the original gear casting allowing them to be retrofited to all KR's.

Current price is \$335.00 including tires and tubes and are available direct, from Rand Robinson Engineering, Inc., 5842-K McFadden Ave., Huntington Beach, Ca. 92649. 714-898-3811.



paid advertisement

FOR SALE___Revmaster R2100 normally aspirated engine. Zero time. D300 Bendix Mags. 12 volt geared starter, oil filter system. 20 amp alternator, rear mounted. Call (714) 626-0562 for details. Alan Watkins.

FOR SALE....KR-2, Revmaster 2100-D: forged crank, geared starter, oil cooler and filter, POSA carb-mixture control, set-screw mod, ball type valve adjust. Positive gear latch. Alpha 200. 170 mph top. 140 cruise at 3,100 rpm. 3.8 gph. 225 TTAE, \$9,000. Further information on request. Dick Holmes, Box 629, Fallen, Nevada, 89406. (702) 423-4770.

FOR SALE....1720 cc VW engine, \$100. R/R 3 blade prop, hub and bolts, excellent condition, \$200. R/R motor mount for VW engine, \$50. Jim Kramer, Osceola, Iowa. 515-342-4450.

KR COMPUTER PARTS ASSISTANCE

The KR Newsletter Computer Parts Assistance is available free of charge to anyone wishing to BUY, SELL, or TRADE parts. Simply call or write the newsletter with your request and I'll enter your ad into the computer and help look for a match. 303-841-9379.

FOR SALE___52 x 48 prop with stainless steel leading edge brand new. Cost \$350, will sell for \$250. Also Hapi engine mount for KR-2 - brand new - \$75. Glenn Brooks, Hazelton, Idaho 83335. 208-829-5174.

WANTED...KR-2 project, prefer boat stage finished. Engines and misc. parts also. Ray Loukinen, 195 W. Glenn, Coalinga, Ca. 93210 209-935-3847.

CAREY ANDERSON
UTEFLITE HARDWARE

Rt. 3, Box 138-10
 Stafford, Missouri 65757
 (417) 736-2298

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Heim joints
 E. spacers \$26.*

Landing gear lockbar SPRINGS
 mouse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates
 drilled, ready for Camloc \$54. *

'Upper elevator pulley
 bracket \$15*
 Assembled

Rudder, elevator
 horns & hinges &
 back-up plates \$55.*

Aileron bellcranks *
 horns complete
 Assemblies (24 pieces)
 \$87. *

Rudder pedal mount blocks
 \$30. *

Control stick assembly per
 plans w/mike switch \$75.*

'Lower elevator pulley
 brackets \$28. assembled*

Aileron pulley brackets
 assemblies \$30.*

Quality...all material is aircraft aluminum/steel as specified
 in the KR Construction Plans Book. S.A.S.E. more information.

*postpaid items

KR NEWSLETTER
 PO BOX 4113
 ENGLEWOOD, COLORADO 80155-4113
 ISSUE NO. 122 OCTOBER 1985

FIRST CLASS MAIL
 US POSTAGE
 PAID
 DENVER, COLORADO
 PERMIT NO 2677



ISSUE NO. 123
JULY
1986

1985 KR NEWSLETTER

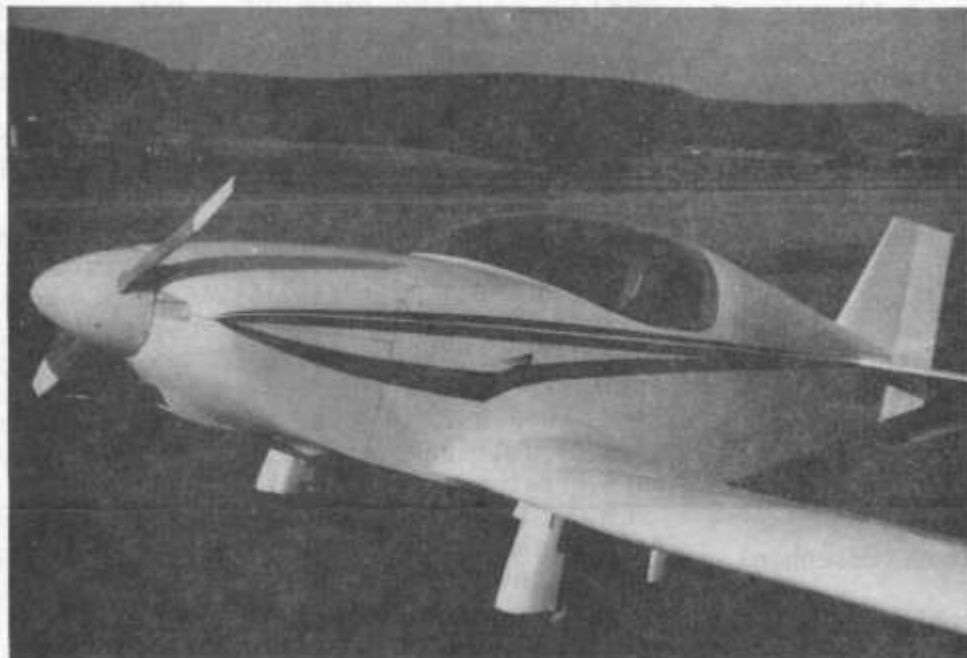


KR NEWSLETTER

Rates

USA \$12.00 YEAR
CANADA \$16.00 YEAR
OVERSEAS \$20.00 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



KR-2

Gyke McCardle
100 S. Logan Blvd.
Burnham, Pa.

Empty Weight: 589 lbs.
2100cc Engine
Flaps
Speed Brakes
First Flight: Oct. 1984

WELL HERE I am running several months behind again on the Newsletter. No excuses, just an explanation.

As most of you know I suffered a severe illness last summer which originally got me behind on the Newsletter. I was making very good progress by the KR Fly-In and had most of the feeling and control back in my arm and hand. I was even able to fly myself to the Fly-In. I thought things were going to continue getting better, but I was wrong.

A couple of weeks after the Fly-In the disease attacking me came out of remission and dealt another major blow. Although the doctors finally got it back under control, I suffered very severe nerve damage this time and they don't know if I'll ever get full feeling back again in my hands and left arm.

To top it off, I had just started a new business which was demanding lots of time. I am once again regaining some control and feeling in my hands and am able to resume working on the newsletter and hope to complete my new KR-II soon.

I'm told that each improvement may be as good as I ever get again and it has really brought home the reality of how fragile life is. I think I'm learning that each day must be lived to it's fullest and if you want to accomplish something you better do it now, because you may not be able to later.

Thank you all for your support and understanding during this difficult time.

Now let's get on with the KR's!

TRI-GEAR UPDATE

Work has resumed on the tri-gear system and it should be complete by the time you read this.

I have already received orders for 15 gears so the decision has been made to market both plans and kits. Those of you who don't want to perform any welding will still be able to use the gear.

The gear will retrofit all existing KR's with the stock width between the spars and will work with any engine mount.

FLIGHT REPORT

KR-2 N34BL

BenLudtke

SH 3614 Catlin Rd.

Loyal, Wi. 54446

There are some modifications necessary to the airframe and controls in addition to the slot and tunnel in the front floor for the nosewheel.

If you plan to use the tri-gear and are still in the construction phase, here are some items to assist you in planning.

* Don't mount the outer main spar cable pulleys yet. They will have to be moved into the cockpit.

* Make or buy another set of the aileron bellcranks. Go ahead and mount the stock set on the rear spar end as normal.

* Make or buy another rudder bellcrank.

* Don't install the elevator cables yet.

* If you haven't made your firewall yet, make it out of 3/8" instead of 1/4". If you have already installed a 1/4" firewall, laminate a piece of 3/32" plywood across the face.

* Mount your rudder pedals from the bottom of the firewall shelf.

* Don't install the forward floor yet.

Plans price has been set at \$50.00 and the complete kit price will be \$815.00 which will include the plans. The kit will include:

- * Main Gear Struts and Nose Gear Struts
- * Nose Wheel and Tire (Azulite)
- * Main Wheels and Disc Brakes (Rosenhan)
- * Main Gear Tires (Lamb)
- * Retraction and lock assemblies
- * Suspension Springs
- * Firewall plates
- * All attachment plates, bushings, etc.
- * Complete control modification plans.
- * Nose-Wheel Steering

Recently Steve Alderman and I decided to do some timed climb performance in his KR-II. Steve's aircraft is equipped with a Revmaster 2100D turbo and a Maloof 2-speed prop. Empty weight is 605 lbs. With the two of us and fuel we weighed 1,075 lbs. Temperature was 45°F.

Indicated airspeed of 170 mph resulted in 180 mph true at 32" manifold pressure and 3200 rpm.

Timed climb was begun at 6,500 feet at 35" inches of manifold pressure and 3500 rpm. One minute timed climb resulted in a climb rate of 850 fpm. Not bad!

Steve is now getting ready to install an O-200 which should make this already fast bird a real screamer.

My Kr-2, N34BL, was finished last September, but before I could get it to the airport and elderly Uncle came to see it and had an unfortunate accident. He pulled up to my closed garage door, reached for the brake, but hit the accelerator instead. The auto hit the garage door, pushing it into the KR and nearly falling onto it. Damage was considerable, but could have been much worse. I don't know who felt worse, my Uncle or me.

Having wood to cut for winter and other commitments I had to put off repairs till after the holidays.

N34BL is powered with a 1835 Hapi with electrics, dual ignition, and a SuperCarb. It has a Great American, 52x46 prop. Mods include Diehl wing tips, DeFreeze canopy, wing tanks, rollover bar, 22" greater wing span, flaps and electric trim. I also installed a NASA type air vent on each side of fuselage. Small, but they really work great and are quiet.

Empty weight is 540 lbs. with CG near front limits, which I think is great as any weight added goes to the rear except fuel in the main tank, (9 gallons).

I have heard many comments on the handling qualities of KR aircraft on the ground and in the air. Mostly good, but now and then a bad report. I concluded after flying mine that if you take the time to build them right, they will handle beautifully.

I had less than 60 hours total time when I flew my KR. It had been four years since I had flown when I got checked out this spring. No taildragger time, except about 45 minutes with a friend of mine in his Luscomb. I taxied slow and fast about 4 hours, lifting off several times. The hardest part for me was not being able to see over the nose. Maybe I shouldn't talk about my limited experience as it could give some a false sense of security as I do consider luck in my favor and a little prayer didn't hurt either.

Anyhow, my KR was inspected May 7th and was ready to go. I wasn't ready though and didn't fly till May 22nd. Temperature was about 70°F. Winds light and variable. I made one run down the 5,000 foot runway and knew it had to be now. Everything went perfect.

- 8 - Removable custom turtle deck with 3 windows for 360° visibility.
 - 9 - Long-Eze type Whelan position/Strobe lights on wing tips.
 - 10 - Dual landing lights.
 - 11 - All antennas glassed in, ala RST Labs Com in vert, stabilizer; Nav/GS in outer left wing; Marker Beacon in rear right wing; Transponder in outer right wing leading edge. All work just fine.
 - 12 - Two props: Climb - Hoffman; Cruise - Warnke "Almost Constant Speed".
- Pilot: Tail Dragger "Driver" since 1945. Most recently, 75 hours in New F-21 Taylorcraft.

General Impressions:

- 1 - Limbach engine - "The" most respected item in the whole aircraft, next to my King Nav/Com. Strong, reliable, certified (Europe), economical (2.85 gph @ 3,000 rpm).
- 2- KR-2 - A fine little airplane; responsive, stable, fast and fun. GUARANTEED to quicken the heartbeat everytime you land it.

Now have 13 hours on 81NB. Took to 11,000' MSL this morning, (7/13/85). Still getting 400 fpm @ 11,000! Will go higher tomorrow. Have done no rerigging or trim, (except pitch which is per plans).

Gear is easy to retract which I do about 200' to 300'. Gear down by hitting lever and gear locks down in one 1/2 second motion with an audible "klunk".

FOR A GOOD interview article with Jeanette Rand which covers some KR history see the March/April, 1986 issue of "Sport Pilot" Magazine.

NOTICE TO KR'S FLYING TO OSHKOSH. LETS TRY TO GET OUR OLD ORIGINAL PARKING SPOT BACK THIS YEAR. THE AREA WHERE THE VARI-EZE'S HAVE BEEN PARKING THE LAST COUPLE OF YEARS, (IN FRONT OF THE CONTROL TOWER) IS WHERE WE WOULD LIKE TO BE. THE FIRST KR'S COMING INTO OSHKOSH SHOULD MAKE A STRONG EFFORT TO PARK THERE AND HOPEFULLY WE WON'T BE STUCK OFF AT THE END OF THE FIELD AGAIN.

ANOTHER WORD TO Oshkosh bound flying KR's. Many of you will be flying your KR to Oshkosh for the first time this year and for some it is the first time flying into unfamiliar airports along the way. The last couple of years we have lost some pilots because they got into trouble at unfamiliar airports. Don't make stupid mistakes! If you still need a lot of runway to get down, don't plan stops at short fields and watch out for tailwinds and crosswinds when landing. Don't try to impress the locals with your superior climb-outs and lets all get to Oshkosh and home safely this year.

KR INSURANCE

As most of you know it is impossible to obtain hull insurance on a KR and very difficult if not impossible to obtain liability insurance.

Hopefully this may soon change. I have taken the KR insurance problem to Mark Williams at Avemco Insurance and as a result Avemco has finally agreed to review the KR status and may possibly begin to insure KR's.

One of the major reasons for difficulty in insuring KR's stems from their accident record.

I have obtained the FAA accident report on KR's from January 1980 to March 1986 and a review of this report shows 104 accidents and/or serious incidents involving KR's during this period. They break down into the following catagories:

Engine Failure:	34
Lost Control on Ground:	16
Lost Control in Air:	13
Forgot to Lower Gear:	9
Unkown Cause:	8
Landing Gear Failed:	6
Ran out of Fuel:	5
Prop Failure:	5
Mid-Air Collisions:	3
Canopy came off:	2
Rudder Hinge Failure:	2
Controls Jammed-Foriegn Object:	1

Reading the report shows that most of these accidents were the result of poor builder/pilot judgement and/or construction methods and could have been prevented. PLEASE DON'T TAKE SHORT-CUTS!! DO IT RIGHT -- OR DON'T DO IT AT ALL.

Gross weight for flight was 754 lbs. Stall is about 50 mph indicated, with a burble over the wings before the break, which is gentle with wings level. Airspeed at 3,200 rpm seems to be about 140 mph indicated. Oil temp: 180°, CHT: 325°.

I had a HEGY 52x42 prop on the front for awhile. It really got off and climbed, but sure lacked speed. I had no trouble with pitch sensitivity, probably because the KR Newsletter had me well prepared for it. The standard gear latch does give me some problems trying to stay level and work the gear at the same time.

I now have 20 hours flown off and have had few problems. I did have a flat tire discovered just before take-off one day. Also had starter problems. It broke a bushing on the Bosh starter.

It took me 5 years and about 2,000 hours to complete my KR. I think it was time well spent as I'm sure I would have wasted at least half of this time if I hadn't had this project.

To sum it up, build it right and it won't let you down. It really flies great and ground handling is easy too, once you get used to the reduced forward visibility of a taildragger.

FLIGHT REPORT KR-2 N81NB

Neil Bingham
1333 N. Oakridge Dr.
Centerville, Utah 84014

Empty Weight: 610 lbs.
Engine: Limbach L2000E01, 80 Horsepower
Prop: Hoffman H011A-135 B 901 (53 x 35)
Test Weight: 866 lbs.
Air Temp: 78F
Wind: Calm
Runway: 4700' paved
Field Elevation: 4222' MSL
Date/Time: July 4, 1985/ 6:45 AM

After 3 years build time, 4 1/2 hours taxi time and 4 tail-up runs down the runway, eased in throttle to 2,500 rpm. Tail up at about 35 mph, line up on center line and ease in rest of throttle. Much left rudder to hold straight, hold on runway to 60 mph, ease off slight forward stick pressure and off she comes.

Climb out at 1,000 fpm and 80 mph indicated. Very smooth and total control.

Attain pattern altitude, (5000 MSL), and start x-wind. Leave gear down and flaps up on down-wind. Make two 130 mph indicated low passes with no flaps, gear down and no flaps, gear down and cowl flap open.

Fly lake shore-line for a few minutes getting used to such a responsive machine. Cruise at 3,000 rpm and 90 mph indicated. CHT - 350°F, (about 25° difference between 1 & 3 / 2 & 4). Oil pressure • 38 psi, fuel pressure - 1.9 psi, oil temp - 225°F. Did gentle power on slow flight to determine V_s . Appears to be about 50 indicated. Very well controlled into back side- of power curve. No real stall, losing 250 fpm, nose up, full aileron control, no wing drop. It NEVER stalls, or slips off into spin/spiral.

Back to the airport for a landing try. Downwind at 85, pull in 11° of flaps. Pull in 2nd notch of flaps, 27°, on base and full flaps, 44°, on final. Flare is too high, go around. Dump flaps slowly as Limbach pulls us back to 80 mph and 900 fpm.

This time over the fence at 70 indicated, trimmed for slightly nose high, (visibility still very good • flaps are worth about 8-10 mph. Important, but not nearly so, as the forward pitch it offers for a view of ALL the runway right down to flare for 3 point).

Settle into ground effect carrying 1,800 rpm. Chop throttle, hold 'er off, hold 'ef off - mains touch first, tail next, stick steady, walk the rudder pedals to keep 'er straight. Turn off at 2nd exit. Canopy open for better visibility and fresh air. Pull into tie-down area, gentle left brake, gentle throttle, it comes around like a Pitts! WHEW!!!

Some of the mods/additions to Ken Rand's original design include:

- 1 • Full panel for IFR, except ADF.
- 2 - 13 1/2" longer, 18" more wingspan.
- 3 - Dual controls, including heel brakes.
- 4 - 100° balanced control surfaces.
(Have had it to 205 true with no indication of flutter).
- 5 - King avionics include KX-155/KI-209 Nav/Com/GS, King transponder with blind encoder, King Mkr. Ben.
- 6 - Wing tanks (in center section, 5 gal. each side). Facet transfer pump.
- 7 - Removable forward deck/14.5 gal. main tank.

General Aviation
Parts & Supplies

Experimental
Aircraft Kits



- Composite Supplies
- AN Hardware
- Instruments and Radios
- Propellers
- DIEHL "SUPERCASE"
- "THE STING" Tuned Exhaust Systems
- **FAST** ~ AIRCRAFT ENGINES

THIS MONTH'S SPECIAL SALE

**** **FAST-FOAM** ****
A 2 part, 2 lb. density
polyurethane foam. The BEST
for fastening & filling foam.
\$22.00 (2-quart kit)

CATALOG \$3.00

P.O. BOX 4113
ENQUEWOOD, CO 80155



(303) 693-8230

FOR SALE....KR-II, 99% complete. Not flight tested. HAPI-60-2 engine, Warnke constant speed prop. Fiberglass body, Hangar trailer and storage. \$6,000. Will deliver. 206-352-1172 collect after 5 pm. Bill.

FOR SALE—KR-II project, on gear, most foam work left. Whelen Nav and strobe lights, extras. Moving overseas. \$1,600. 805-258-6662.

FOR SALE....KR-II, MAPI engine, 0-time, runs smooth, 0-time airframe. Nice. 503-756-4979.

FOR SALE....KR-II and Revmaster 1834, dual ignition, alternator, starter, ground adjustable prop, instruments, lights. Needs completion work. 813-936-3752 Roy.

FOR SALE...0-200 GPU. Complete except for exhaust stacks. 7 hrs. since major. \$1,500. Bob Hill, 405 Saratago, Kingsford, MI 49801. Will crate.

WE'RE MAKING FLYING AFFORDABLE AGAIN

FLIGHT TRAINING

- * 40 Hr. PRIVATE PILOT COURSE \$1,650
(includes all materials & ground school)
- * INSTRUMENT PILOT COURSE \$2,345
- * Biennial, Pinch Hitter & Advanced Courses Available

AIRCRAFT SALES

FLIGHTHAWK is an authorized PIPER Sales Agent and we're prepared to give you the best deals anywhere on new and quality used aircraft. Guaranteed leasebacks available.

MAINTENANCE

Our Quality-Oriented maintenance shop can handle all your aircraft maintenance needs. Come experience the difference excellence makes.

FLYING CLUB

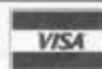
- * Reasonable pilot qualifications for aircraft rental
 - * FREE Computer Flight Planning Center
 - * FREE Computer Weather Center
 - * Discounts on Pilot Supplies
 - * Reasonable Rental Rates
- | | |
|-------------------------|--------------------------|
| C-152's "with intercom" | \$22.00 @ Hr. (WET) |
| C-172's IFR | \$36.00 @ Hr. (WET) |
| C-150 "Taildragger" | \$30.00 @ Hr. (WET) |
| T-310 | \$60.00 (cD Hr. i) (DRY) |
| Warriors | \$42.00 @ Hr. (WET) |
| ATC Simulator | " \$12.00 Hr. |
- * Block Discounts and Non-Member Rental Available
 - * New Aircraft arriving monthly

MAINTENANCE CLUB

We have developed an innovative program that can save you up to 40% a year on your aircraft maintenance. Aircraft in this program pay only \$16.70 @ Hr. labor and receive up to 25% off on parts.

FHahthawk
INTERNATIONAL, INC.

FRONT RANGE AIRPORT
(East Denver Metro Area)
5100 Quail Run Road
Watkins, Colorado 80137-0006
303/367-4000



CAREY ANDERSON

LITEFLITE HARDWARE

Rt. 3, Box 138-10
Strafford, Missouri 65757
(417) 736-2298

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Heim joints & spacers \$26.*

Landing gear lockbar SPRINGS
mbuse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates
drilled, ready for Camloc \$54. *

'Upper elevator pulley
bracket \$15*
Assembled

Rudder, elevator
horns & hinges s,
back-up plates \$55.*

Aileron bellcranksf,
horns complete
Assemblies (24 pieces)
\$87. *

Lower elevator pulley
brackets \$28. assembled*

Aileron pulley brackets
assemblies \$30.*

Control stick assembly per
plans w/mike switch \$75.*

Rudder pedal mount blocks
\$30. *

Planning to purchase the Rand-Robinson #4 Aluminum Extrusion Kit? Let us save you time and money. Miniature Metrics will pick up the kit from Rand-Robinson, perform necessary machining and return to Rand-Robinson for shipping. Parts will be cut, milled, drilled and shaped. Send us a S.A.S.E. for more information.

Quality...all material is aircraft aluminum/steel as specified in the KR Construction Plans Book. S.A.S.E. more information.

•postpaid items

KRNEWSLETTER

PO BOX 4113

ENGLEWOOD, COLORADO 80155-4113

ISSUE NO. 123 JULY, 1986

FIRST CLASS MAIL
US POSTAGE
PAID
DENVER, COLORADO
PERMIT NO 2677



ISSUE NO. 124
AUGUST
1986



KR NEWSLETTER

Rates

USA \$12J00 YEAR
CANADA \$1500 YEAR
OVERSEAS \$20.00 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



FLIGHT REPORT
N600MJ KR-2

Mark Jones

14 Westwind Dr. Caribou, Maine 04736

Construction Time: 3-21-84 - 9-5-85
1500 hours.
FAA Inspection: 9-25-85
First Flight: 9-29-85
Engine: Revmaster 2100D
Prop: 52 x 52 Warnke
Weight: 580 Ibs.

seem like a lot of taxi testing, but I wanted to be very comfortable with ground handling before any flight, (surprisingly very little tire or tailwheel wear)

The big day came on Sunday. Breakfast with the rest of the airport bums and 3 takeoffs and landings in the FBO operators personal Champ and then came the wind. It took 8 hours for the wind to die down. I had plenty of time to check and recheck all systems. In preparation I took two taxi runs and I was ready.

Taxi test went very well considering I had no tailwheel time I made about 50 runs on a 3000' runway, progressing very quickly to lifting the tail. This may

(Continued on Page 4)

CUTTING, TRIMMING, & DRILLING YOUR PLEXIGLASS CANOPY

- (1) Protect the canopy before you begin.
- (2) Clean the canopy.
- (3) If you use masking tape, remove it IMMEDIATELY. If masking tape is left on it, it will etch into the plexi and ruin it.

Tools you will need:

Drill Motor

#40 drill bit

Abrasive disc-Norton Pt. no. OBN A2, 4" to 6" diameter., .035 thick OR

ZIPPIDI-DO disc - available at most hardware stores.

Proto Tool 1/2" dia. conical grinding stone.

Belt sander

Cutting & Trimming Techniques:

First, install the abrasive disc on a small mandrel and chuck it up in a drill motor. A 1/4" or 3/8" variable speed drill seems to work the best.

Begin by practicing on the forming flanges first to develop your technique. The basic idea is just to grind your way through. The best way is to use the edge of the disc and move around the part, scoring the trim lightly where you have marked the trim line on the Plexiglas.

Repeat this process, each time deepening the score line. This doesn't take very long and very shortly you will begin to break through. At this point just grind gently, opening the cut as you go.

Take your time and make sure the disc doesn't jump out. You should have several other hands supporting the part as you are trimming to avoid binding. Repeat the process for the final trim line also.

The beautiful thing about the abrasive disc is that it is sanding the edge as it cuts through.

If you have a belt sander, you can use it to take the Plexi down to your final trim line. Use a coarse grit belt and it will surprise you how fast the sander cuts.

Drilling Techniques:

It is recommended that the Plexiglas be allowed to "float". At the points where attach the Plexi to your canopy frame you should drill a larger diameter hole in the

Plexiglas. For an 8-32 or 10-32 screw use a 1/2" dia. hole. Get an egg or conical shaped 1/2" dia. grinding stone and use this in your drill for drilling holes.

Most hardware stores handle some brand of high-speed grinding and engraving tool similar to the Proto Tool. Use the grinding stone accessory.

If you desire to fit the canopy to the frame before the final trim and before drilling the 1/2" holes, use a #40 drill bit for a pilot hole and a 3/32" cleco for the preliminary fit-up. When drilling with the #40 bit, use a high-speed drill and don't force the bit. If you use just enough pressure to feed, there isn't too much danger of cracking the Plexi.

If the bit is allowed to "grab" at any time you can be assured the Plexi will crack.

There are several other tools you can use for cutting and drilling Plexiglas, but I have found that these do the best job as far as eliminating the possibility of cracking your canopy.

Optional Cutting Tools:

Router with 1/8" double flute wood bit.
Band saw with a fine tooth blade.

NEVER USE A SABER SAW OR A JIB SAW!!

Clean canopy with Kerosene and wash the Kerosene off with water.

JACK FYFE, a long-time KR-2 pilot and a very close personal friend was killed in the crash of his KR-2 on the way to Oshkosh this year.

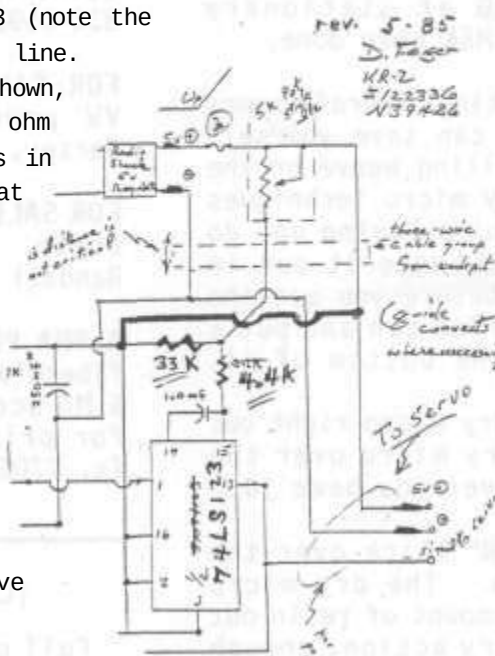
Many of you will remember Jack's wonderful article printed last year in the KR Newsletter about his flight from Anchorage to Oshkosh to Denver and back to Anchorage.

He was trying to make an emergency landing on a Canadian highway following a severe vibration caused by either prop failure or the leading edge tape on the prop coming loose. While trying to avoid traffic, he stalled and crashed.

Jack will be missed, but always remembered with admiration.

I discovered that a gremlin crept into the circuit skematic for the Digital-proportional Electric Trim Tab Controller I submitted and you included in the KR Hewsletter #116, Feb. 1985. Please include the following correction in the next newsletter.

Add wire to supply 5v+ to 1C #74LS123 (note the new 1C number) as shown by the heavy line. Also add the 33k 1/2watt resistor as shown, and change the 2.2k resistor to 4.4k ohm 1/2-watt (wire in two 2.2k ohm resistors in series). With luck you will find that the servo will be center when the 5k ohm control pot is centered and travels equally in each direction. If not then the 33k and 4.4k values will need to be changed up or down (substitute in variable resistors of greater value, adjust to get ideal servo-travel, remove the resistors, measure their values and wire in permanently 1/2-watt resistors of the closest value you can get to the above readings. Sorry for the 'glitch' !
Dave Feiger KR-2 39426



TRI-GEAR UPDATE

QUESTIONS& ANSWERS

Q. Should the firewall be at right angles with the top longeron and is the engine line of thrust off set any to the right or left to compensate for drift?

A. The firewall should be at right angles with the top longeron. Engine should not be mounted with any offset.

Q. Should the vertical fin be offset right, left or none?

A. It should not be offset at all.

Q. I would like to make my fuselage fuel tank removeable for servicing. Will this effect the strength of the fuselage?

A. As long as you don't cut into or delete any of the standard fuselage structure below the top longeron you'll be alright. The structure above the top longeron does not carry structural loads, only air loads.

THE NEW KR tri-gear has suffered a setback to planned production due to "product liability fear".

As many of you know we had special springs designed and manufactured for the gear. The company which made the original springs went out of business this summer. After several months of hassles we got our jigs back and began to talk to other companies about making them. As soon as they find out they are for a experimental aircraft they scream liability and refuse to make them.

This has forced us to redesign the gear to try to use "off-the-shelf" springs and will result in a delay in production.

If you have received the information sheet you will be receiving updates as they occur. As always we insist that NO MONEY BE SENT YET. We will place your name on the production list, but don't send any money till we're ready to ship your gear.

The KR Newsletter is published monthly by the KR NEWSLETTER, PO Box 4113, Englewood, Colorado, 80155, John Forrester, Publisher. All back issues are available at following rates: 1-12 issues; \$1.00 each. 13-24 issues; .75 each. 25 or more;

QUICK TIPS

IF YOU'RE HAVING trouble marking aluminum with a visible mark that stays until you're finished try "SHARPIES" colored markers. They are available in several sizes for under \$1.00 at stationary stores. Clean off with MEK when done.

FROM REX TAYLOR at Viking Aircraft comes the following tip. You can save yourself an awful lot of time **filling** weave on the wing with the simple dry micro techniques that we tried...when you're laying up, do the wet out, lay up, squeegee it out in the normal manner, but before you use the peel ply, get a 2 lb. coffee can and put a lot of tiny holes in the bottom of it, (about 1/64" diameter).

Fill it up with pure dry micro right out of the bag, and shake dry micro over the whole surface of whatever you have just finished squeegeeing.

Put a layer about 1/8" thick over the top of the whole layup. The dry micro will pull up a certain amount of resin out of the layup by capillary action, enough to **fill** up the little depressions between the seave.

You come back to it the next day after it is dry, sweep up the loose, dry micro into a pile, put it back into your shaker sieve and shake it back into your bag to take out any lumps.

Then just take dry sandpaper and do a little light sanding and presto, you've got a lightweight, smooth surface.

EPOXY BRUSHES can be cleaned up with lacquer thinner immediately after each layup.

THE CONTROVERSY concerning use of auto gas continues. In addition to several reports of vapor lock when used in VW conversions come more reports of fuel tanks dissolving.

Many oil companies add TOLUENE to their fuel. This is a very strong solvent. While it doesn't pose a problem for metal tanks, IT WILL eventually eat up a epoxy tank.

Several accidents have been directly linked to epoxy fuel tanks beginning to breakdown and plug the fuel lines with dissolved epoxy.

FOR SALE...KR-1 Kit, 45% completed, good workmanship, some engine instruments. All goes for \$2,000. Call Kim, 405-255-5207.

FOR SALE...KR-1, 405 Hours TT, 1600cc VW engine, Terra TX720 radio, reliable, well maintained, always hangared, \$4,000. 402-334-8598.

FOR SALE...KR-2, finished but never flown. VW powered, must sell. \$4,500. New Jersey, 201-423-0306.

FOR SALE...Revmaster 2100D, new, still in crate. \$2,800. Emmet Arneson, 170 W. Randall Rd. Carroll, IA 51401.

ALPHA PLASTICS has big savings on foam, fiberglass, epoxy and carbon fiber. VISA & MC accepted. 713-780-0023. Send SASE for price list. 8734 Daffodil, Houston, Tx. 77063.

(Continued from Page 1)

Full power, let the tail come up on its own and before I knew it I was off and climbing. I climbed to 3000 ft., circling the airport and did some stalls, gentle and straight ahead, airspeed about 45 knots.

With the stalls complete it was time to retract the gear and see what she would do. 160 knots! I could hardly believe it. I reduced power and had to lower the gear to keep airspeed down during descent. Entered downwind and flew a wide long pattern for a practice approach. I was high and fast so next time around I went out a little further. I was still high and fast and decided to go around within 5' AGL of the runway. When I pushed the power in the engine sputtered, I sunk in and scratched a wing tip and after a few other maneuvers not in the flight instruction manual the engine took off and I was flying again. Last try, long, long, flat final, touched down in perfect 3-point.

To date I have 10 hours flight time and 15 landings with no problems. To those of you still building, do it, you'll not regret one hours work once you're in the air.

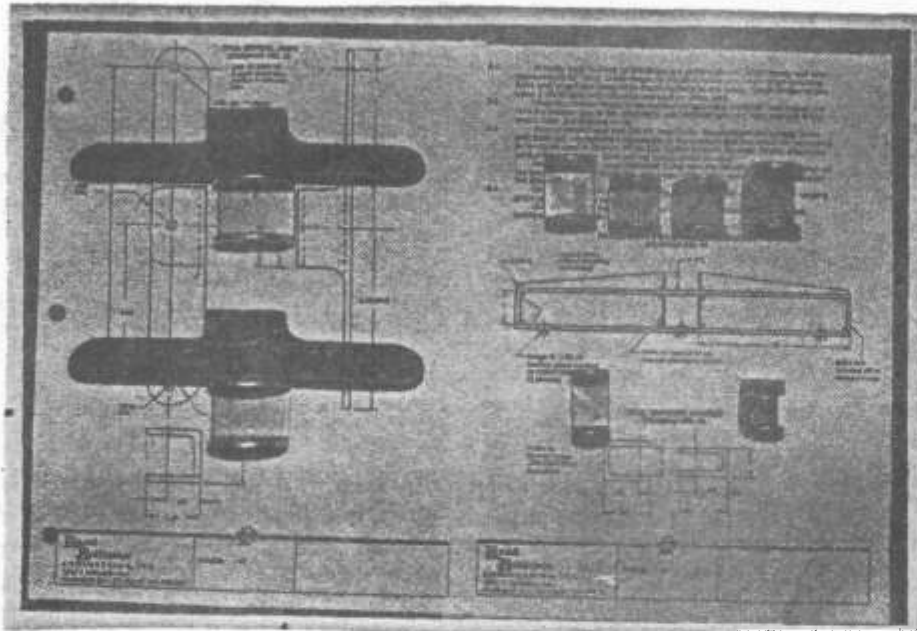
ELEVATOR AND RUDDER HINGE ASSEMBLIES

Assemblies are now available from Rand Robinson Engineering, Inc. Fittings are made from 2024-0 aluminum, then heat treated T6. All hinge points are drilled. Can also be used as replacement parts for all KR's. Note; 2024 is stronger than 6061.

Price: \$85.00 - 10 piece set

Price: \$63.00 - when ordering with aluminum kit.*

*When ordering with aluminum kit the 6061 channel pieces are not needed.



Also sold separately:

TH \$1 - Rudder and Elevator horn	- 2 required per airplane	\$14 .50/ea .
TH rf2 - Rudder and Elevator hinge	- 2 required per airplane - to be used with TH H	\$ 9 .00/ea
TH #3 - Elevator hinge only	- 2 required per airplane	\$ 7 .00/ea .
TH #4 - Elevator hinge only	- 2 required per airplane	\$ 8 .50/ea .
TH #5 - Rudder hinge only (top)	- 1 required per airplane	\$ 7 .50/ea .
TH #6 - Rudder hinge only (top)	- 1 required per airplane	\$ 5 .00/ea .



**Rand
Robinson**
ENGINEERING, INC

5842 K McFadden Ave., Huntington Bch., CA 92649
714 pqp_3P1I

CAREY ANDERSON
LITEFLITE HARDWARE

Rt. 3, Box 138-10
 Strafford, Missouri 65757
 (417) 736-2298

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms 6, Helm joints f, spacers \$26.*

Landing gear lockbar SPRINGS mouse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates drilled, ready for Camloc \$54. *

'Upper elevator pulley bracket \$15* Assembled

Rudder, elevator horns & hinges & back-up plates \$55.*

Aileron bellcranks f. horns complete Assemblies (24 pieces) \$87. *

Lower elevator pulley brackets \$28. assembled*

Aileron pulley brackets assemblies \$30.*

Rudder pedal mount blocks \$30. *

Control stick assembly per plans w/mike switch \$75.*

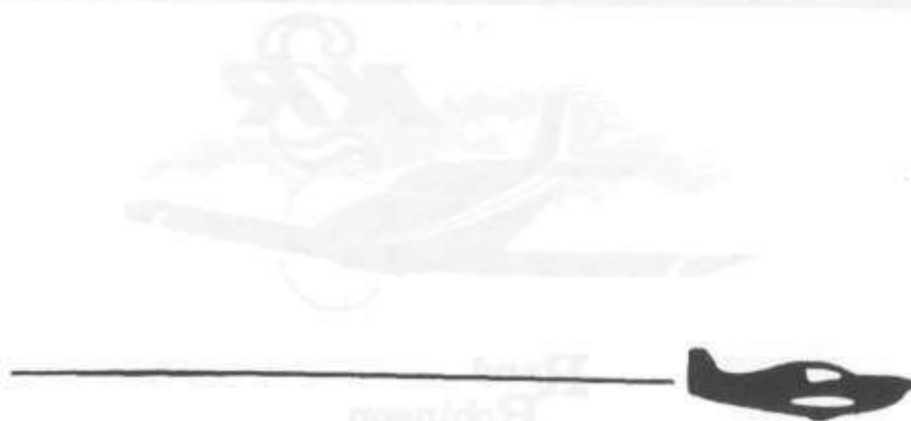
Planning to purchase the Rand-Robinson #4 Aluainun Extrusion Kit? Let ua save you time and Money. Miniature Metrics will pick up the kit from Rand-Robinson, perform necessary machining and return to Rand-Robinson for shipping. Parts will be cut. milled, drilled and shaped. Send us a S.A.S.E. for more information.

Quality...all material is aircraft aluminum/steel as specifie< in the KR Construction Plans Book. S.A.S.E. more information.

•postpaid items

KR NEWSLETTER
 PO BOX 4113
 ENGLEWOOD, COLORADO 80155-4113
 ISSUE NO. 124 AUGUST 1986

•FIRST CLASS MAIL
 U.S. POSTAGE
 PAID
 PARKER, COLORADO
 PERMIT NO. 10



ISSUE NO. 125
SEPTEMBER
1986



KR NEWSLETTER

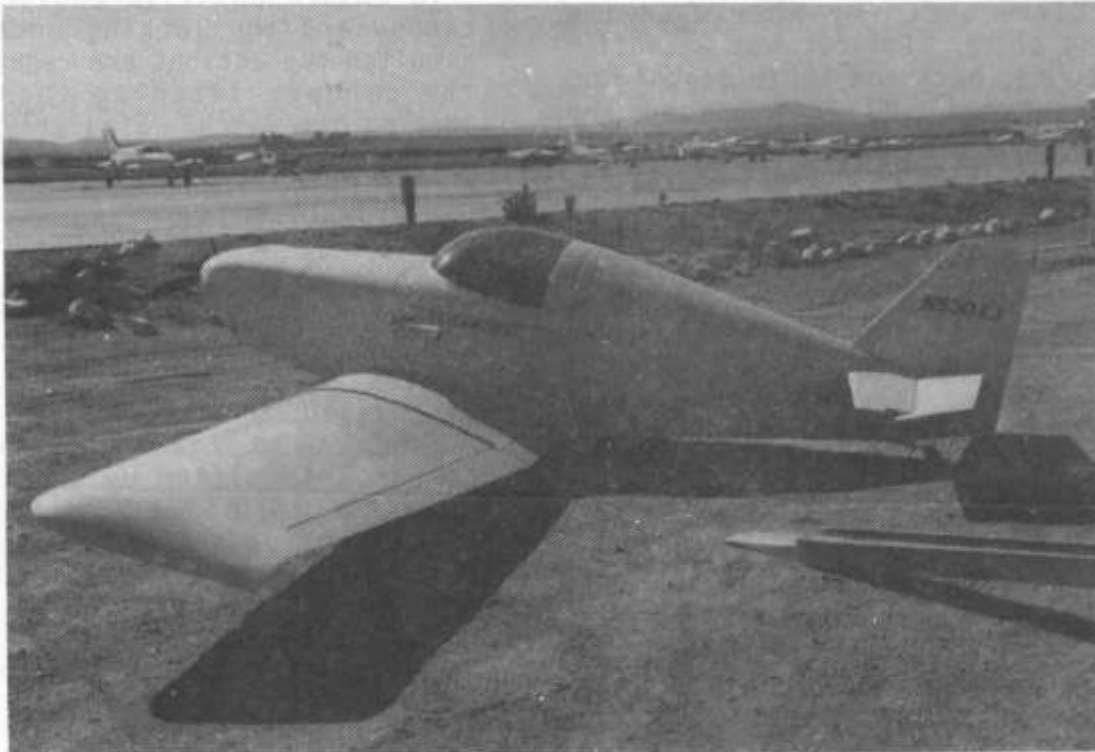
Rates

USA \$12.00 YEAR

CANADA \$15.00 YEAR

OVERSEAS \$20.00 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



FLIGHT REPORT

N5304J KR-2

Steven Plyler

14906 Conner Dr., San Jose, Ca. 95124

My KR-2 has a 1835 Hapi engine, dual ignition, Posa carb with adjustable mixture, 13 1/2 gallon fuel tank, and droop tips. The airframe is stock with pre-molded parts except that I made my fuselage sides straight up and down for more hip room, simplicity, and 2" wider cockpit.

I also installed electric trim for the rudder and elevator, EGT, CHT, Mark 12 radio and VOR, VSI, Oil Temp, Oil Pressure gauges, sensitive Altimeter, Artificial Horizon with a 9" Venturi, and electric Turn & Bank. (Heavy, Heavy!)

Also installed was a removeable homemade fuel tank, (Thank God, it leaked like

crazy), center console, push/pull tubes to the elevator and ailerons.

I did not do extensive full power ground testing prior to flight. I revved it up to 2,900 static and figured it was ok.

1st taxi run at maybe 40 mph was wild! I nearly ran off the runway 10 times, (it was a narrow runway). The day before I'd regained my proficiency after 2 years of no flying by taking a 2 hour lesson in a J-3 Cub, (I had 25 hours tail-dragger time).

I was overwhelmed by the quickness of the KR-2, so down the line the second time I tried a little more power and got the tail up sooner to see better. Before I knew it I was 3 feet in the air, nose heavy, and yawing and banking from the backwards torque of the VW. I decided I'd rather fly before crashing so I gently advanced the throttle until I was 20 feet

AGL and the end of the runway where upon the engine quit. I pulled the throttle back some and the engine caught again and I limped into the air at 2400 rpm maximum. If I tried to give it more throttle it would quit running.

CHT immediately headed for 450° and oil pressure only indicated 5 lbs. I seriously considered landing on the freeway next to the runway and became quite concerned about the paint job's future.

I flew 5 patterns, each time lower to the runway until I had 70 mph and the numbers close under my wheels on the 2,500' long strip. Rollout was attention getting to me, back and forth dancing on the rudders until 10 feet before the runway ended. I jumped out and was almost bubbling over with tears of joy and relief. (The engine had quit during the rollout).

During the flight I had to talk to myself - "relax, you can do it, etc."). I found my hands fatiguing from squeezing the controls and my legs tense.

Since then I've accumulated 50 hours total time. I richened the mixture considerably, eliminating the heat problem and found the oil gauge to be defective at high rpm. I've learned to fly my delightful, sporty KR-2 alone - I use a brick in the tail to balance it when flying alone. With 2 people it is in balance.

My advice to others would be:

- Controls are quick but controllable
- Definitely taxi before flying more than I did
- Make sure the motor is capable of full power for at least 5 minutes tethered
- Use a long, wide runway in the country

I feel very good about having build a KR-2 and enjoy very much flying it. It took 4 1/2 years of off and on building to complete.

Performance is 130 mph indicated maximum at 8,000' MSL. Stall buffet is at 45 mph indicated. I finally have stalled it at 40 mph at which it nearly pitches down a little with some rudder needed to keep it level.

Empty weight is 583 lbs. with upholstery. I'm still messing with the prop size and engine. The current prop, a 52 x 42 Great American yields 2,900 to 3,000 static. No one knows why I can't run a 52 x 47 like everyone else does.

I hope to clean up the airframe and motor trouble and get the 150 to 160 mph I deserve, but all in due time. I'm gonna fly a while first.

CANOPY LOCK

This aircraft canopy lock can be operated from both the inside and the outside but is unlikely to be actuated by accidental pilot movements or aerodynamic forces during flight.

To ensure positive engagement of the canopy and the locking mechanism, two simultaneous actions are required to close the canopy; latching the canopy and locking the latch. Similarly, to prevent the canopy from flying open accidentally, two actions are required for opening; unlocking the latch and unlatching the canopy.

To unlock the latch from the inside, the pilot pulls a knob out from the cockpit wall to disengage a pull pin from a recess (Figure 1). Once the pin is disengaged, the arm on which the knob is mounted can be rotated. The motion of the arm is transmitted by a pair of linked rods to a pair of hooks, thus causing the hooks to disengage from a pair of pins on the canopy (Figure 2). The canopy is then free to open upward.

To release the canopy from the outside, an attendant pushes an ejection pin. This action presses the ejection pin against the pull pin in the hole of the conical base, forcing the latter pin out of the hole. The attendant then rotates an exterior handle counterclockwise. This handle is connected to the interior arm with the knob. The motion of the exterior handle therefore causes the arm to rotate and release the hooks.

To fasten the canopy from the inside, the pilot moves the arm forward (counterclockwise in Figure 2), thus driving the rods forward so that the hooks slip over the pins. The tip of the pull pin rides up the cone of the base as the knob is rotated and shoots into the recess under spring compression when it arrives at the peak of the cone.

To close the canopy from the outside, the attendant rotates the outside handle clockwise, driving the rods forward and engaging the hooks with the pins. As with interior closing, the pull pin automatically rides up the base cone and shoots into the hole.

Unintentional release is unlikely since accidental pilot motions would push on the knob in most cases. This safety feature, coupled with the simplicity and reliability of the mechanism, make it useful for emergency exits.

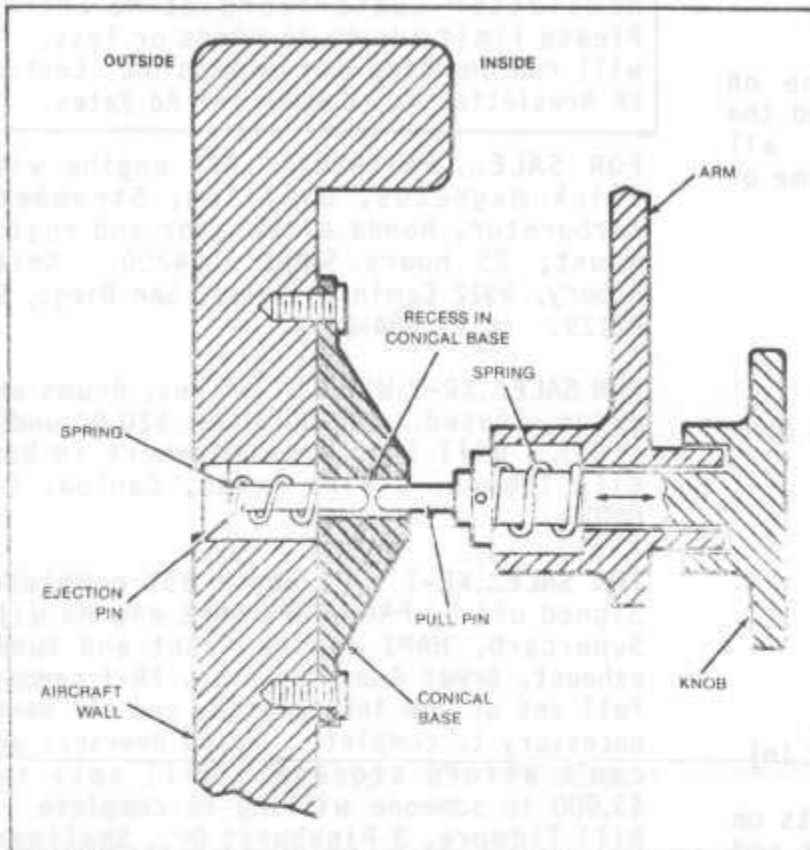
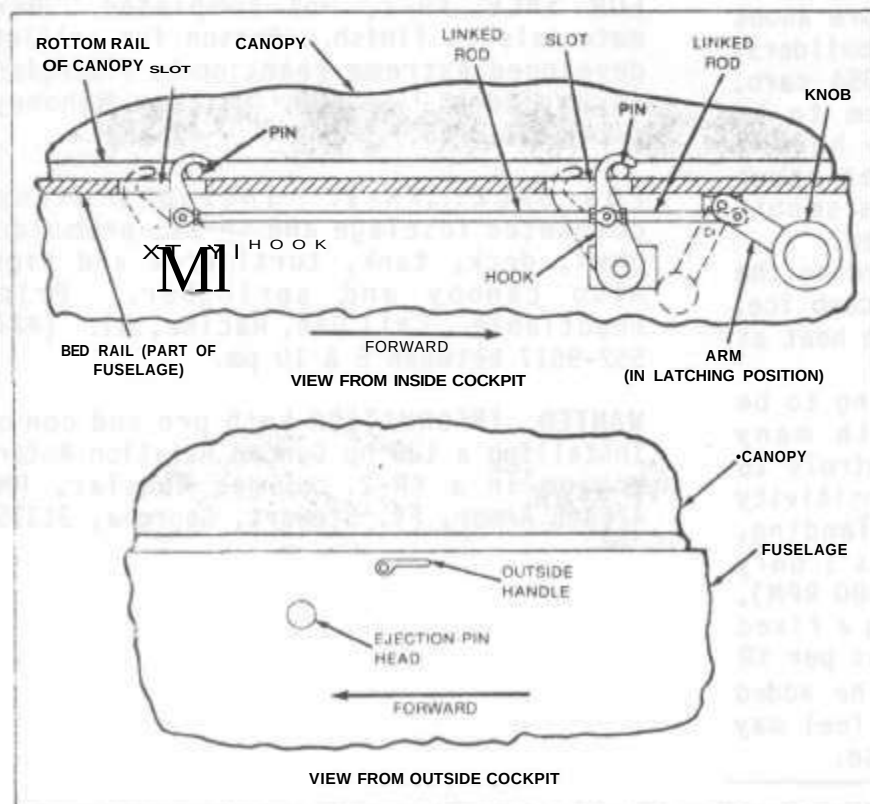


Figure 1. **Locking or Unlocking** occurs when the pull pin enters or leaves the conical base. Pushing the ejection pin or pivoting the knob unlocks the mechanism.



THE KR NEWSLETTER is attempting to assemble a comprehensive **PILOT'S OPERATING HANDBOOK** for the KR-1 and the KR-2.

If you have a flying KR please send us all applicable information such as empty weight, weight and balance, construction time, all speeds, power settings, operating temps, engine used, fuel burns, type prop used and size, total flight time on aircraft, etc.

Also all flight characteristics including, takeoff, climb, stalls, cruise, etc.

We will average all information and try to come up with a good handbook for new KR pilots to follow

TAKE YOUR TIME DO IT RIGHT!



The KR NEWSLETTER is published monthly at PO Box 4113, Englewood, Colorado 80155-4113. (303) 841-9379 John Forrester, Publisher.

Subscription Rates: One year \$12.00; (Canada \$15.00, Foreign \$25.00). US FUNDS ONLY.

All back issues available at the following rates: 1 - 12 issues; \$1.00 each, 13 - 24 issues; \$.75 each, 25 or more; \$.50 each. (Canada & Foreign add \$5.00 shipping)

When changing address be sure to include complete old and new address.

Copyright 1986 by KR Newsletter.

Figure 2 **Latching or Unlatching** occurs when the arm is moved forward or backward. Rotation of the arm with the knob or of an external handle moves the linked rods, causing the hooks to engage or release the pins on the canopy.

FLIGHT REPORT

C-GJWP KR-2
Jim Palmer
PO Box 246 CFB Portage
Southport, Man Canada

My KR-2 flew for the first time on September 15 and while I've not paced the aircraft to check the airspeeds, all instruments were bench-checked. Some of the data on the aircraft is:

Engine: 2100 Revmaster
Prop: Zenair 52" x 47"
Empty Weight: 540 lbs.
Static RPM: 3050
Airborne RPM: 3450
Stall Speed: 40 - 45 MPH
Best Rate of Climb: 1,200 fpm @ 85 MPH
Rate of Climb @ 95 MPH: 750 fpm
Top Speed: 3,450 RPM = 150 MPH
162 TAS
Cruise: 3,000 RPM - 120 MPH
130 TAS

Fuel Burn: 3 1/2 Imperial Gals
Best Glide Speed: 70 - 75 MPH
Takeoff Distance: 500 - 700 feet
Landing: Comfortably in 2,500 feet
(I've done it in less and in)
(much more!)

I built a small oil cooler which fits on top of the engine, (1 - 1 1/2" thick and about 8" x 6"), and find that the engine runs well within limits, cyl. head temp is 290°, oil temp is 190°, oil pressure about 40 - 45 PSI. As with many other builders, I've had difficulties with the POSA carb; the full rpm range doesn't seem to be perfectly smooth. I seem to have a "rough" or "not-smooth" range at about 2,600 to 2,900 RPM, however it's smooth enough that it's not a real problem.

Contrary to soom comments regarding the inability of the POSA to develop carb ice, I agree with those advocating carb heat as I had icing on one occasion.

I've found the aircraft handling to be very good, but again, as with many builders, I find the elevator controls to be extremely sensitive. This sensitivity has caused me some problems on landing, (i.e. - a tendency to balloon). As I only get about a 10 MPH in cruise (3,000 RPM), with the gear up, I'm considering a fixed gear similar to Bill Rosman's, (as per KR Newsletter about 2 years ago). The added flexibility to use grass strips I feel may outweigh the 10 MPH speed increase.

MARKETPLACE

CLASSIFIED ADVERTISING RATES: Buy, Sell, Wanted, and Trade ads may be placed by KR Newsletter subscribers at No Charge. Please limit ads to 25 words or less. Ad will run one time per submission. Contact KR Newsletter for Commercial Ad Rates.

FOR SALE...CONTINENTAL A75 engine with Slick magnetos, baffling, Stromberg carburetor, Honda alternator and engine mount; 25 hours SMOH. \$4200. Keith Asbury, 9922 Caminito Bolsa, San Diego, CA 92129. (619) 484-2014.

FOR SALE...KR-2 WHEELS, brakes, drums and axles, unused. \$95.00 (about \$20.00 under list). Will ship free anywhere in USA. Bill Thomas, 9 Pine Acres, Canton, Ct. 06019.

FOR SALE...KR-1 1/2, about 85% complete. Signed off by FAA, HAPI 60-E engine with Supercarb, HAPI engine mount and tuned exhaust, Great American Prop, KR-1 canopy, full set of new instruments, and all parts necessary to complete. Going overseas and can't afford storage. Will sell for \$3,000 to someone willing to complete it. Bill Tidmore, 3 Pinehurst Dr., Shalimar, Fl. 32579.

FOR SALE...KR-2, 95% completed. Have materials to finish. Reason for selling, developed extreme reaction to fiberglass in any form. \$3,500. Mickey Mahoney, (714) 591-3768.

FOR SALE...KR-1. Includes plans, completed fuselage and spars, premolded cowl, deck, tank, turtleneck and tips. Also canopy and springbar. Price negotiable. Cal 1 Dan, Racine, WI. (414) 552-9617 between 5 & 10 pm.

WANTED...INFORMATION both pro and con on installing a 120 hp Duncan Aviation Rotary engine in a KR-2. James Couslar, HHC 4/64th Armor, Ft. Stewart, Georgia, 31315.

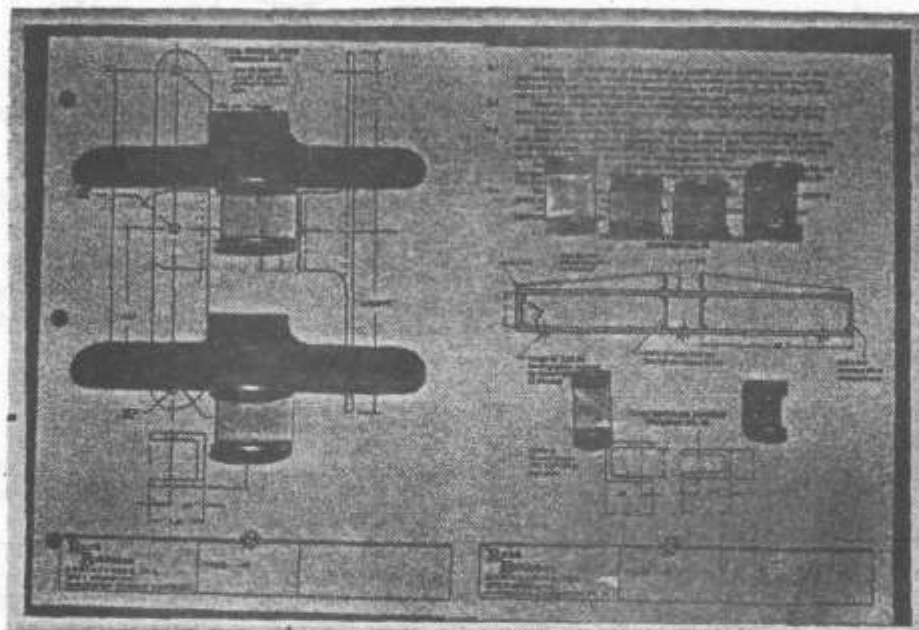
ELEVATOR AND RUDDER HINGE ASSEMBLIES

Assemblies are now available from Rand Robinson Engineering, Inc. Fittings are made from 2024-0 aluminum, then heat treated T6. All hinge points are drilled. Can also be used as replacement parts for all KR's. Note; 2024 is stronger than 6061.

Price: \$85.00 - 10 piece set

Price: \$63.00 - when ordering with aluminum kit.*

*When ordering with aluminum kit the 6061 channel pieces are not needed,



Also sold separately:

TH #1 - Rudder and Elevator horn	- 2 required per airplane	\$14.50/ea.
TH #2 - Rudder and Elevator hinge	- 2 required per airplane - to be used with TH #1	\$ 9.00/ea
TH #3 - Elevator hinge only	- 2 required per airplane	\$ 7.00/ea.
TH #4 - Elevator hinge only	- 2 required per airplane	\$ 8.50/ea.
TH #5 - Rudder hinge only (top)	- 1 required per airplane	\$ 7.50/ea.
TH #6 - Rudder hinge only (top)	- 1 required per airplane	\$ 5.00/ea.



**Rand
Robinson**
ENGINEERING, INC

5842 KMcFaddenAve, HuntingtonBch, CA 92649

PAGE 5 | KR NEWS | LETTER | SEPTEMBER 1986

CAREY ANDERSON
LITEFLYTE HARDWARE

Rt. 3, Box 138-10
 Strafford, Missouri 65757
 (417) 736-2298

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Helta joints
 s. spacers \$26.*

Landing gear lockbar SPRINGS
 mouse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates
 drilled, ready for Camloc \$54. *

Upper elevator pulley
 bracket \$15*
 Assembled

Rudder, elevator
 horns s. hinges s.
 back-up plates \$55.*

Aileron bellcranks f.
 horns complete
 Assemblies (24 pieces)
 \$87. *

Lower elevator pulley
 brackets \$28. assembled*

Aileron pulley brackets
 assemblies \$30.*

Rudder pedal mount blocks
 \$30. *

Control stick assembly per
 plans w/mike switch \$75.*

Planning to purchase the Rand-Robinson #4
 Aluminum Extrusion Kit? Let us save you
 time and money. Miniature Metrics will
 pick up the kit from Rand-Robinson, perform
 necessary machining and return to Rand-
 Robinson for shipping. Parts will be cut,
 milled, drilled and shaped. Send us a
 S.A.S.E. for more information.

Quality...all material is aircraft aluminum/steel as specified
 in the KR Construction Plans Book. S.A.S.E. more information.

'postpaid items

KR NEWSLETTER

PO BOX 4113
 ENGLEWOOD, COLORADO 80155-4113
 ISSUE NO. 125 SEPTEMBER 1986

FIRST CLASS MAIL
 U.S. POSTAGE
 PAID
 PARKER, COLORADO
 PERMIT NO. 10



ISSUE NO. 130
OCTOBER
1987



KR NEWSLETTER

Rates

USA \$12.00 YEAR
CANADA \$15.00 YEAR
OVERSEAS \$20.00 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



THE KR100 PROTOTYPE AS IT APPEARED PRIOR TO FINAL PAINT EARLY THIS SUMMER

NEW ADDRESS FOR KR NEWSLETTER

The KR Newsletter has a new address.

KR NEWSLETTER
PO BOX 876
PARKER, COLORADO 80134

The KR HOTLINE Phone number for subscription information and builder assistance is **still** the same.

KR HOTLINE
303/841-9379

NEW ADDRESS FOR RAND ROBINSON

RAND ROBINSON HAS also moved to larger facilities this year. The new address is:

RAND ROBINSON ENGINEERING, INC.
5395-A Industrial Dr.
Huntington Beach, California 92649
714/898-3811

Be sure and call or write for an updated Parts Catalog and price list for your KR project!

THIS ISSUE MAY come as a surprise to many of you. The KR Newsletter has not been published for many months now and many builders thought it was gone forever. To be honest, I did give some serious thought to not continuing publication of the Newsletter after all the problems of the last year, but after talking to many builders who promised support and a visit to Oshkosh this year to rekindle my enthusiasm and catch-up on new developments, I decided to continue the Newsletter.

I realize that some of you will not want to continue subscribing to the KR Newsletter and that is understandable, but I hope you will remember the many years of excellent builder assistance the KR Newsletter has provided and will decide to continue supporting the Newsletter.

I have also decided that the KR Newsletter is vital to the KR Builders and must continue even if I don't publish it so I promise that if circumstances prevent me from continuing to publish I will turn the Newsletter over to an experienced builder who can continue to support the builders with quality information on a timely basis.

John Forrester - Editor

THERE HAVE CERTAINLY been a lot of positive developments lately at Rand Robinson. The big news of course is the development of the KR100.

The KR100 is a single seat, fixed gear KR powered by a Continental O-200. This is not a high-powered KR-1, but a totally new aircraft built from the ground up by Kevin Kelly and being marketed by Rand Robinson.

While the prototype did not make Oshkosh as expected, Kevin did have several test flights completed when I spoke with him at Oshkosh and he is VERY thrilled with the initial flight results.

Kits will be something different for those familiar with Rand's previous KR kit marketing. The aircraft will be all pre-molded sandwich-construction fiberglass and will only be available as a complete kit and not in pieces as the KR-1 and KR-2.

Kits for the KR100 are expected to be ready in early 1988.

The KR100 is NOT intended to replace the KR-1 or the KR-2 and Rand will continue to sell plans and parts for both aircraft.

The KR Newsletter will also have an in-depth report on the KR100 and an interview with the designer, Kevin Kelly, in an upcoming issue.

Stay tuned -- This is going to be a HOT little airplane.

KR TRI-GEAR KIT UPDATE

THE KR-2 TRI-GEAR kit which I developed last year and which was scheduled to be marketed by a local FBO, Flighthawk International, Inc., has been withdrawn due to corporate liability risk. Although they received over 100 inquiries regarding the gear system, that was not enough to cover the cost of liability insurance for retail sales of a kit and the company did not want to undergo sales of plans for the gear.

The good news for KR Newsletter subscribers is that I retained the prototype system, (which is installed on my KR-2), and still have the initial rough drawings for the gear design.

I have decided to publish these drawings in the KR Newsletter so that all KR Builders will have access to an easy-to-build, economical tri-gear system. Look for the first drawings and pictures in the next issue!

MANY OF YOU will notice that the mailing label on your Newsletter is different this issue. In response to requests by several builders I am now in the process of computerizing all subscriber information.

This will not only allow better service for subscribers, but you will now be able to keep track of when your subscription expires by looking at your mailing label each issue.

The issue with which your subscription expires will now appear in the upper right corner of the label.

I will still be sending a renewal notice enclosed in your expiration issue as before so you never have to miss an issue.

It will take a few issues to get everyone on the computer, (there are over 2,000 subscribers to the Newsletter), so don't get worried if your label hasn't changed yet.

HOMEBUILT COMPOSITES
(tools, techniques & planning)
by **JERRY J. STALLINGS**

HAVING SPENT THE last 20 years building and designing fiberglass cars, boats and airplanes, I have had the opportunity to talk to many home'uilders. There are several questions that always pop up. How do you build them so fast? How do you get them to look so good? Bet that took you many years to build! What kind of a workshop do you have? What kind of tools do I need? There are many others but these are the most popular questions.

Most builders think that the most time consuming part of a fiberglass project is the laying of the fiberglass. They are wrong. The most time consuming part of the project is getting the foam or mold ready to put fiberglass on. Most homebuilders don't think about the fiberglass taking on the same contour lines of whatever they are putting the fiberglass on. If there is a ridge on your foam core, there will be a ridge on your finished product. If you have a valley or trough in your foam it will still be there after you fiberglass over it. The more perfect your foam or mold is, the better and smoother your fiberglass coat will be. In every case, a high spot is the worst thing you can have.

Every high spot has to be sanded out or there is a bump there. If you don't sand the bump out you have to fill around it. If you sand the bump out you have a weak point or a hold in your surface that has to be filled or reinforced. If you fill the area around the bump, your project starts weighing more and your construction costs and project finish time rises. This all goes back to...prepare your foam or mold the best that you can before you try to place fiberglass on top of it.

How do I glue the foam together? We have found that if you glue foam together with anything harder than the foam itself you will more than likely have a ridge where you glue them together. We have tried almost everything that is commercially available and we have found that our smoothest and easiest to sand joints come from gluing with foam. We have used the pour foma (X-40 or equivalent) canned foam found at your local hardware store (the type used for insulation). Pour foam or two part foam is relatively messy and usually too hard to use because it is too thin and runs

through the cracks. If you wait until it starts ti rise it gets too thick to seep into the cracks. Pour foam definitely has its place but you have to be careful where you use it. We use canned foam which is the foam used to insulate homes. There are several types on the market and its all good. When looking for this foam you need to look on the label and see how long it takes to dry and if it has silicone in the indgredients. Its best to get the 30 minute or one hour dry time rather than the long drying, the obvious reason is that it takes all day to do the job.

The other drawback is some of the canned foam dries with large bubbles in the middle o'f it. Try not to use the foam with the silicone in it, we aren't sure the resin will stick to it and we don't want to take the chance. You will have to try several different types to get what you need. Always remember when you apply the foam between the joints or into a crack, it expands about 10 to 22 times it's size while its curing. You will need to use it sparingly and support your foam in such a manner that it will be the shape you want it to be when the foam has dried. Temperature determines how much the foam Vises. The warmer it is, 70 degrees and above, the more it rises. The colder it is, the less it rises. Try using some foam on different materials and see how it reacts. (ed: I have found that if you use this type of foam at cold temperatures you should heat it with a hair dryer after it achieves it's initial set to insure that it won't expand again later).

After I have glued the foam together, what do I do to prepare it so I can put fiberglass on it? Some of the experts tell you to go to your kitchen and get a butcher knife to cut your foam. Well the butcher knife works fine sometimes, but we have found that if you use a filet knife (like fishermen use to filet fish) with about a 9" blade, it works much better because the blade is thinner and it is very flexible. We use the filet knife to cut off the surplus foam from the glued joint. The knife will lay flat on the foam so that you can cut the high ridge off level with both surfaces of the foam.

Here are our techniques for laying and finishing the fiberglass surface. Before you can place the fiberglass cloth on top of the foam you must properly prepare the foam. The first process is to get the foam surface exactly like you want the finished product to look like. Next you mask off all areas that you don't want to

put resin on (masking tape and newspapers). Now you are ready to prepare the foam surface with your slurry. We use 1 part resin to 2 parts of micro mixed thoroughly, spread on top of the foam. By looking at the surface while applying the slurry you can tell when you have it on properly.

If the surface looks wet, you have too much slurry, if the surface looks dry you don't have enough. The proper amount is half way between wet and dry.

With a good light shining on the surface of the foam while you are applying the slurry, this is between state shouldn't be hard to see.

NOTE: The fiberglass cloth must be applied to the slurry while it's wet. Do NOT allow the slurry to dry first before you apply the fiberglass cloth. The purpose of the slurry is to keep the fiberglass cloth from slipping off the surface and to give it a bond to the foam.

Foam slurried, now apply cloth. The cloth should have already been cut to the approximate size and rolled up. As you apply the fiberglass cloth be sure to keep the grain of the cloth as straight as possible. Before you try to apply the cloth you might take a small piece and try stretching it in different directions. You will notice that by pulling it with the grain, it will become nice and tight and be free of wrinkles. On the other hand, if you try to pull it against the grain, it will wrinkle and be unmanageable.

After you get all the cloth on the foam, free of wrinkles and grain straight, you will notice that the previous laid cloth is soaking up the slurry. The next step is to put resin on top of the fiberglass. How do I put the resin on? When do I have enough resin on? How do I keep from getting too much on? How do I know if my part is going to weight too much? These are some of the questions you will want to know.

Depending on the size of the part and how the part is positioned (vertical or horizontal) will determine the best way to apply the resin.

If the part is lying horizontal, the surface lying parallel to the gravitational pull, we will pour the resin directly on the surface and spread it with a squeegee. This is the easiest layup. You may pour the resin on and spread it with a squeegee or you may paint the resin on with a paint brush and then spread it with a squeegee. Whatever works for you will suffice.

While we are spreading the resin on we look at the surface to make sure it's not too wet or too dry, the in between state. Basically, the layup is complete. However, we take it one step further.

Our final step on the layup is PEEL PLY. Peel Ply is a 100% polyester fabric that can be purchased at almost any fabric store.

The peel ply is applied on top of the final fiberglass cloth layup while the resin is wet. The peel ply is squeegeed on and is wetted out so that there are no dry spots. The peel ply will smooth the outer layer of the glass cloth so that there are no grain marks of the glass, it takes out the surplus resin from the layup, and it blends in all of the ridges and valleys. The surface that is left after you remove the Peel Ply when the layup has cured will need little or no sanding. When your resin has cured,, the Peel Ply is removed by ripping it from the surface of the layup. The Peel Ply will not stick to the fiberglass surface and must be completely removed.

Peel Ply comes in various thicknesses. The thicker it is the harder it is to wet out and to use. Peel Ply will not bend around corners, so when you come to a curved area you must cut and bend to suit your layup. It's nice to leave a little extra to grab hold of when you want to remove it from the layup. Its best to remove the Peel Ply soon after the resin cures. The longer you leave it in the layup, the harder it is to remove.

It can always be removed, but sometimes with difficulty.

Builders start a project not knowing or understanding how long it takes to build a project and they don't have the right tools to do the job. When asking the builders we come in contact with how long they think it will take them to build their plane, the answer is from 1000 to 2000 hours.

The answer is technically correct, but what they don't understand or think about, is that if they work 3 hours per day it will take them 48 to 95 weeks to complete their project.

At 4 hours per week it take 250 to 500 weeks to complete their project. By using simple arithmetic and knowing that there are 52 weeks per year, 250 weeks is 4.8 years, 334 weeks is 6.4 years, 500 weeks is 9.6 years and I think you get the message.

We have found that the best way to build an airplane fast and efficiently is to have plenty of room in your workshop so that you can work on several pieces at a time.

If you use a resin that has a long curing time, you will have to wait for a part to cure for 10 to 14 hours before you can move it. If you tie up your only work bench for that long, it takes forever to finish your project. By having enough room for your fuselage, wings, canard, rudders and layout benches, you can work on any piece while the other is curing. The more room you have the faster, you can complete your project.

What tools will you need to complete your composite project? We have found that power tools greatly enhance the project finish time. Drilling, cutting and sanding will take up most of the time on your project. Our most used tools are the rotary file by Black and Decker (this is a small adjustable head variable speed sander), jig saw, air sander (d/a and flat), electric drill and plenty of hand tools.

If you have table saws, bench grinder, drill press, band saw and other equipment your job will be easier. If you don't have the elaborate equipment, try to find someone or somewhere you can use them if you need to.

If you can build all of the parts yourself, the job will probably go quicker. If you have to wait on someone to make them for you it will be quite expensive and time consuming.

Homebuilding is a lot of fun and is very rewarding. Composite airplanes are stronger, lighter and faster than most aluminum factory production airplanes. The cost of operating a composite is much lower and maintenance can be performed by the owner/builder. Having build the aircraft yourself, you know how to repair it.

In the years to come we believe most aluminum airplanes will be replaced by COMPOSITES. Happy building and hope to see you in the skies.

Mr. Stallings will be happy to answer any questions that you might have concerning composite construction. Please send your inquiries to J-J Enterprises, 7822 Gulfton, Houston, TX 77036. Please include a S.A.S.E.

QUESTIONS AND ANSWERS

Q. How can I cut aircraft control cable without expensive cable cutters and still not fray the ends?

A. Take about 1" of masking tape and wrap it **tightly** around the cable where you want to cut it. Now lay the cable on a solid metal or concrete surface and use a heavy hammer and a cold chisel. Be sure and hit it hard enough to cut completely thru on the **FIRST** hit.

Q. Do the Diehl Pre-Formed Wing Skins fit the stock KR-2 wing spars?

A. No. You will have to slightly modify the wing spars to fit the skins if you have already **built** your outer spars. If you haven't **built** them **yet**, you may make them to fit the skins without modification. Write Dan Diehl Aeronautical at 1855 N. Elm, Jenks, Oklahoma 74037 and he'll be glad to send you a sheet with the dimensions for the wing spars. Be sure and send a S.A.S.E.

Q. I'm planning to use Saf-T-Poxy on my KR-2 fiberglass. Can I also use it for the wood portion of the airplane?

A. ~~NO. Saf-T-Poxy is not acceptable for use on wood structures.~~ Use either Rand Epoxy or another epoxy made especially for wood structures.

Noncommercial classified advertising is available to subscribers at NO CHARGE. Please limit ad to 25 words or less. Ad will run once per submission.

BUILDERS LOG Certify without hassle. Document construction, easy systems for single, multi-engine airplanes, helicopters, gyros. **FULLY GUARANTEED, FREE BROCHURE.** AERORECORD, Suite C, 1416 Daphne Dr, Willitis, Ca. 95490. 707/459-9012.

FOR SALE...PIPER VIDEO FLIGHT TRAINING FILMS (Beta) and **COMMERCIAL SONY BETA-MAX Machine.** Includes Private, Commercial, Instrument, Multi, CFI and misc. Piper demo films. These are professional flight school films and cost over \$4,000 new. \$700. 303-841-8651.

CAREY ANDERSON UTEFUTE HARDWARE

Rt. 3, Box 138-10
Stratford, Missouri 65757
(417) 736-2298

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Hein joints & spacers \$26.*

Landing gear lockbar SPRINGS mouse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates drilled, ready for Ca»loc \$54. *

'Upper elevator pulley bracket \$15*
Assembled

Rudder 'pedal mount blocks \$30. *

Control stick assembly per plans w/mike switch \$75.*

"Lower elevator pulley f brackets \$28. assembled*

Aileron bellcranks f. horns compl'te Assemblies (24 pieces) \$87. *

Aileron pulley brackets assemblies \$30.*

Rudder, elevator horns s. hinges A. back-up plates \$55.*

'postpaid items

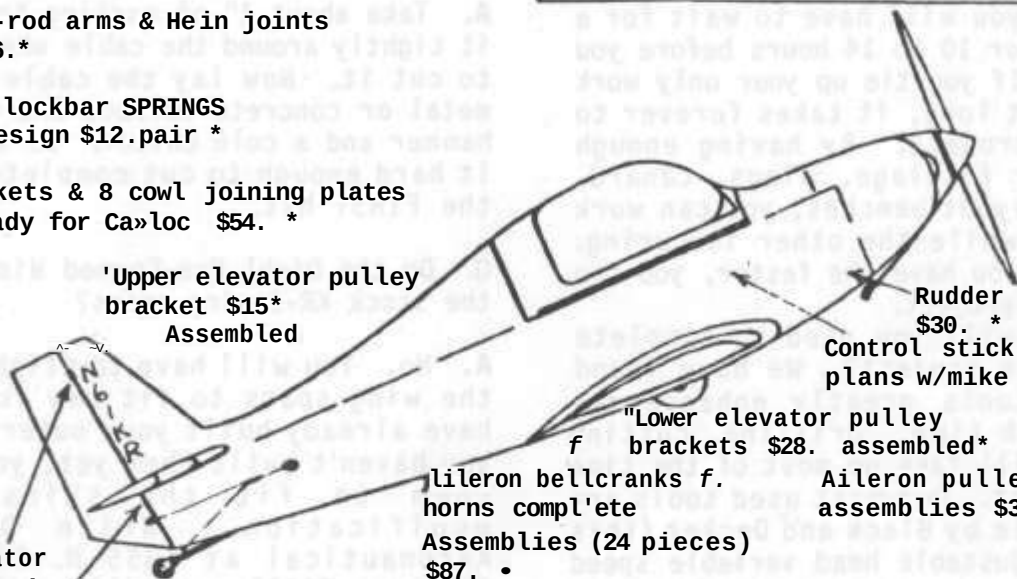
Quality...all material is aircraft aluminum/steel aa specifie< in the KR Construction Plans Book. S.A.S.E. more information.

KR NEWSLETTER

P.O. BOX 876
PARKER, COLORADO 80134



Planning to purchase the Rand-Robinson *4 AlimlnuH Extrusion Kit? Let us save you tlMe and Money. Miniature Metrics will pick up the kit from Rand-Robinson, perform necessary Machining and return to Rand-Robinson for shipping. Parts will be cut. •llled, drilled and shaped. Send us a S.A.S.E. for More information.



Mr. Stallings will be happy to answer any questions that you might have concerning composite construction. Please write to: S.A.S.E. 2424 E. 1st Ave. Suite 100 Denver, CO 80215

ISSUE NO. 131

NOVEMBER

1987



KR NEWSLETTER

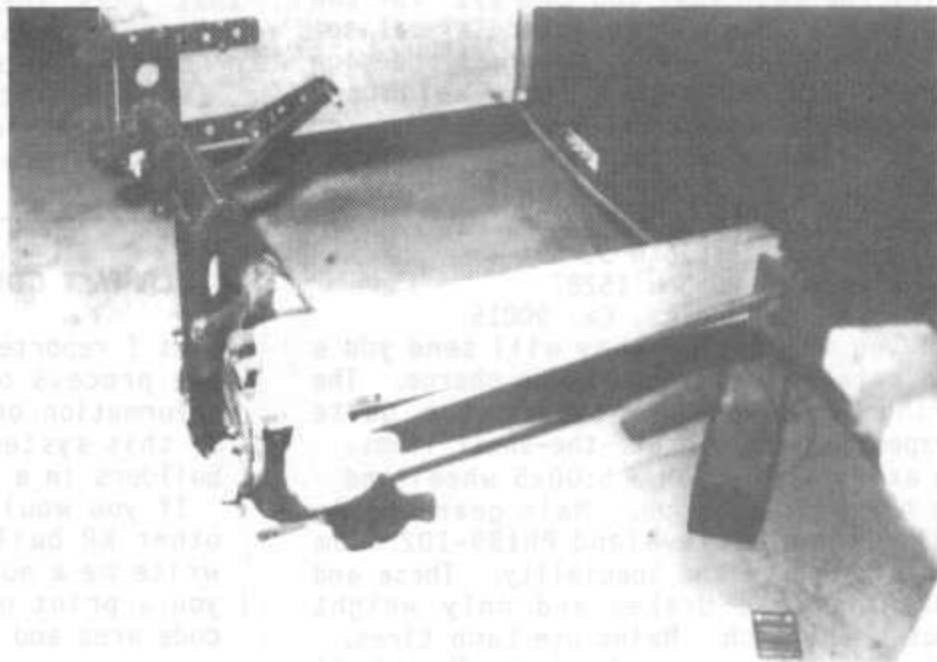
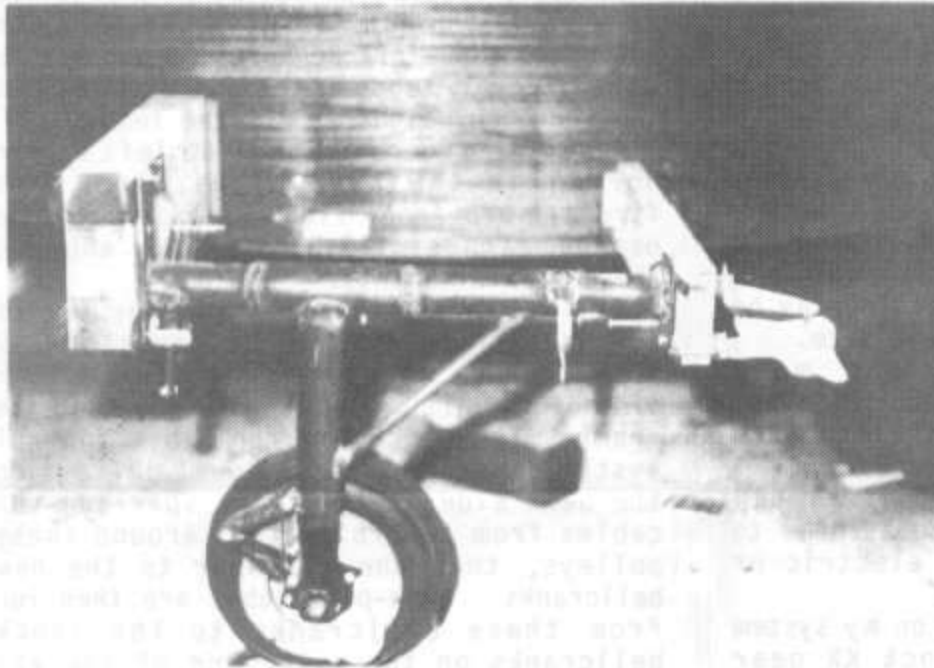
Rates

USA \$12.00 YEAR

CANADA \$15.00 YEAR

OVERSEAS \$20.00 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



KR TRI-GEAR PLANS

THIS MONTH BEGINS our series on the KR retractable tricycle gear system.

These drawings and text are not totally complete as they are only the original "rough drawings" I made prior to building the gear system for my 2nd KR-2.

There should be enough information in the drawings, text and pictures to enable you to build your own tri-gear system.

If any builders have any specific questions on construction please write and I'll answer them in the Newsletter.

KR TRI-GEAR SYSTEM PART 1

This gear was designed for my 0-200 powered KR-2 with a design gross weight of 1,200 lbs.

If installed on a light KR-2, (900-1,000 lb. gross weight, the main tube and rotating tube on the main gear leg may be reduced to the next smaller tube size.

Remember though that the main tube/rotating tube and the gear leg tubes were designed to "slide fit" into each other so that no bushings are needed.

The gear is designed for manual retraction but could easily be adapted to several different types of electric or hydraulic retraction systems.

Total installed gear weight on my system came out at 52 lbs. (a stock KR gear weighs approximately 42-45 lbs).

• Wing attach fittings were lengthened to 5" for the main spar and to 5 1/2" for the rear spar. This allows an additional set of attach bolts. While this was a design feature for the higher gross weight, I would suggest using the longer fittings on any KR-2 using this gear system.

The springs used are available from
Century Spring Co.
222 E 16th Street
PO Box 15287

Los Angeles, Ca. 90015

If you write them they will send you a huge catalog of springs at no charge. The springs used on the system are quite inexpensive and are off-the-shelf items. The axles used are for a 5:00x5 wheel and are the weld-on type. Main gear wheels and brakes are Cleveland PN199-102 from Aircraft Spruce and Speciality. These and hydraulic disc brakes and only weight about 5 lbs each. Mains use Lamb tires.

Nose wheel is an Azulite Model #1 and the tire is a sawtooth tread,

4.10/3.50x5, both available from Aircraft Spruce. This wheel uses a stock KR-2 axle.

EXTREME CARE MUST BE USED WHEN WELDING the rotating tube parts due to the slide fit. If the parts get too hot or you burn through, you will not be able to assemble the pieces to slide. An arc welder works ok for this if you are good with it, otherwise I recommend having someone MIG weld these pieces.

Install a zerk fitting on the outer rotating tube so that you can grease the assembly from time to time.

Scissors assemblies may be purchased new or used or you can easily make your own out of 4130 plate. Be sure and put a stop wire on gear legs so they won't come out too far when weight is off the legs.

Fuselage dimensions may be left as per normal in the KR-2 plans, but some firewall and front floor reinforcement is needed. There will be drawings showing these reinforcements.

You will need to build another set of the aileron bellcranks as per the KR-2 plans. These will be mounted on the back side of the aft spar, just inside the side frame. The stock aileron cable control system cannot be used. Mount pulleys on the back side of the front spar and run cables from control stick, around these pulleys, thru the aft spar to the new bellcranks. Push-pull tubes are then run from these bellcranks to the stock bellcranks on the outer end of the aft spar and an interconnect tube is run between the inner bellcranks. Be sure that this interconnect tube does not interfere with the tube running from the control stick to the elevator bellcrank.

Extra gusset blocks will need to be added to the side frames where the aileron tubes come thru the side frame.

CONTACT OTHER BUILDERS IN YOUR AREA

As I reported in the last issue, I am in the process of putting all subscription information onto computer. One advantage of this system is the ability to call-up builders in a specific zip code.

If you would like to get in touch with other KR builders in your area, simply write me a note with a SASE and I'll send you a print out of everyone in your zip code area and adjoining areas.

Build another bellcrank as used on the center hinge of the elevator. This will be mounted on a stand and mounted behind the aft spar. You will then need to build a tube to run from the lower end of the stock control stick to this bellcrank. Cable then run from the bellcrank to the elevator bellcrank.

Be sure and install backing plates anyplace you bolt thru the spar and make sure that all bolts come thru the center of the spar caps.

I used Birch on my spars for added strength, but mahogeny should be alright for lighter KR's.

Next month the series will continue with more notes and drawings for the nose gear assembly.

KR100 INFORMATION PACKETS AVAILABLE

RAND now has information kits available for the new KR100. Cost is \$8.00, available from Rand Robinson.

QUESTIONS AND ANSWERS

Q. When will kits be available for the new KR100?

A. Rand currently plans to have kits available in February, 1988.

Q. How loud is the noise level in a KR-2?

A. You will find that the noise level in a KR-2 is a lot lower than that of a factory aircraft. The foam and fiberglass absorb a lot of noise. I would still recommend headsets however to protect your hearing. You can also lower the noise by installing sound absorber material between the uprights and diagonals in the fuselage from the firewall to the rear spar. I used a material that was developed for spacecraft that is available at most large fly-ins these days. I'm not sure of the name of the product, but it comes in 4'x8' sheets with glue already applied to one side. Perhaps someone can let the Newsletter know of another source for this lightweight material.

FLIGHT AND BUILDER REPORTS NEEDED

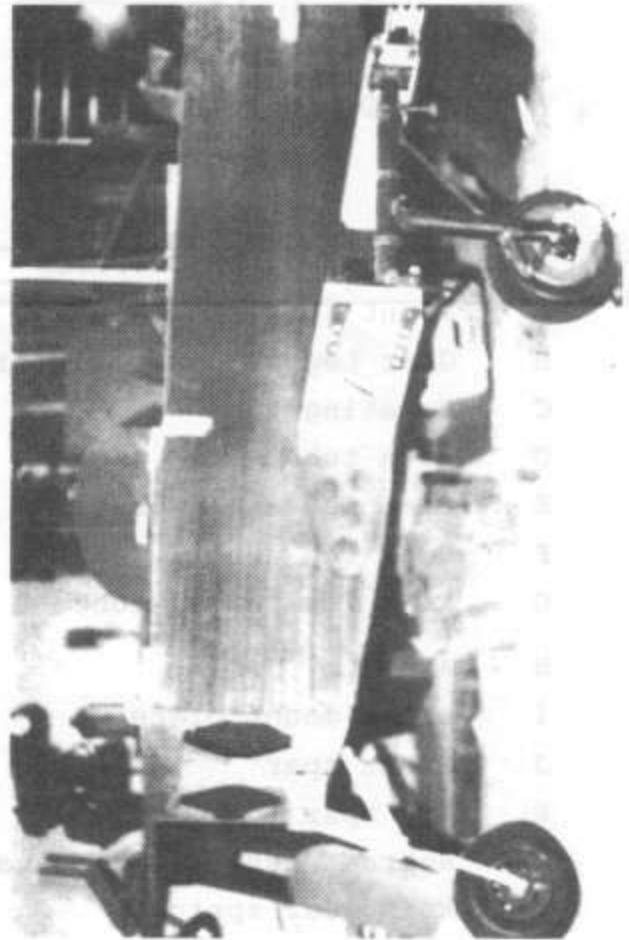
THE KR NEWSLETTER, obtains it's information from you, the builder.

In order for the quality information to continue each year it is imperative that each builder try to contribute builder reports.

FLIGHT REPORTS, ACCIDENT REPORTS, BUILDING TIPS, PHOTOS OF BOTH FINISHED KR'S AND THOSE UNDER CONSTRUCTION ARE ALWAYS NEEDED.

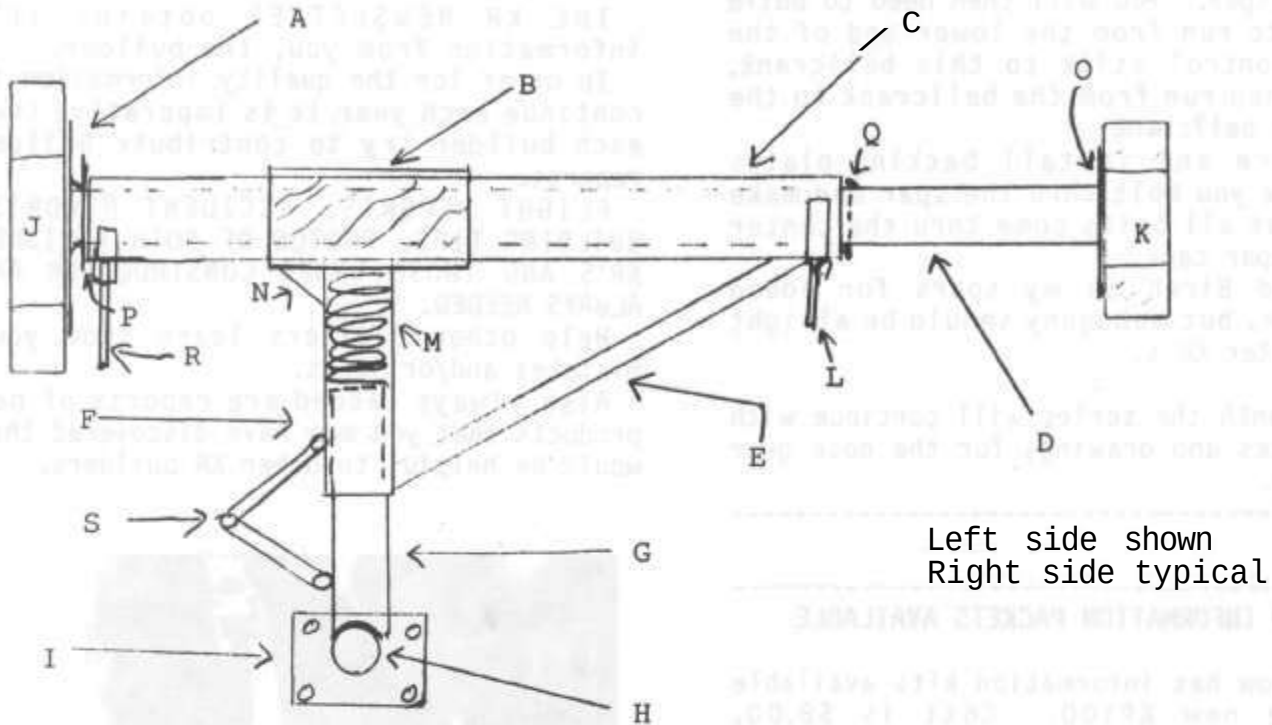
Help other builders learn from your mistakes and/or ideas.

Also always needed are reports of new products that you may have discovered that would be helpful to other KR builders.



THE KR NEWSLETTER is published monthly by Rocky Mountain Publishing, PO Box 876, Parker, Colorado 80134. Phone 303/841-9379. Subscription Rates: \$12.00 yearly US; \$15.00 yearly Canada; \$20.00 yearly Overseas. Back Issues: \$1.00 each.

RETRACTABLE TRI-GEAR
KR-2 MAIN GEAR LEG ASSB



ITEM	DESCRIPTION	MATERIAL	DIMENSIONS
ft	Front spar attach plate	4130 3/32	3"x6 3/4"
B	Gear Leg support reinforce	1 7/8" .120 tube	split" 6" L
C	Rotating tube	1 7/8 .120 tube	17" L
O	Main tube	1 5/8 .120 tube	cut to fit spars
E	Gear leg angle brace	5/8 .095 tube	9"
F	Gear leg tube	1 7/8 .120 tube	9"
G	Gear leg inner tube	1 5/8 .120 tube	10 1/2"
H	Axle	PN11703 Aircraft Spruce Co.	
I	Brake mount plate	4130 3/32	cut to fit wheel
J	Front spar	normal KR-2	
K	Aft spar	normal KR-2	
L	Retract assist spring tab	4130 3/32	
M	Main gear spring	D-1362	Century Spring
N	Gear leg gusset	4130 3/32	
O	Aft spar attach plate	4130 3/32	3"x3 1/2"
P	Front Spacer	Large washer	
Q	Aft stop	AN3 bolt	
R	Retract arm	4130 k" plate	4" L from bottom of main tube
S	Scissors	4130 plate	

MARKETPLACE

FOR SALE...KR-2 PLANS, Unused or will trade for Teenie Two or Windwagon plans. PO Box 477, Cascade, IA 52033. 319/852-3359.

WANTED...KR-2 PLANS. Must be very reasonable. Jim Murphy, 7004 Escondido Ct., Arlington, Tx. 76016. 817/572-3589.

WANTED...KR-2 PLANS by R/C modeller. Please send price and specifics. Nolon Schmidt, 611 Grant Ave, Fort Leavenworth, KS66027.

FOR SALE...REVMASER 2100-D, 75hp, high performance heads, starter, alternator, oil cooler and filter, dual Bendix mags, Rev-Flow carburetor, manuals. Never Run! \$3,700. 214/867-5892.

WANTED...VW engine in running condition, complete with prop and hub. 1242 Sabrina Ct., Redwood City, Ca 94061.

FOR SALE...HAPI 60-2, 1830CC Engine. Complete with Posa Supercarb, full electrical system, intake manifold, prop hub and matching Great American propeller. All 0-time, never installed. My project "in holding pattern". My loss is your gain. Will sacrifice for \$2400. Dick Denman, 10732 Cedar Way, Grass Valley, Ca 95945. 916/265-5811 days, 273-3471 evenings.

WANTED...Engine mount, cowling, propeller, engine for a KR-2. Roger Ketcham, Rt. 73, Sudbury, Vt 05733. 802/247-5711.

WANTED...KR-2 FLYABLE. Radios not necessary. Please send description, your price and photo if available. Achim Gross, Box 32, Asslar-Werdorf 6334, West Germany 0-11-49-6443-9478.

Non-Commercial Classified advertisements are run at no charge to KR NEWSLETTER subscribers. Ad will run once per insertion. Commercial ad rates available upon request.

Aviation Needs?

Find it
in

Trade-A-Plane

410 W, 4th St.

P.O.Box929A

Crossville, TN 38555

615-484-5137

Subscriptions

\$22 per year

\$11per6rno.

50 Years of Quality & Service

1937

1987



AIRCRAFT SUPPLY, INC.

THOUSANDS OF IN STOCK ITEMS INCLUDING:

ALUMINUM TUBING	4130 TUBE
ALUMINUM SHEET & SHAPES	4130 SHEET STEEL
INSTRUMENTS	AIRCRAFT PLYWOOD
RANDOLPH DISTRIBUTOR	SITKA SPRUCE
RAZORBACK FABRICS	AN-HARDWARE
AIRCRAFT KITS	SHOP TOOLS
SUPERFLITE	TIRES
SAFE-T-POXY	BATTERIES
OIL COOLERS	POLISH
CLEVELAND WHEELS & BRAKES	PLEXIGLAS

PLUS:

A Knowledgeable Staff - To help answer your questions.

Fast Service - 95% same day shipping.

First Quality Products.

YOU'VE TRIED THE REST: NOW TRY THE BEST

CALL TOLL FREE 1-800-345-2558 - OUTSIDE IL.
INSIDE ILLINOIS & FOR INFORMATION -1-312-422-3220

B & F Aircraft Supply, Inc., 6141 W. 95th St, Oak Lawn, IL

Catalog4.00 U.S. - 10.00 Overseas/ Refundable on 1st 30.00 purchase

CAREY ANDERSON
LITEFLITE HARDWARE

Rt. 3, Box 138-10
 Strafford, Missouri 65757
 (417) 736-2298

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Hei« joint* & spacers \$26.*

Landing gear lockbar SPRINGS mouse-trap design \$12.pair *

12 cowl brackets & 8 cowl joining plates drilled, ready for Camloc \$54. *

upper elevator pulley bracket \$15* Assembled

Rudder pedal mount blocks \$30. *

Control stick assembly per plans w/mike switch \$75.*

Lower elevator pulley brackets \$28. assembled*

Aileron pulley brackets assemblies \$30.*

Aileron bellcranks & horns complete Assemblies (24 pieces) \$87. *

Rudder, elevator horns & hinges & back-up plates 555.*

Quality...all material is aircraft aluminum/steel as specific. in the KR Construction Plans Book. S.A.S.E. more information.

*postpaid items

KR NEWSLETTER

P.O. BOX 876
 PARKER, COLORADO 80134

Planning to purchase the Rand-Robinson «4 Aluminum Extrusion Kit? Let us save you time and money. Miniature Metric* will pick up the kit from Rand-Robinson, perform necessary machining and return to Rand-Robinson for shipping. Parts will be cut, drilled and shaped. Send us a S.A.S.E. for more information.



ISSUE NO. 132

DECEMBER

1987



KR NEWSLETTER

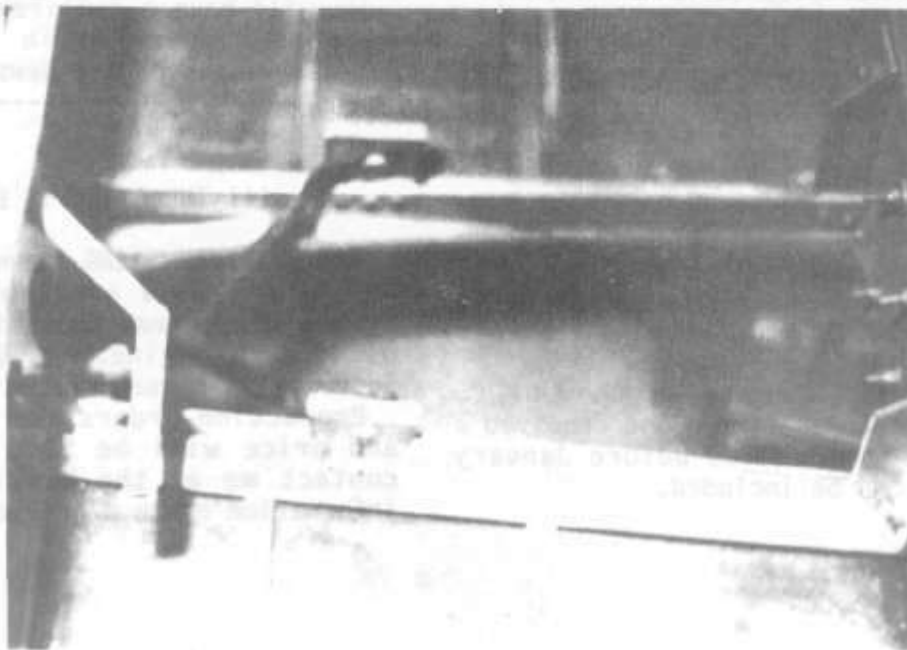
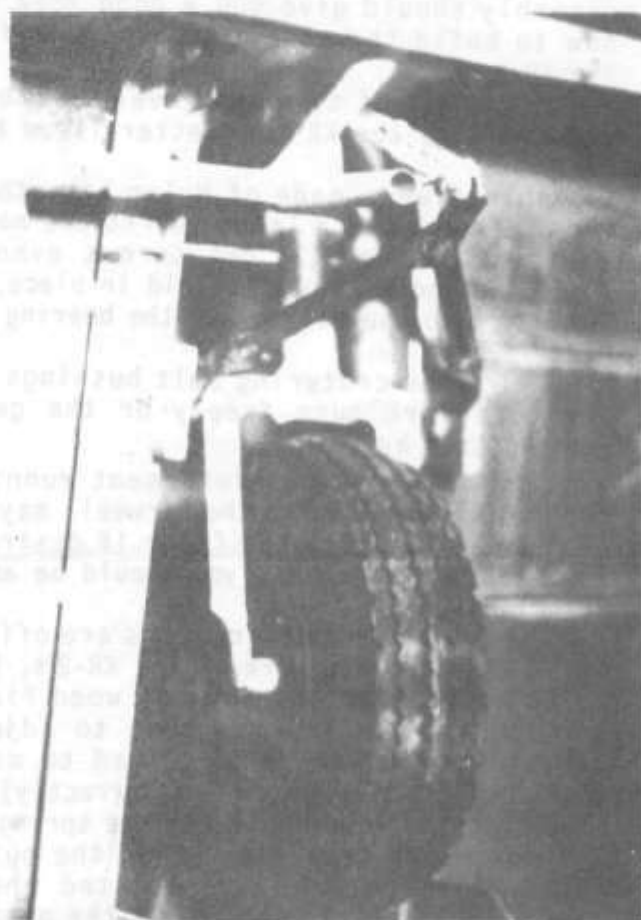
Rates

USA \$1200 YEAR

CANADA \$1500 YEAR

OVERSEAS \$20 00 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimenter/aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering Inc.



JUDGING FROM THE RESPONSE I'm getting, a lot of builders must be thinking about installing this gear on their KR. Should make for some good builder reports.

KR TRI-GEAR, PART II

NOSE WHEEL ASSEMBLY

This month's drawing of the nose gear assembly should give you a good idea of how to build the nose gear assembly for the KR-2.

For address of tire and wheel assembly and springs, see KR Newsletter issue No. 131.

Bushings were made of Nylon bar stock which I turned on a lathe to fit the nose tube. Use three (3) set screws evenly spaced around the tube to hold in place. You may also use Oilite for the bearing if desired.

Be sure the centering bolt bushings on the nose fork turn freely or the gear won't center by itself.

Aluminum angle reinforcement running from the Front Spar to the Firweall may be also be bolted thru the floor if desired. I heli-arc'd mine, but you should be able to bolt it.

All pivot hole measurements are off of my KR-2 and should work on all KR-2's, but to be safe, make you arms of wood **first** and check fit. You may have to adjust lenght to fit your KR. (I had to make mine 5 times before they fit correctly)

Be sure the lower bolt for the spring on the nose fork does not rub on the outer tube. This bolt may be located where needed on the fork tube to put the proper tension on the spring.

NEXT MONTH WE'LL CONTINUE WITH DRAWINGS OF POSSIBLE RETRACT SYSTEMS, THE MAIN GEAR LOCK-DOWN AND RETRACT ARMS AND MORE PICTURES OF THE GEAR.

KR CLUB ROOSTER TO GO OUT NEXT MONTH

IF YOU ARE a member of the KR CLUB, expect to receive your rooster in late January.

IF YOUR ARE NOT a member of the KR CLUB and would like to be listed and received a copy, send in your \$5.00 before January 10th and you can be included.

KR NATIONAL FLY-IN

IT'S TIME TO start thinking of good weather next year and begin planning another National FLY-IN.

If you know of a good site, please contact me as soon as possible so we can begin planning. Site should be in the Mid-west to make it easy to get to for everyone.

We would also like to organize this years Fly-In with forums, etc. Please let me know if you would be willing to give a forum.

HELP! KR-2 BUILDERS IN THE NETHERLANDS NEED COPIES OF FAA AIRWORTHINESS CERTIFICATES FOR KR-2'S WITH INCREASED CABIN WIDTHS. THE DUTCH VERSION OF THE FAA REQUIRES PROOF THAT WIDER CABIN KR'S HAVE FLOWN IN OTHER COUNTRIES BEFORE THEY WILL ALLOW DUTCH BUILDERS TO BUILD WIDER KR'S. IF YOU CAN HELP, PLEASE CONTACT:

LOUIS STAALBERG
7234 E. PAPAGO DR.
SCOTTSDALE, AZ. 82527
602-949-1959

STEVE ALDERMAN REPORTS that he now has over 600 hours on his KR-2. Many of you have seen Steve's KR which ran in the CAFE 400 a few years ago with a Revmaster engine, and again in the Oshkosh 500 and the CAFE 400 with a water-cooled RotoWay engine. Steve is now installing a Continental C-85 in his KR and expects to be flying with this engine next month.

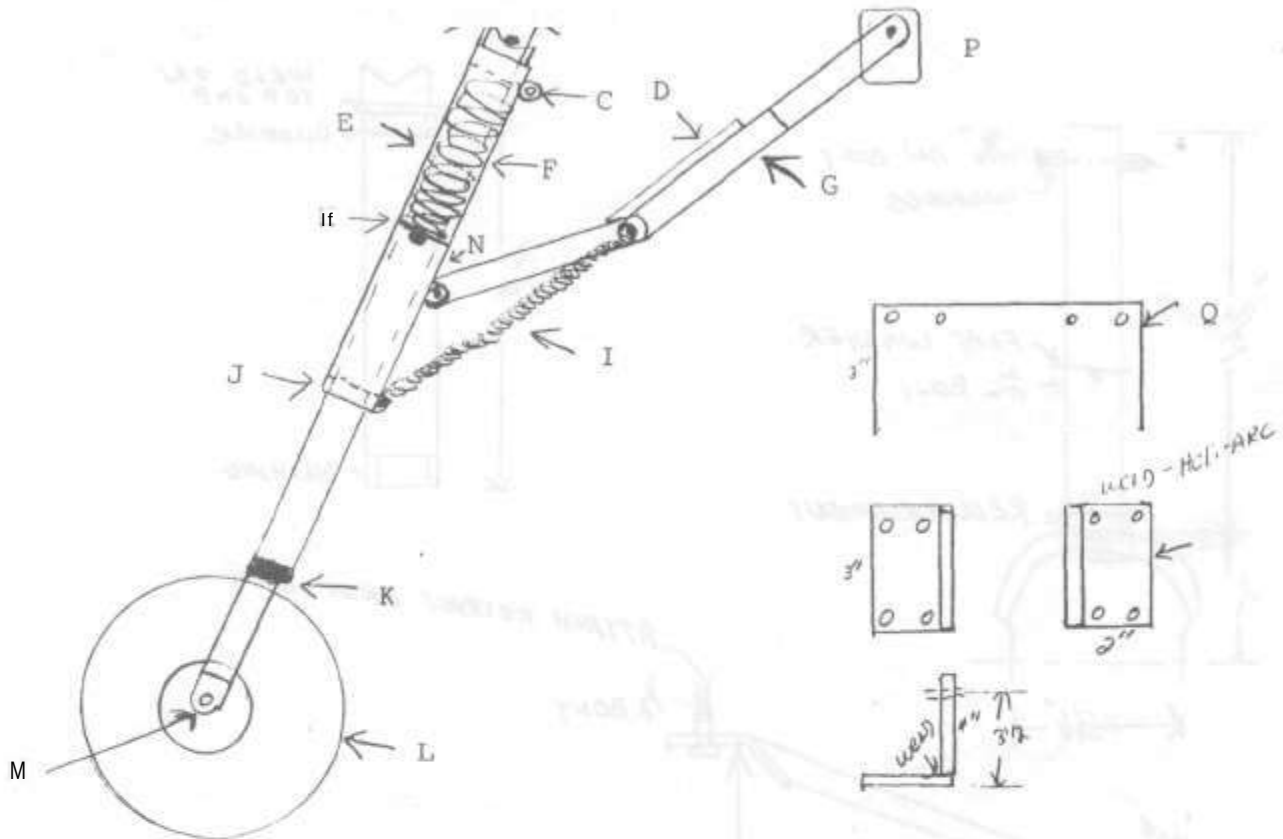
We will have a full report and pictures of this conversion in the January or February issue of the Newsletter.

!!! THE STING IS BACK !!!

THE ORIGINAL STING tuned exhaust system for KR's is now available again. This system is designed specifically for the KR using a VW engine. Provides a 15 to 20% increase in horsepower.

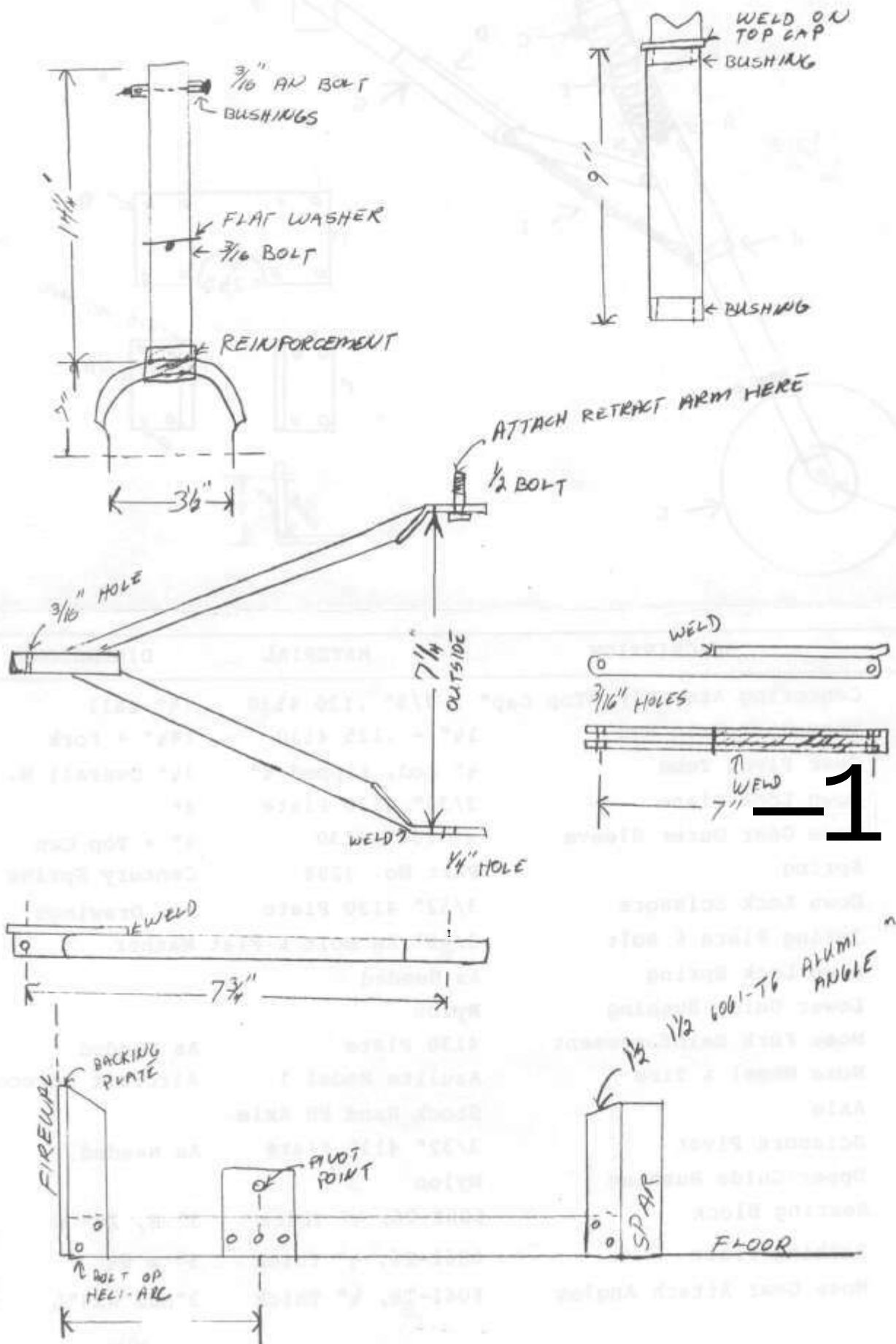
Production orders are now being taken and price will be \$250 a set. Please contact me at the Newsletter for more information or to place your order.

KR TRI-GEAR NOSE WHEEL ASSEMBLY



ITEM	DESCRIPTION	MATERIAL	DIMENSIONS
A	Centering Assembly "Top Cap"	1 7/8" .120 4130	IV tall
E	Nose Fork Main Rod	IV - .125 4130	14V + Fork
C	Gear Pivot Tube	V rod, tapped V	3V Overall W.
D	Down Lock Plate	3/32" 4130 Plate	4"
E	Nose Gear Outer Sleeve	2" .065 4130	9" + Top Cap
F	Spring	Part No. 3298	Century Spring
G	Down Lock Scissors	3/32" 4130 Plate	See Drawings
H	Spring Plate & Bolt	3/16" AN Bolt & Flat Washer	
I	Down Lock Spring	As Needed	
J	Lower Guide Bushing	Nylon	
K	Nose Fork Reinforcement	4130 Plate	As Needed
L	Nose Wheel & Tire	Azulite Model 1	Aircraft Spruce
M	Axle	Stock Rand KR Axle	
N	Scissors Pivot	3/32" 4130 Plate	As Needed
O	Upper Guide Bushing	Nylon	
P	Bearing Block	6061-T6, V Thick	3" H, 2V W
Q	Backing Plate	6061-T6, V Thick	3" x 9V
R	Nose Gear Attach Angles	6061-T6, V Thick	3"Hx2"Wx4"L

KR TRI-GEAR NOSE WHEEL ASSORTED ASSEMBLIES



MARKETPLACE

FOR SALE...KR-2 PLANS, Unused or will trade for Teenie Two or Windwagon plans. PO Box 477, Cascade, IA 52033. 319/852-3359.

WANTED...KR-2 PLANS. Must be very reasonable. Jim Murphy, 7004 Escondido Ct., Arlington, Tx. 76016. 817/572-3589.

WANTED...KR-2 PLANS by R/C modeller. Please send price and specifics. Nolon Schmidt, 611 Grant Ave, Fort Leavenworth, KS66027.

FOR SALE...REVMaster 2100-D, 75hp, high performance heads, starter, alternator, oil cooler and filter, dual Bendix mags, Rev-Flow carburetor, manuals. Never Run! \$3,700. 214/867-5892.

WANTED...VW engine in running condition, complete with prop and hub. 1242 Sabrina Ct., Redwood City, Ca 94061.

FOR SALE...HAPI 60-2, 1830CC Engine. Complete with Posi Supercarb, full electrical system, intake manifold, prop hub and matching Great American propeller. All 0-time, never installed. My project "in holding pattern". My loss is your gain. Will sacrifice for \$2400. Dick Denman, 10732 Cedar Way, Grass Valley, Ca 95945. 916/265-5811 days, 273-3471 evenings.

WANTED...Engine mount, cowling, propeller, engine for a KR-2. Roger Ketcham, Rt. 73, Sudbury, Vt 05733. 802/247-5711.

WANTED...KR-2 FLYABLE. Radios not necessary. Please send description, your price and photo if available. Achim Gross, Box 32, Asslar-Werdorf 6334, West Germany 0-11-49-6443-9478.

Non-Commercial Classified advertisements are run at no charge to KR NEWSLETTER subscribers. Ad will run once per insertion. Commercial ad rates available upon request.

Aviation Needs?

Find it
In

Tnde-A-Plane

410 W. 4th St.

P.O. Box 929A

Crossville, IN 38555

618-84.5137

Subscriptions

\$22 per year

\$11 per 6 mo.

50 Years of Quality & Service

1937

1987



AIRCRAFT SUPPLY, INC.

THOUSANDS OF IN STOCK ITEMS INCLUDING:

ALUMINUM TUBING	4130 TUBE
ALUMINUM SHEET & SHAPES	4130 SHEET STEEL
INSTRUMENTS	AIRCRAFT PLYWOOD
RANDOLPH DISTRIBUTOR	SITKA SPRUCE
RAZORBACK FABRICS	AN-HARDWARE
AIRCRAFT KITS	SHOP TOOLS
SUPERFLITE	TIRES
SAFE-T-POXY	BATTERIES
OIL COOLERS	POLISH
CLEVELAND WHEELS & BRAKES	PLEXIGLAS

PLUS:

A Knowledgeable Staff - To help answer your questions.

Fast Service - 95% same day shipping.

First Quality Products.

YOU'VE TRIED THE REST NOW TRY THE BEST

CALL TOLL FREE 1-800-345-2558 - OUTSIDE IL.
INSIDE ILLINOIS & FOR INFORMATION -1-312-422-3220

B&F Aircraft Supply, Inc., 6141 W. 95th St, Oak Lawn, IL

Catalog 4.00 U.S. - 10.00 Overseas/ Refundable on 1st 30.00 purchase

CAREY ANDERSON
L-ITEFLITE HARDWARE

Rt. 3, Box 138-10
 Strafford, Missouri 65757
 (417) 736-2298

Aileron counterbalances (arms & weights) \$65. plus shipping

Aileron push-rod arms & Heiw joint* & spacers \$26.*

Landing gear lockbar SPRINGS mouse-trap design \$12.pair •

12 cowl brackets & 8 cowl joining plates drilled, ready for Camloc \$54. •

•tipper elevator pulley bracket \$15*
 Assembled

Rudder. eIevator horns & hinges fc back-up plates \$55.*

•tileron be11cranks*. horns complete
 Assemblies (24 pieces) \$87. •

Rudder pedal mount blocks \$30. *
 Control stick assembly per plans w/mike switch \$75.*

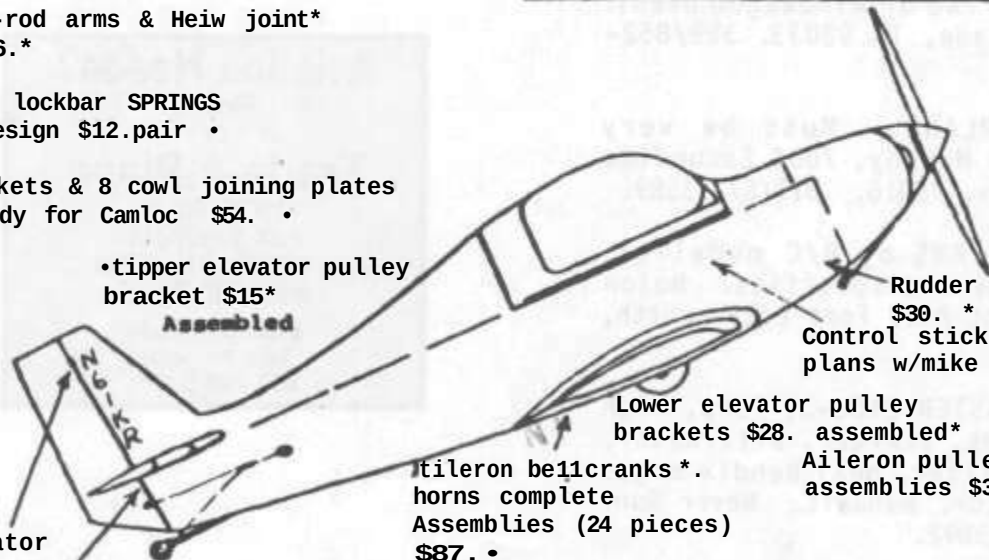
Lower elevator pulley brackets \$28. assembled*

Aileron pulley brackets assemblies \$30.*

•postpaid items

Quality...all material is aircraft aluminum/steel as specified in the KR Construction Plans Book. S.A.S.E. more information.

Planning to purchase the Rand-Robinson #4 Aluminum Extrusion Kit? Let us save you time and money. Miniature Metrics will pick up the kit from Rand-Robinson, perform necessary machining and return to Rand-Robinson for shipping. Parts will be cut, milled, drilled and shaped. Send us a S.A.S.B. for more Information.



KR NEWSLETTER

P.O. BOX 876
 PARKER. COLORADO 80134



55108 154
 JEFFREY WALTER
 2417 BOURNE AVE
 ST PAUL, MN 55108





KR NEWSLETTER

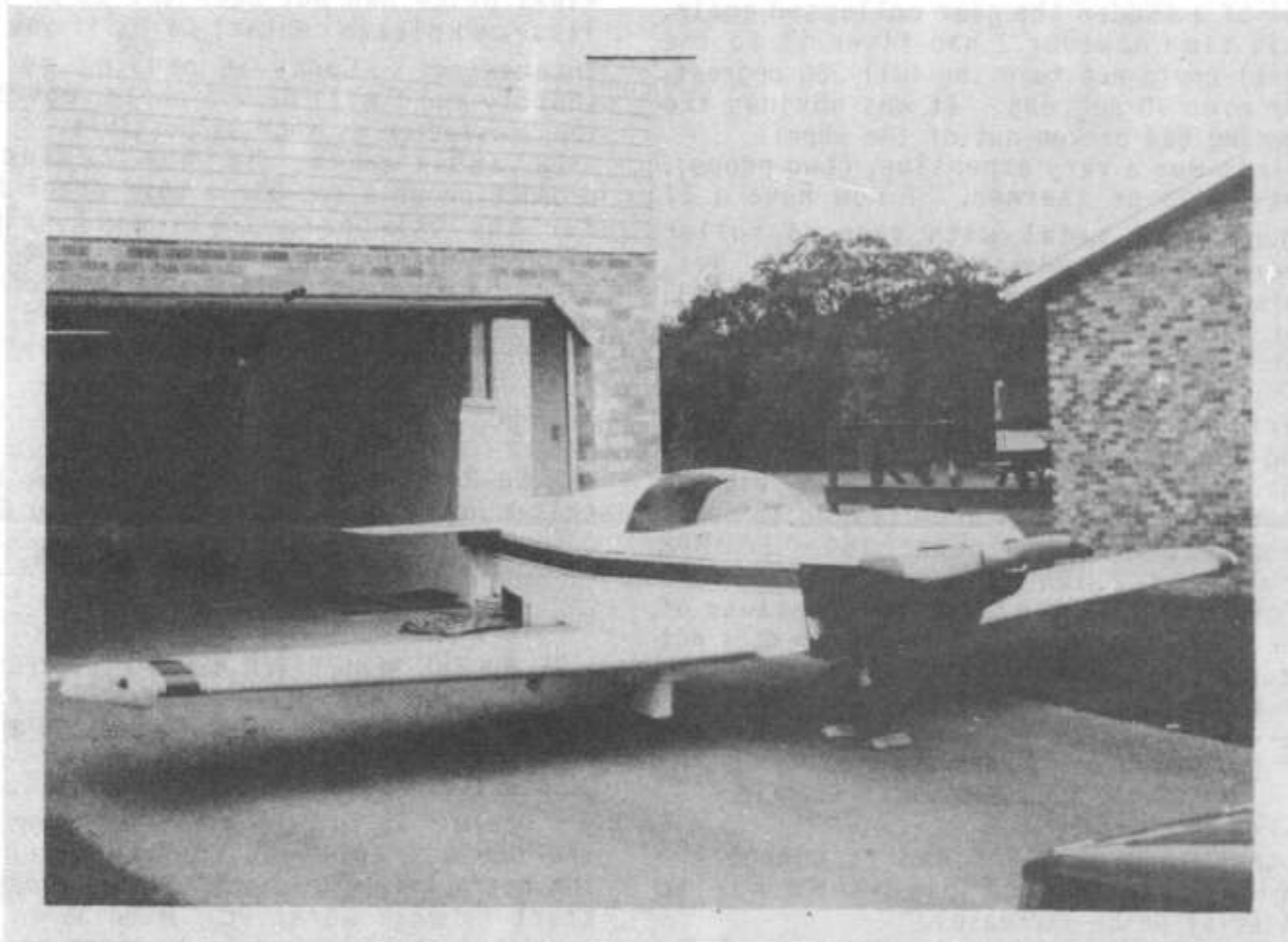
Rates

USA \$12.00 YEAR

CANADA \$15.00 YEAR

OVERSEAS \$20.00 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



CORRECTIONS

ISSUE NO. 132 contained a request for assistance by builders in the Netherlands regarding wider KR's. THE ZIP CODE IS INCORRECT. The correct address should be Louis Staalberg, 7234 E. Papago Dr., Scottsdale, Az. **85257.**

THERE IS A NUMBERING error in the Newsletters. When I resumed publishing the Newsletter again last year I numbered the issues incorrectly. There is no Issue 126, 127, 128 or 129. Subscriptions have all been extended 4 issues to allow for the error.

TRI-GEAR NOSE WHEEL FAILURE

Gary Jasper
118 Druid Dr.
McMurray, Pa 15317
412/941-3414

I WANTED TO write you and make a suggestion on your Tri-Gear after reading the Newsletter. I have completed my tri-gear KR and have 36 hours on it. This has not come without some hard times.

I used the DeFreze plans because it looked pretty simple. Now we know nothing is simple, but the point is I see your nose gear is very much like the DeFreze

plans. My suggestion is that you DO NOT use the Azulite wheel. I used this wheel when I first installed my nose gear. (I might add that I have a Cont. 85 hp engine in my KR).

After a couple of high speed taxi runs I was slowing down when the gear collapsed. The only things I could figure out at the time was somehow the wheel got turned sideways. Anyway, back to the shop. After a lot of work and repair it was back to the airport with a new AZULITE wheel.

Things went pretty good for awhile, then all of a sudden the gear collapsed again. This time however I had fixed it so the wheel could not turn the full 360 degrees, nor even 90 degrees. It was obvious the bearing had broken out of the wheel.

This was a very expensive, (two props), lesson to be learned. I now have a EZ wheel, all metal with tapered roller bearings at a cost of about \$60. Yes, this is a lot more than the Azulite wheel, but believe me it works a whole lot better also.

My KR-2 flies GREAT! I have a lot of performance with the 85 hp and will try and get you a flight report as soon as I get running the way I want it. My biggest problem to date has been trying to get a prop that will work best. 160 - 170 MPH cruise at 2,300 rpm on 4.5 gph is no problem. With the CG forward because of the extra engine weight the pitch does not seem as bad as others I have read about. Once trimmed up it will fly hands off.

LITEFLITE HARDWARE PRICE CHANGES

CAREY ANDERSON HAS had to change the prices on some of his items due to material price increases.

Please refer to Carey's ad on page 6 for details.

Also, Carey informs me that if you plan to purchase Rand's #4 Aluminum Extrusion Kit and have him perform the machining, Wicks is the nearest shipper to him, so you can save quite a bit of shipping expense if you purchase the kit from Wicks and have them ship it directly to him.

TRI-GEAR ASSEMBLIES AND PARTS

THOSE OF YOU who plan to build the tri-gear featured in the last few Newsletters will be happy to know that Carey Anderson at Liteflite Hardware has also decided to

build parts for the gear system!

First parts available are the Scissors assemblies needed for the main gear. These are symmetrical assemblies made of cast aluminum alloy by Carey specifically for this gear. Cost is \$25.00 a pair and 2 pair are needed for the system.

CAREY IS ALSO now ready to make retraction gearboxes for the gear system. These high-quality aluminum gearboxes have stainless steel shafts, a 5-crown gearbox and turn 3 shafts at once to retract the gear. The gearbox is hand cranked. A final price had not been set as of this issue, so please contact Carey if you are interested. Carey is sending me one shortly and I will have a photo report in the Newsletter as soon as possible.

In addition he is now beginning production of a one-piece nose wheel fork for the tri-gear. This will have a slightly wider fork for a wider wheel and a tow hook-up. I will have pictures and more information as soon as available.

THE KR-2 TRI-GEAR pictured on page 1 of this month's Newsletter belongs to Gary Jasper.

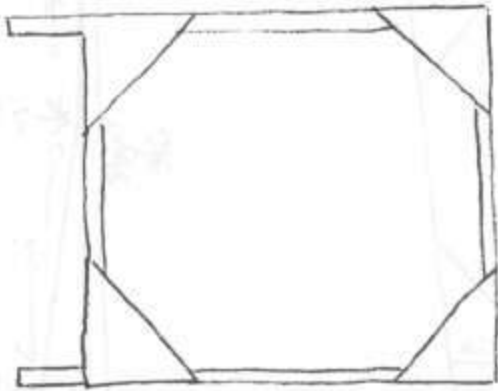
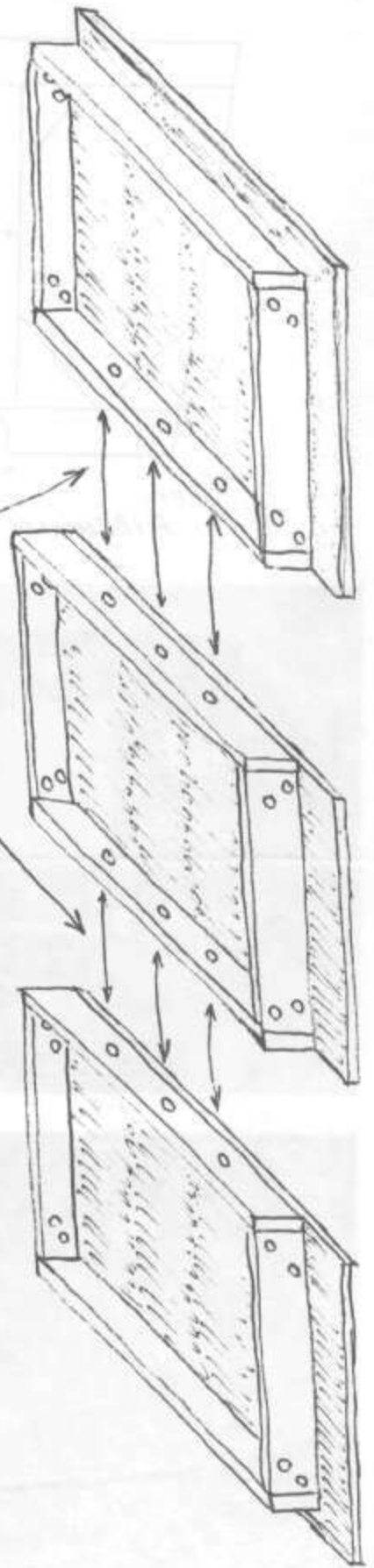
DO YOU HAVE A WIDER KR-2?

IF SO THE NEWSLETTER NEEDS PICTURES AND OR BUILDING AND FLIGHT REPORTS. I AM PREPARING A SERIES ON WIDENING KR'S AND YOUR ASSISTANCE IS NEEDED!

I would like to pass along the plans for the table I am using for construction. The extra time for those getting ready to start is well worth it. Mine is in two parts but could be made into three or four depending on the size required. Using 2x4's as framed legs and making a 2x4 frame under the table top, you can bolt together the amount needed. (Example: three four foot square sections bolted for one 12 foot table). On mine I put the top frame flush against the back leaving two inches on the sides and front for clamps. The four foot section is hinged to the garage wall. This way I can unbolt the legs and fold up the table for transportation and quick setup too.

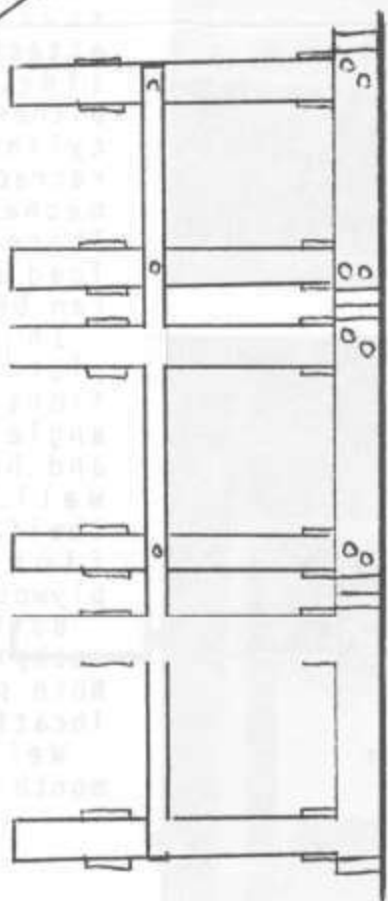
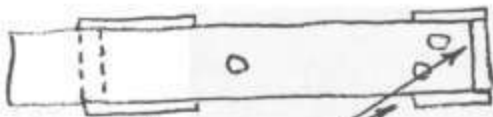
Randy Carrels
Flint, Michigan

BOLT TABLE TOP TOGETHER
(TOP - PARTICLE BOARD OR PLYWOOD)



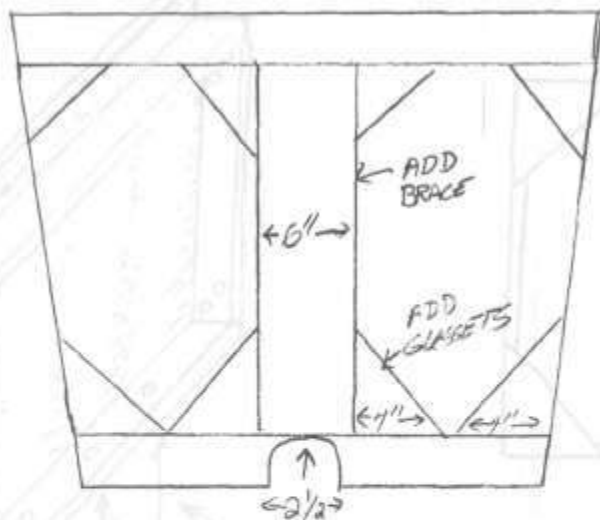
LEGS MADE OF 2x4's

MADE TO INSERT IN
LE FRAME
THEN BOLTED TO FRAME.
IS FOR IRONING STRIP BOLTED ON
FOR SID TO SIDE SUPPORT.

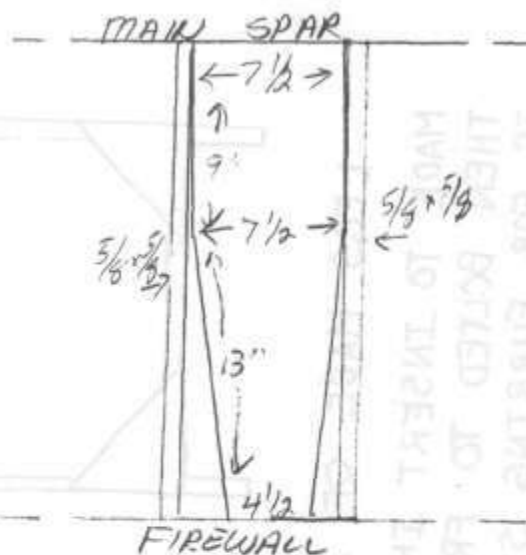


{CORNER GUSSETS ARE NEEDED
FOR SUPPORT. TOP CROSS PIECE
SHOULD GO OVER LEG PIECES}

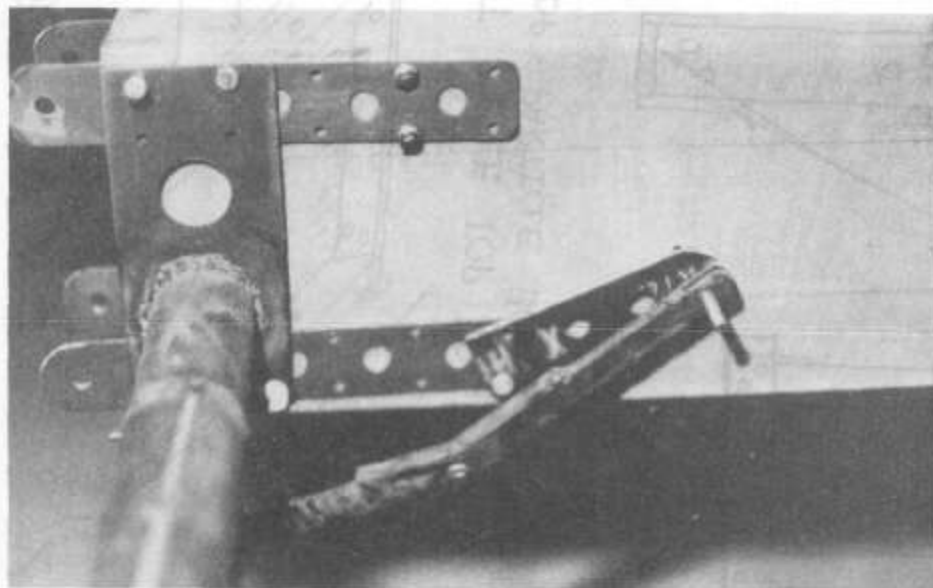
(WORK TABLE IS VERY STABLE!)



FIREWALL ADDITIONS



NOSE WHEEL FLOOR CUT-OUT



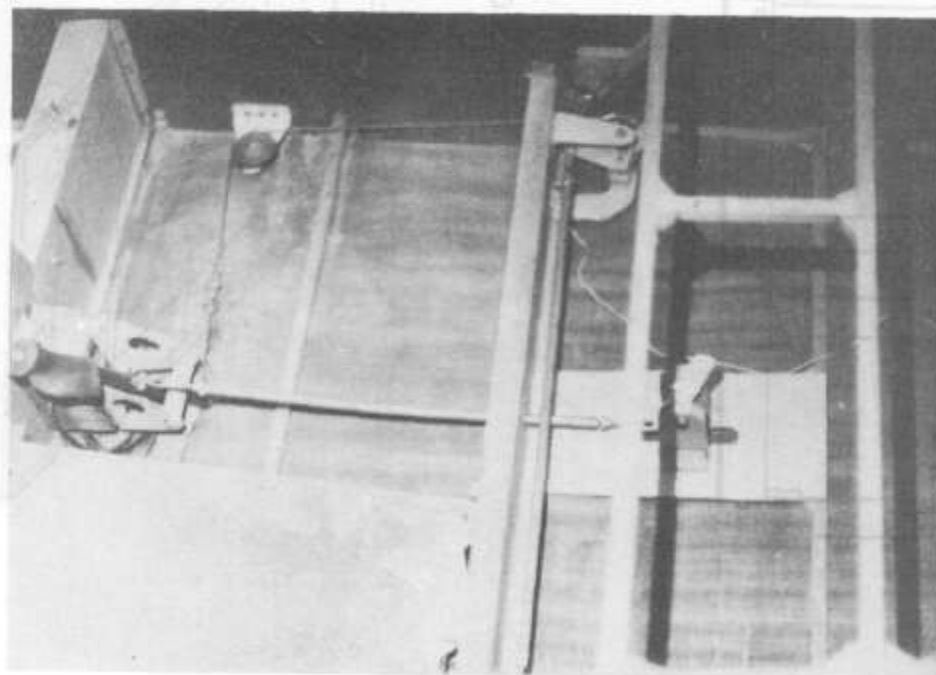
TRI-GEAR, PART III

The mains lock with an "over-center" arm. A shaft is welded to the top arm, run thru the spar and a lever is attached on the forward side. You may then either attach a hydraulic cylinder for hydraulic retraction of a shaft for mechanical retraction. There will not be much load on this shaft so it can be hollow aluminum.

In addition to the pictured firewall additions, add an aluminum angle to the inside top and bottom of the firewall. Attach to top shelf and floor. Make floor out of 1/4" plywood.

Bottom picture shows cockpit control mounting. Note pulley and bellcrank locations.

We'll continue next month with more.



MARKETPLACE



A Performance Tuned Exhaust
for the vW Aircraft Engine!

•"The Sting" will give you a 5 to 15% increase in engine performance over the customary "straight pipes".

•Fuel economy is increased. You get more pou/er from less fuel due to the efficient design.

•Exhaust valve life is prolonged due to the long tubes creating a "buffer zone" between the valves and rapid temperature change.

* Will fit 160ticc to 2200cc conversions, It's ready to bolt on your engine, nothing to fabricate.

•"The Sting" is designed specifically for Rev/master, Diehl, and HAPI VUI conversions as installed in a KR. Will fit most other VW powered aircraft also.

\$250 plus shipping
JOHN FORRESTER
P.O. Box 876
Parker, Co. 80134
303/841-9379

FOR SALE...KR-2: Fuselage and wing spars complete, on gear. Factory glass components, some fabricated hardware, all foam and glass cloth, VMS tape for Diehl wing skins, extra set of disc brakes with Lamb wheels and tires, brake pedals and hydraulics, some instruments. Quality craftsmanship throughout. Also have three 1835cc engine kits with new OEM crankshafts. Large valve, twin-plug cylinder heads, some accessories. Matt Kurke, 4284 Enterprise Ave., Naples, Florida 33942. Days: 813/643-0911, Evenings: 813/455-6503.

FOR SALE...ROTORWAY RW100 Engine, new in crate, complete accessories and radiator, prop hub and extension. \$3,000 or best offer. 805/824-4359 or Evenings: 805/948-9642.

FOR SALE...KR-2 PROJECT. Partially completed. Most materials needed to finish project, including engine. 507/282-2403. NO COLLECT CALLS PLEASE.

FOR SALE...KR-1 KIT. Wood, aluminum, fozm, fitting and hardware kits, main gear, rudder pedals, mag & harness, engine mount, Diehl accessory case, posa carb. Will deliver within reason. Contact Joe Wallace, Creston, Iowa. 515/782-6575 days, 515/782-8190 eveings.

FOR SALE...KR-2 PROJECT. On wheels, have fuel tank, engine cowlng, some styrofoam, fabric, wood and a rebuilt 2180cc VW engine. Wings spars are aligned (pilot holes drilled), aileron and elevator controls in place, retractable gear. Will sell all for \$2,500 or \$2,000 without engine. No collect calls. Bob Craft, El Paso, TX. 915/598-3372.

FOR SALE...KR-2 REVMASER ENGINE COWLING. New, still in carton. \$150. Max Calkin, 501/426-5307.

Aviation Needs?

Find it
in'

Trade-A-Plane

410 W. 4th St.
P.O. Box 929A
Crossville, TN 38508
615-484-5137

Subscriptions
\$22 per year
\$11 per 6mo.

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
PO BOX 876, PARKER, COLORADO 80134.
303/841-9379 - EVENINGS AND WEEKENDS.
ALL BACK ISSUES ARE AVAILABLE.
NON-COMMERCIAL ADS ARE FREE TO
SUBSCRIBERS.

CAREY ANDERSON UTEFLITE HARDWARE

Rt. 3, Box 138-10
Strafford, Missouri 65757
(417) 736-2298

Aileron counterbalances (arms & weights) \$65.*
Aileron push-rod arms & Heim joints & spacers * \$38.
Landing gear lockbar SPRINGS, mouse-trap design. \$12 pair*
12 cowl brackets and 8 cowl joining plates. Drilled,
ready for camloc. * \$65.

Planning to purchase the Rand-Robinson #4 Aluminum Extrusion Kit? Let us save you time and money. Purchase the kit from Wicks Aircraft Supply, have them ship it directly to us where we will perform the necessary machining and we'll ship it to you. Parts will be cut, milled, drilled and shaped. Send us a S.A.S.E. for more information.



QUALITY...all material is aircraft aluminum/steel as specified
in the KR Construction Plans Book. S.A.S.E. more information.

*postpaid items

KR NEWSLETTER
PO BOX 876
PARKER, CO. 80134
ISSUE 133 JAN. 1988



ISSUE NO. 134

FEBRUARY

1988

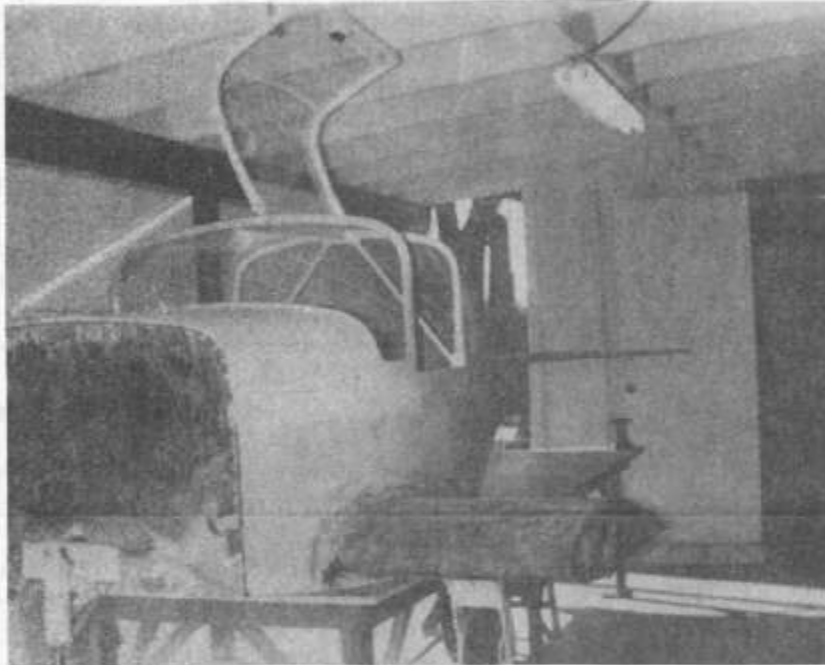


KR NEWSLETTER

Rates

USA \$12.40 YEAR
CANADA \$15.00 YEAR
OVERSEAS \$20.00 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



Vernon Cheney
8607 E. Thornwood Dr.
Scottsdale, AZ 85251

(Drawings to go along with this text can be found on page 2.)

Dear John:

I am really pleased that you are again publishing the KR Newsletter.

I thought you might want a little feedback from someone who has benefitted in the past.

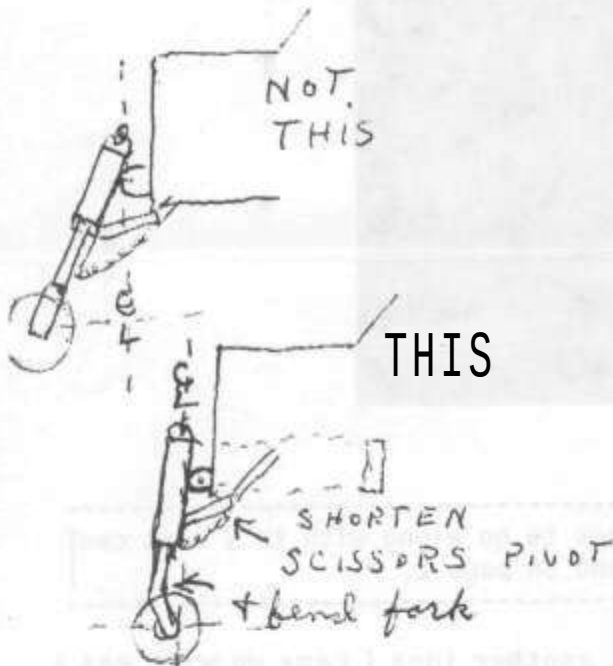
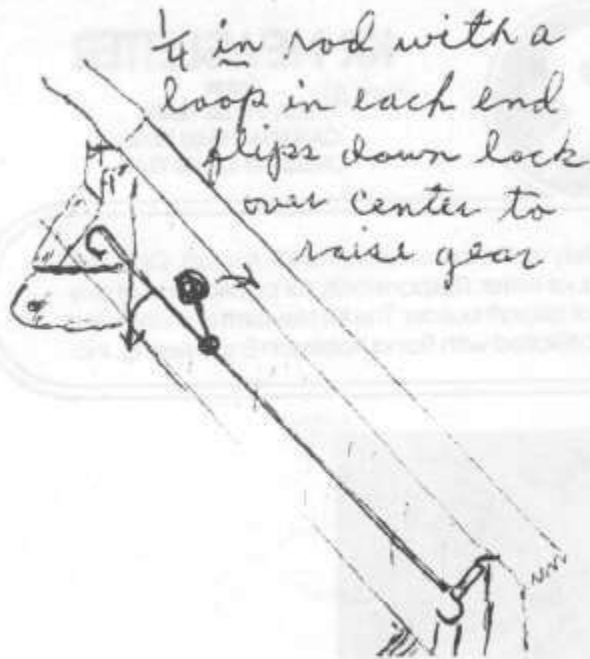
I have been working on my KR-2 tri-gear for almost 10 years, off and on and etc.

I used Bill DeFreze's excellent ideas and went from there. However, after reading LANDING GEAR DESIGN FOR FLIGHT AIRCRAFT, I decided to reduce the forward slant of the nose gear to almost vertical. Especially since it is free casting. Putting the center line behind the pivot point. The way it was, it would be more prone to "flap" over or shimmy, putting more strain on the fork and wheel bearings. However, that is the way I interpreted Pazmany's book.

Also, another idea I came up with was a way to lock up the nose gear and also the mains at the same time. I mounted a common door latch on the main spar, so a pawl on the retraction lever would hit the latch, just like shutting a door. Then, where the door knob was I made a walnut lever to unlock the gear again.

When the gear goes down, the two downlock bars go back towards the spar and back over center. To raise the gear I have a long 1/4" rod with a loop on each end, which when flipped, lets the gear raise again.

That's about all, except I made my fuselage sides straight instead of "canoeing" it.



HAVE YOU CONTRIBUTED INFORMATION TO THE NEWSLETTER LATELY?

PLEASE DO SO TODAY

TRI-GEAR NOTES

I have received some letters asking for more detailed plans for the tri-gear featured in the last few Newsletters.

Once again I must stress that these drawings are NOT complete plans, but only the rough sketches and notes from when I originally built my tri-gear system.

They are not intended to be complete or to be followed "to-the-letter".

They are to be "food for thought" and to help give you some ideas for the complete design of your own gear system.

Next month I will have more photos of my installation, showing the control system and retraction ideas. (The photos came out too dark for reproduction, so I must shoot them again).

If you're building a system, your input is needed in the form of photos, tips and ideas!

QUESTIONS & ANSWERS

Q. Where do you get the information contained in the Newsletter?

A. Information in the Newsletter comes from a variety of sources. Some of it comes from my own aircraft experience, (I am an A&P) and the building of two KR-2s myself. Most of it however comes from you the builder. Without constant input of ideas, articles and photos the Newsletter could not exist.

Q. I am interested in installing Rand's new fixed gear system. Do you know of anyone who has installed this system yet and how did it work out?

A. So far I have not talked to anyone who has installed this system, nor have I received a builders report. If anyone is using this system, please send a report to the Newsletter and I'll quickly publish it.

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
PO BOX 876, PARKER, COLORADO 80134.
303/841-9379 - EVENINGS AND WEEKENDS.
ALL BACK ISSUES ARE AVAILABLE.
NON-COMMERCIAL ADS ARE FREE TO
SUBSCRIBERS.

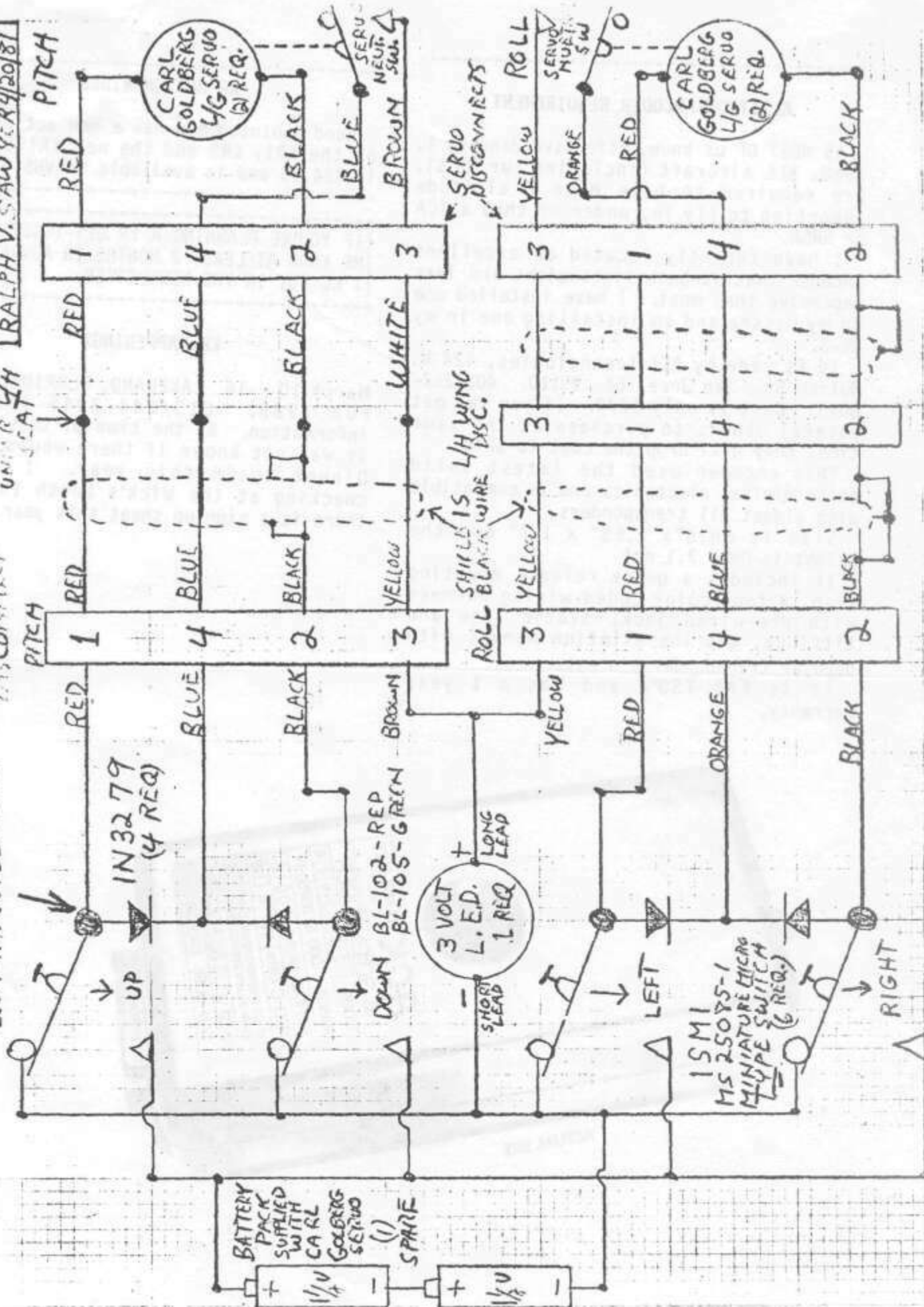
KR ROLL CONTROL SYSTEM

NOTE- MOST DIODES
THAT WILL CARRY
20 MA. WILL WORK.

PANEL
CONTROL UNIT
CONNECT

CABLE
SPICES
UNIP. 4H
SEA

"GPS" TRIM SYSTEM
DESIGNED BY:
RALPH V. SAWYER 4/20/81



KR ACTION VIDEO

Rand Robinson now has a new action video on the KR1, KR2 and the new KR100. Cost is \$24.95 and is available in VHS or BETA.

IF YOU'RE PLANNING A KR GET-TOGETHER LET
ME KNOW AT LEAST 2 MONTHS IN ADVANCE AND
I'LL PUT IN THE NEWSLETTER

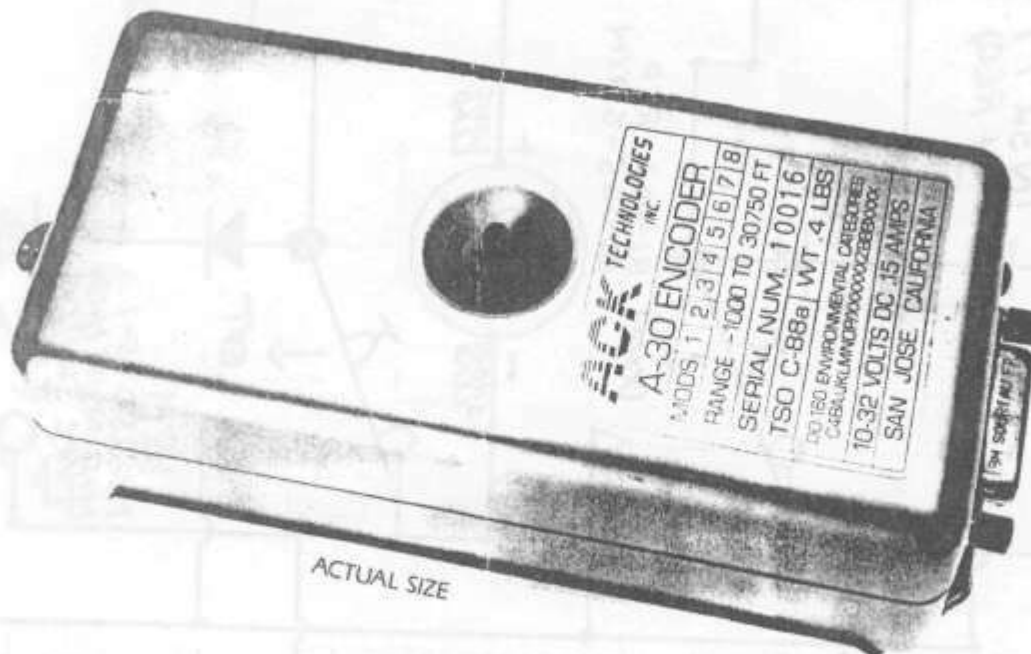
KR HAPPENINGS

March 10 - 16 LAKELAND, FLORIDA. Sun 'n
Fun 1988. 813/644-2945 for more
information. At the time of this writing
it was not known if there would be a KR
Dinner again this year. I suggest
checking at the Wick's booth to see if
there is a sign-up sheet this year.

Size is on 6"x 2.65" x 1.7" and the weight is ONLY 7.1 oz!

It includes a quick release mounting trap, 4 foot color coded wiring harness with pre-wired jack, static line and fittings, and installation manual with popular transponder pin outs.

It is FAA TSO'd and has a 1 year warranty.



MARKETPLACE



A Performance Tuned Exhaust
for the Aircraft Engine!

*"The Sting" will give you a 5 to 15% increase in engine performance over the customary "straight pipes".

Fuel economy is increased. You get more power from less fuel due to the efficient design.

•Exhaust valve life is prolonged due to the long tubes creating a "buffer zone" between the valves and rapid temperature change.

» Will fit 1600cc to 2200cc conversions. It's ready to bolt on your engine, nothing to fabricate.

*"The Sting" is designed specifically for Revmaster, Diehl, and HAPI VW conversions as installed in a KR. Will fit most other VW powered aircraft also.

\$250 plus shipping
JOHN FORRESTER
P.O. Box 876
Parker, Co. 80134
303/841-9379

Aviation Needs?

Find it
in

Xtrade-A-Plane

410 W. 4th St.
P.O. Box 929A
Crossville, TN 38555
615-484-5137

Subscriptions
\$22 per year
111 per 6 mo.

FOR SALE...COMPLETE RETRACT GEAR FOR KR-2, has been installed and tested, but never landed or taxied on. Will sell for \$150 or trade for kr-2 parts. Merrit Crabtree, 358 N. Elm, Colville, Wa. 99114. 509/684-5970.

FOR SALE...KR-2. Revmaster 1834, retractable tri-gear, full IFR panel, Escort 110 radio, starter and alternator. Expanding family forces sales. \$7,000 or trade to a 4-place plane. Mark Needs, 302/335-3931.

FOR SALE...KR-2. All wood, (epoxy allergy caught me), 2100 cc Revmaster engine, push-pull control on ailerons and elevator. Ailerons, elevator, rudder balanced. Wings hold 6 gallon gas tanks plus regular Rand main tank. Wings completely done but will cover with ceconite 7600 (Blue River). Fuselage structurally done. Require fairings at retractable gear area, wing and elevator fillets. Work remaining includes engine mounting and all engine controls and instruments. Build canopy frame since I built my own turtle deck raising it 2 inches and making it flat on top. Also have flaps that go up 10° for high speed cruising and down to 90 ° for dive brakes. Navigation lites, elevator trim position in cockpit, servo driven trim. Have Loran for navigation. Arthur Heavener, Aerospace Consultant, Route 1, Box 154, Aurora, MO 65605. 417/678-5785.

FOR SALE...KR-1 KIT. Wood, aluminum, foam, fitting and hardware kits, main gear, rudder pedals, mag & harness, engine mount, Diehl accessory case, posa carb. Will deliver within reason. Contact Joe Wallace, Creston, Iowa. 515/782-6575 days, 515/782-8190 evenings.

FOR SALE...KR-2 PROJECT. On wheels, have fuel tank, engine cowlings, some styrofoam, fabric, wood and a rebuilt 2180cc VW engine. Wings spars are aligned (pilot holes drilled), aileron and elevator controls in place, retractable gear. Will sell all for \$2,500 or \$2,000 without engine. No collect call s. Bob Craft, El Paso, TX. 915/598-3372.

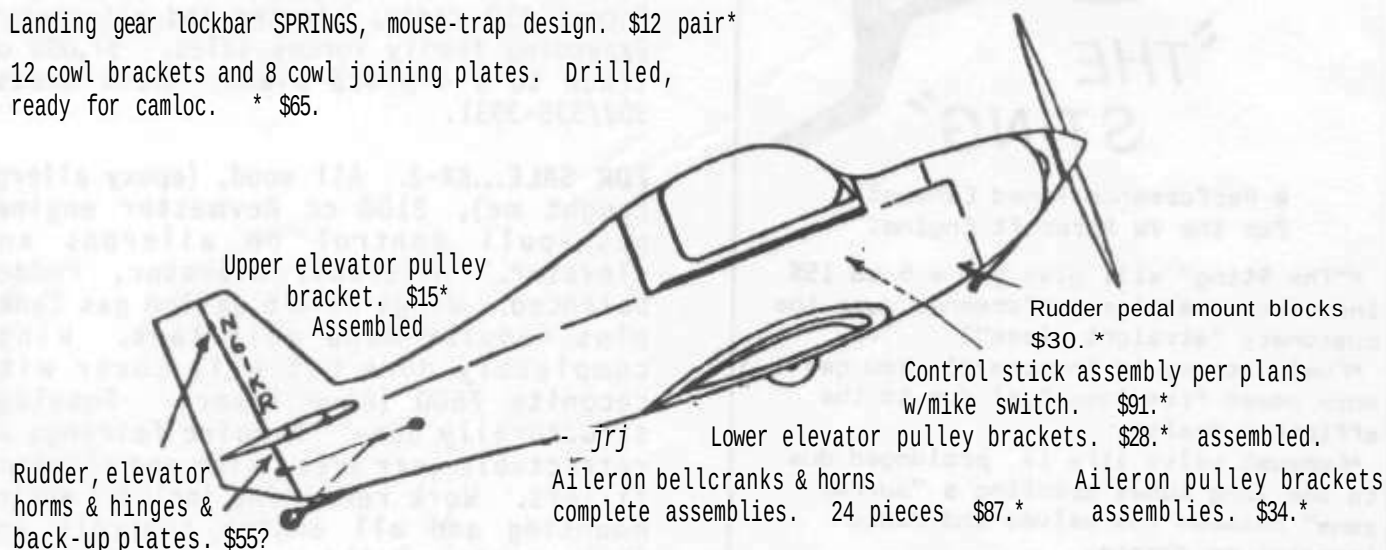
FOR SALE...KR-2 REVMASER ENGINE COWLING. New, still in carton. \$150. Max Calkin, 501/426-5307.

CAREY ANDERSON
LITEFLITE HARDWARE

Rt. 3, Box 138-10
 Strafford, Missouri 65757
 (417) 736-2298

Planning to purchase the Rand-Robinson #4 Aluminum Extrusion Kit? Let us save you time and money. Purchase the kit from Wicks Aircraft Supply, have them ship it directly to us where will perform the necessary machining and we'll ship it to you. Parts will be cut, milled, drilled and shaped. Send us a S.A.S.E. for more information.

Aileron counterbalances (arms & weights) \$65.^T
 Aileron push-rod arms & Heim joints & spacers * \$38.
 Landing gear lockbar SPRINGS, mouse-trap design. \$12 pair*
 12 cowl brackets and 8 cowl joining plates. Drilled, ready for camloc. * \$65.



QUALITY...all material is aircraft aluminum/steel as specified in the KR Construction Plans Book. S.A.S.E. more information.

*postpaid items

KR NEWSLETTER
PO BOX 876
PARKER, COLORADO 80134
ISSUE NO. 134 FEB. 1988





KR NEWSLETTER

Rates

USA \$120) YEAR

CANADA \$15.00 YEAR

OVERSEAS \$20.00 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KRAircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



FLIGHT REPORT

KR-2 N63BH

NEW KR NEWSLETTER EDITOR SOUGHT

AS MOST OF you know, my health has not been the greatest lately and as a result I am seeking a new editor to take over the KRNewsletter.

The Newsletter provides an excellent source of extra income and you get to communicate with some of the greatest people you could ever hope to know - KR BUILDERS!

If you are interested and desire more information, please contact me at 303/841-9379, evenings or weekends.

I AM ENCLOSING a phot of my KR-2, which I started to build in 1980. I worked on it a few hours at night and weekends for four years.

The final outcome was well worth all the hard work and frustration. I took the plane to the airport in August of 1985, but did not fly it until May 17, 1986.

I had a problem with the carburetor not delivering enough gas for high speed operation. It would run two minutes at full power and quit cold. I tried everything I could think of to clear the problem. I finally installed an electric fuel pump and it ran ok.

I taxi tested for a few hours and found other things not to be the way they should be and made corrections.

On May 17th I taxied to the end of Runway 4 at Manahawkin airport, added power, and didn't add left rudder to

compensate for torque and started off the side of the runway. I over corrected and started to the other side. It got airborne at this time.

I was too far down the strip to stop and climbed out to 2000 feet and flew around for half an hour. It flew very well and trimmed out and flew hands off straight and level, with no fall off on either side.

My first approach was too fast and I had to go around for another try. I touched down and the engine stalled. I had my hands full trying to stop and went off the runway into the sand. No damage.

I tried more adjusting of the carburator and a week later I tried again. Take off was uneventful. Again I made too hot an approach and went around for another try. This time I got on the ground, but still couldn't stop. I went out in the sand at the end of the strip.

I checked the brakes for adjustment and the idle adjustment again. The next take off went well and I flew to Miller Air Park, with a 6000 foot strip, and landed with no problem.

I now have 72 hours on the plane. I replaced the wheels and brakes with the Rand Robinson kit and it was well worth the money and time to install them. I can now stop in 1000 feet.

I changed the troublesome carb to an Ultra-carb from HAPI. It runs much better with no hesitation on touch and gas.

The empty weight came out to 560 lbs. I have a 12 gallon tank as per the plans. I installed the aluminum angle to the upper firewall as shown the KR Newsletter. I had already installed the gussets to the stabilizer spar.

I used two layers of fiberglass and epoxy on the wings and four on the leading edges. The paint job was done by my son, using automotive Dupont Centari acrylic enamel.

The wing span was made 21 feet even. The rest of the plane was according to the plans book.

Performance is as follows:

Empty weight: 560 lbs.
Gross weight: 960 lbs.
Cruise at 2900 rpm: 145 indicated
Climb at 3000 rpm: 900 fpm
Approach at 60 mph
Touch down at 55 mph

I have cylinder temp gauge which runs 400 degrees on climb and 325 to 350 degrees at cruise. Oil temperature runs 150 to 170 degrees. The oil pressure holds at 60 lbs.

I did not install flaps and that is probably the reason I had trouble landing on my first flights. I don't have any trouble now.

Nelson R. Heinrichs
Mill St.
West Creek, NJ 08092

KR COMPUTER PERFORMANCE ANALYSIS

THE FOLLOWING COMPUTER analysis on the KR-2 is a copy of a standard computer aircraft analysis. It shows performance figures at different speeds.

RAND-ROBINSON KR-2
NON-LAMINAR
FUSELAGE AREA- 1.5 SQ.FT.
CD- .17
MAINS= 4 IN. NOSE/TAIL= 2 IN.
WHEEL PANTS ATTACHED
STRUTS: 0 LENGTH= 0 FT.
WIRES= 0 FT.
SPAN- 20.7 FT. AREA- 80 SQ. FT.
WEIGHT- 900 LB BHP- '4
PROP DESIGN SPEED= 200 MPH
ASPECT RATIO= 5.35613
WING LOADING- 11.25
FUSELAGE AND JUNK TOTAL EFFECTIVE CDA= .370277
CLEAN STALL SPEED- 57.0793 MPH
SPEED* 57.0793 MPH
POWER RKQULKElfe 16.64 THRUST HP
THRUST POWER AVAILABLE- 19.4 THP
RATE OF CLIMB- 101.28 FPM
POWER OFF SINK RATE- 793.03 FPM
TOTAL DRAG- 109.28 LBS
LIFT/DRAG RATIO- 8.24
SPEED. 60 MPH
POWER REQUIRED- 14.44 THRUST HP
THRUST POWER AVAILABLE- 20.29 THP
RATE OF CLIMB- 214.51 FPM
POWER OFF SINK RATE- 688.07 FPM
TOTAL DRAG- 90.2 LBS
LIFT/DRAG RATIO- 9.98
SPEED- 70 MPH
POWER REQUIRED- 13.2 THRUST HP
THRUST POWER AVAILABLE- 23.24 THP
RATE OF CLIMB- 368.04 FPM
POWER OFF SINK RATE- 629.29 FPM
TOTAL DRAG- 70.71 LBS
LIFT/DRAG RATIO- 12.73
SPEED- 80 MPH

POWER REQUIRED- 13.2 THRUST HP
 THRUST POWER AVAILABLE- 26.07 THP
 RATE OF CLIMB= 472.11 FPM
 POWER OFF SINK RATE= 629.02 FPM
 TOTAL DRAG- 61.84 LBS
 LIFT/DRAG RATIO= 14.55
 SPEED= 90 MPH
 POWER REQUIRED= 13.97 THRUST HP
 THRUST POWER AVAILABLE= 28.78 THP
 RATE OF CLIMB= 543.32 FPM
 POWER OFF SINK RATE= 665.66 FPM
 TOTAL DRAG= 58.17 LBS
 LIFT/DRAG RATIO= 15.47
 SPEED= 100 MPH
 POWER REQUIRED- 15.33 THRUST HP
 THRUST POWER AVAILABLE= 31.37 THP
 RATE OF CLIMB= 588.25 FPM
 POWER OFF SINK RATE= 730.65 FPM
 TOTAL DRAG= 57.47 LBS
 LIFT/DRAG RATIO= 15.66
 SPEED= 110 MPH
 POWER REQUIRED- 17.42 THRUST HP
 THRUST POWER AVAILABLE= 33.84 THP
 RATE OF CLIMB= 601.85 FPM
 POWER OFF SINK RATE= 830.58 FPM
 TOTAL DRAG= 59.39 LBS
 LIFT/DRAG RATIO= 15.15
 SPEED= 120 MPH
 POWER REQUIRED= 20.31 THRUST HP
 THRUST POWER AVAILABLE= 36.18 THP
 RATE OF CLIMB= 582.24 FPM
 POWER OFF SINK RATE= 967.87 FPM
 TOTAL DRAG= 63.44 LBS
 LIFT/DRAG RATIO= 14.19
 SPEED= 130 MPH
 POWER REQUIRED= 23.93 THRUST HP
 THRUST POWER AVAILABLE= 38.41 THP
 RATE OF CLIMB= 530.84 FPM
 POWER OFF SINK RATE= 1140.67 FPM
 TOTAL DRAG= 69.01 LBS
 LIFT/DRAG RATIO= 13.04
 SPEED= 140 MPH
 POWER REQUIRED= 28.3 THRUST HP
 THRUST POWER AVAILABLE= 40.51 THP
 RATE OF CLIMB= 447.66 FPM
 POWER OFF SINK RATE= 1348.99 FPM
 TOTAL DRAG= 75.79 LBS
 LIFT/DRAG RATIO= 11.88
 SPEED= 150 MPH
 POWER REQUIRED- 33.46 THRUST HP
 THRUST POWER AVAILABLE- 42.49 THP

RATE OF CLIMB= 331.18 FPM
 POWER OFF SINK RATE= 1594.78 FPM
 TOTAL DRAG= 83.62 LBS
 LIFT/DRAG RATIO= 10.76
 SPEED= 160 MPH
 POWER REQUIRED= 39.46 THRUST HP
 THRUST POWER AVAILABLE= 44.35 THP
 RATE OF CLIMB= 179.12 FPM
 POWER OFF SINK RATE= 1881.02 FPM
 TOTAL DRAG= 92.47 LBS
 LIFT/DRAG RATIO= 9.73
 SPEED= 169 MPH
 POWER REQUIRED- 45.61 THRUST HP
 THRUST POWER AVAILABLE= 45.92 THP
 RATE OF CLIMB= 11.09 FPM
 POWER OFF SINK RATE= 2174.21 FPM
 TOTAL DRAG= 101.19 LBS
 LIFT/DRAG RATIO= 8.89

BALANCING COULD BE VERY WORTHWHILE

THE FAA HAS just published guidelines for dynamic balancing of propellers on piston-engine aircraft thus allowing FBO's to perform this balancing operation on experimental aircraft also.

Dynamic balancing is done on the aircraft with the engine running and results in a smoothness that is unbelievable!

For the KR pilot it can mean the end of repeated avionics failures, shattered spinners, cowling cracks, broken exhaust manifolds, ignition harness failures, broken engine mounts, leaky oil coolers and other problems usually attributed to "normal wear and tear".

The FAA has found that at least 1 of 5 propellers is out of balance enough to cause these problems and 80% of propellers dynamic balanced have shown remarkable improvement.

Dynamic balancing requires a vibration analyzer/tracker set-up which is available at many FBOs.

The prop is balanced by adding common no. 10 washers to the spinner backplate or the surface of the spinner bulkhead. The spinner is replaced after balancing and the repair is permanent and invisible.

Cost should run about \$150 to \$175 and is well worth it.

FLIGHT REPORT
KR-2 N39426

HAVE A LITTLE over 400 hours on my KR-2, sure do enjoy it. Recently installed dual-port heads on my HAPI 1835cc engine. Used stock Volks cast aluminum intake manifolds, had to plumb in crossOver intake tubing to connect these to the stock HAPI lower half of the intake system. Engine runs a lot smoother.

In the process I removed all the original engine/cowl baffling and tightly jacketed the tops of the cylinders and heads (connects to the stock lower engine jacketing). Cooling air is directly ducted to these (each side separately) and to the oil cooler (installed on the upper right side firewall).

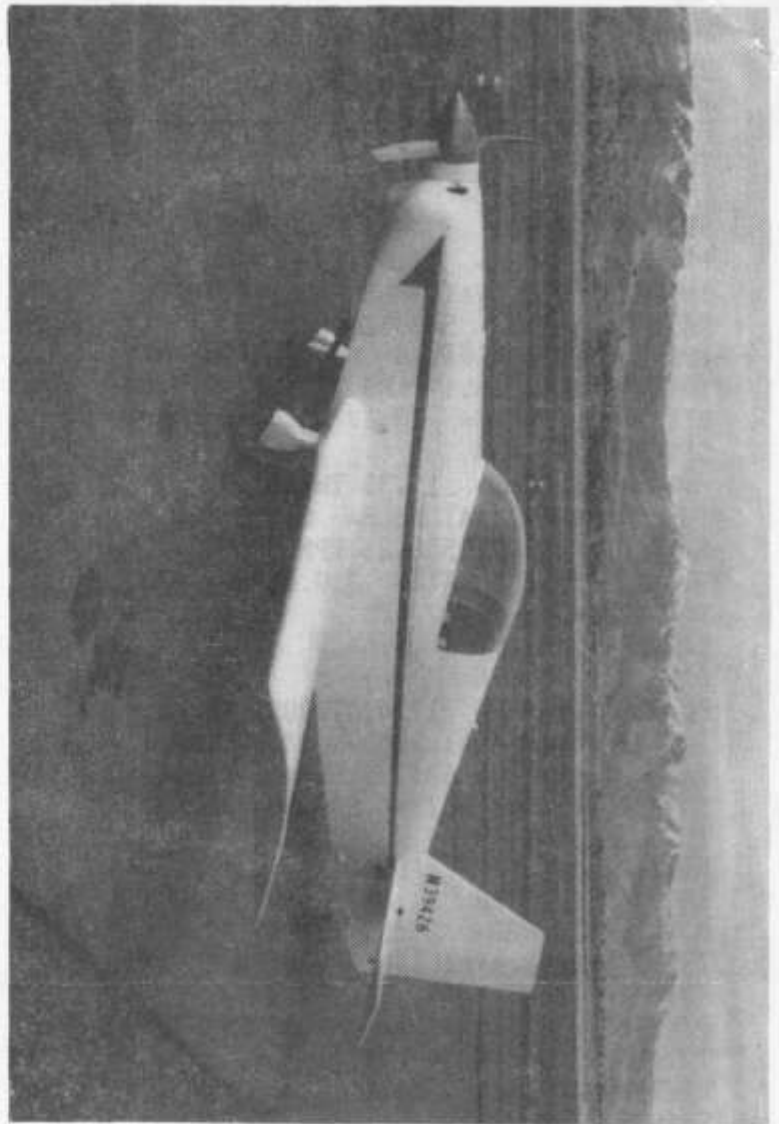
I have temporarily closed off 1/2 of the original air inlet opening on each side and reduced the bottom cowl exit area. Results: during 50-60°F CHT is below 300°F in cruise, oil temp is at 160°F. Both cool off during descent. The rear-upper cowl no longer bulges up during flight and I've picked up almost 10 mph in cruise, now to 140+ mph true.

Must have a lot of cooling drag. Waiting for hot weather to find out how much inlet area I need, then will glass in front of cowl to this. Wonder if the stock VW engine jacketing (minus the fan shroud of course), with a **little** modification wouldn't be a better method of efficiently cool the engine than the standard engine to cowl baffling, with all its leaks and increased cooling drag?

I'll take some pictures of the installation and get these to you later this spring.

Data KR-2 N39426
639 lbs. empty weight
HAPI 60-2 engine, Aerial Prop Co. 52x46 prop on 3" extension.
Stall: 55 mph with power/flaps, 60 mph clean/idle.
Cruise: 140+ mph true
Max: 150+ mph true
Climbout: 500+ fpm at 100 mph solo
First flight: Sept 28, 1984, over 400 hours to date and I Love IT!

David Feiger
Box 581
John Day, Or. 97845
503-575-0766



THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
PO BOX 876, PARKER, COLORADO 80134.
303/841-9379 - EVENINGS AND WEEKENDS.
ALL BACK ISSUES ARE AVAILABLE.
NON-COMMERCIAL ADS ARE FREE TO
SUBSCRIBERS.



KR NEWSLETTER

Rates

USA \$1200 YEAR
CANADA \$1500 YEAR
OVERSEAS \$2000 YEAR

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



"ALL GOOD THINGS must come to an end someone once said and so this issue ends my tenure as publisher of the KR Newsletter.

As most of you are aware, I have been experiencing some severe health problems the last few years and as a result the KR Newsletter has suffered and I can no longer work on my project. Three years ago I suddenly lost feeling in my hands and feet and was diagnosed as having Multiple Sclerosis. Although I was able to ignore symptoms of the disease for the first year or so, it has progressed to the point that I am having difficulty walking and using my hands and I am no longer able to ignore it. While it saddens me greatly that I can no longer publish the

Newsletter, I am happy to announce that it is going to be in very capable hands.

The new publisher of THE KR NEWSLETTER is EARL TEPORTEN of Lakeville, Minnesota. Earl has also purchased my latest tri-cycle geared KR-2 project which is 50% complete AND a completed and flying KR-2 which was at Oshkosh this year.

Earl is an experienced newsletter publisher and I'm confident that he will be able to continue the tradition of excellence that I know Butch Koppe brought to the Newsletter as it's first publisher and that I tried to continue. I would also like to take this opportunity to apologize to you for the problems the Newsletter has experienced the last couple of years and to sincerely thank everyone who withstood these problems and for all

the letters and phone calls giving support and encouragement to me during these trying times. The KR builders have always been more like a close-knit family than any group of builders I've ever known and it really showed. I'm sure that you will all continue to give this support to Earl as he puts the Newsletter back on course.

I do intend to write some articles from time-to-time for the Newsletter and hopefully attend a fly-in once-in-a-while so hopefully I can stay in touch with all the great people I've had the pleasure of meeting during these last 13 years of KR involvement.

God Bless You and Goodbye.



John Forrester

THIS ISSUE OF THE KR NEWSLETTER IS DEDICATED TO THE MEMORY OF JACK FYFE, A HELL OF A KR PILOT AND FRIEND. FLY FREE JACK — WE MISS YOU.

QUESTIONS AND ANSWERS

Q. What is Rand's epoxy? How critical is the ratio of part A to part B? Can it be used for fiberglass or is it just for wood?

A. Rand's epoxy is made of Shell Epon 813 and General Mills Versamed 125. Ratio of mixing part A to part B can vary up to 2/3 of either part and still be ok. Rand's epoxy may be used for either wood or fiberglass, but I prefer to use it only on the wood portions and use Saf-T-Poxy II for all fiberglass work. You'll find it easier to work with on fiberglass with superior wetting ability and it will result in a lighter aircraft if used properly. It is also easier to use if you purchase an epoxy pump which is available from most suppliers for about \$150. While we're on the subject of epoxy, don't use Dow's "non-allergenic" epoxy on fuel tanks. IT IS NOT FUEL PROOF!

NATIONAL KR "GET TOGETHER"

Max Calkin informs me that this year's NATIONAL KR FLY-IN is being billed as a KR Get Together instead of a fly-in because of liability reasons.

It will be held October 8th and 9th at the Covington, Tenn. airport. There will be free hangar space and free coffee supplied by the city of Covington.

Covington is about 40 miles N.E. of Memphis so it is a very central location. Jim Vaughn and Chuck Grammer will handle the forums.

Max also states that if anyone would like to come on the 7th to help set-up and partake of some KR talk and some flying they would be most welcome.

For more information please contact:

Max Calkin
501/426-5307

The new address for the KR Newsletter is:

EARL TEPORTEN

**KR NEWSLETTER
PO BOX 579**

LAKEVILLE, MINNESOTA 55044

The new phone number is:

(612) 435-7275

YOUR FLIGHT REPORTS AND BUILDER REPORTS ARE NEEDED!

The KR Newsletter has always survived because of builder involvement. As a person who is fairly new to the world of KR's, Earl needs input from you to continue to make the newsletter interesting. I encourage you to take a moment and drop a note to Earl to help him become acquainted with you and your project. As always, photos and reports are much needed and appreciated so please take time to contribute something.

FLIGHT REPORT KR-2 N83VB
BarryVanTassel
RD 24 Box 540 York, PA 17406

CONTINENTAL ENGINE MOUNTS FOR KR'S

(Ed. Note: Barry's KR-2 is pictured on the cover page of this months issue.)

Just to let you know that another KR-2 has "left the nest". After 4-1/2 years of building, our home-grown, fixed gear version was flown in August, 1987.

For various reasons, the project was built around a Lycoming O-145 rather than a VW powerplant. This required a rather large propeller disc which ruled out the short retractable legs. We kept the Rand desing and just built longer legs and lowered the spring bar; then faired in the legs and made skirts at the wing skin.

The most intelligent thing I did was to get 5 hours of tail wheel experience in a Luscombe prior to flying the KR. Those nose wheel aircraft have a way of instilling a false sense of security. I practically had to re-learn to fly.

In August it was 96°F at the airport, but everything else was great; i.e., no one around and wings calm. With an advance of the throttle in a steady fashion, the right pedal required the proportional depression. On the very first take-off I had the feeling that I ran out of right rudder. Later it was found that I had let the torque get ahead and therefore required to over-correct in order to get the nose back.

The Lycoming is an early one and rated at on 50 HP; however, empty weight is 519 lb. and the whole bunch - iron, aluminum, wood and me - came off the ground in eight seconds. This on a clam day, 96°F and 450' elevation.

Response is - well, you know, QUICK. After some minor changes to the static air system we found that straight and level at 2150 RPM is 135 MPH. This year I hope to do more serious testing in order to establish performance numbers, but it looks like 145 cubic inches is plenty of power.

Presently making some minor changes in the airframe and converting the engine to dual ignition -- a J3 this is not!

I am so grateful to have been able to join you foks who have already done this. My enduring gratitude to Ken Rand.

IF YOU ARE planning to install a C-85, C-95, or O-200 in your KR you may want to talk to Steve Alderman.

Steve as you probably know flys a VERY active KR-2 which has raced in the CAFE 400 and the Oshkosh 500. He has had a Revmaster 2100 turbo, a RotorWay RW100, a C-85 and a C-95 installed in his KR-2 and he informed me a few weeks ago that he now plans to build KR engine mounts for the Continental engines.

Steve is also a good reference source for information on the C-85 - O-200 series of engines.

Steve may be reached at:

Steve Alderman
825 S. Pratt Pkwy.
Longmont, Colo. 80501

MARKETPLACE

FOR SALE...KR-2 PRE-MOLDED FIBERGLASS PARTS. Revmaster Engine Cowl - \$200. Canopy Frame - \$100. Forward Deck & Instrument Panel - \$100. Fuel Tank - \$100. Completed Horizontal Stabilizer with trim - \$200. or \$650 for all. Prices are firm. Serious inquires only please. John Forrester 303/841-9379.

FOR SALE...KR-2 PROJECT. 90% finished, on fixed gear, Revmaster 2100 w/electric starter and many more options, tuned exhaust, Great American Prop., tinted canopy, finished wet wings, all instruments except radio. Nearly everything to finish. \$4900. carl 712/546-8269.

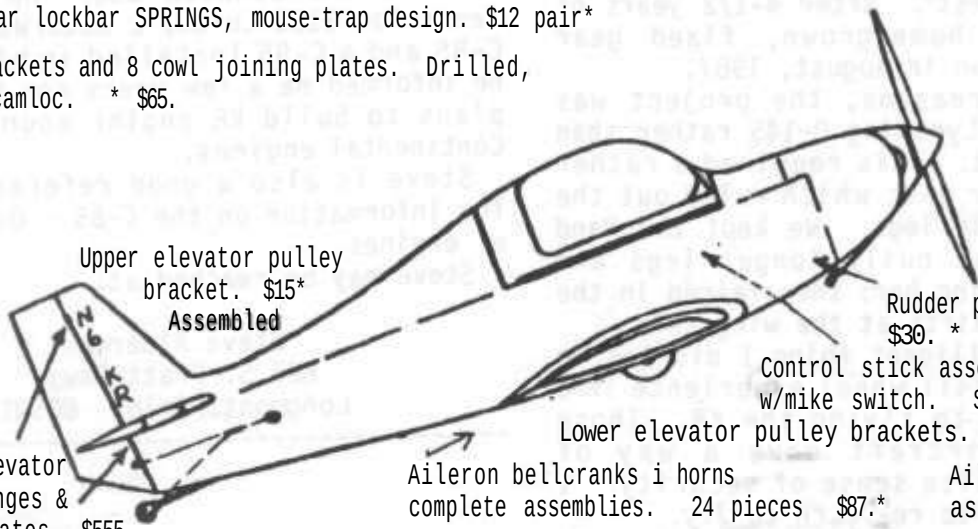
FOR SALE...REVMASER 2100. 6 hours run time and assorted KR-2 part/instruments, including Revmaster tach, temp, pressure, speed, ignition. Take all for \$2100. Teddy. 301/584-2943.

CAREY ANDERSON
UTEFLITE HARDWARE

Rt. 3, Box 138-10
 Stratford, Missouri 65757
 (417) 736-2298

Aileron counterbalances (arms & weights) \$65. ^
 Aileron push-rod arms & Heim joints & spacers * \$38.
 Landing gear lockbar SPRINGS, mouse-trap design. \$12 pair*
 12 cowl brackets and 8 cowl joining plates. Drilled,
 ready for camloc. * \$65.

Planning to purchase the Rand-Robinson #4 Aluminum Extrusion Kit? Let us save you time and money. Purchase the kit from Wicks Aircraft Supply, have them ship it directly to us where we will perform the necessary machining and we'll ship it to you. Parts will be cut, milled, drilled and shaped. Send us a S.A.S.E. for more information.



Upper elevator pulley bracket. \$15* Assembled
 Rudder pedal mount blocks \$30. *
 Control stick assembly per plans w/mike switch. \$91.*
 Lower elevator pulley brackets. \$28.* assembled, ^
 Aileron bellcranks i horns complete assemblies. 24 pieces \$87.*
 Aileron pulley brackets assemblies. \$34.*
 Rudder, elevator norms & hinges & back-up plates. \$555

QUALITY...all material is aircraft aluminum/steel as specified in the KR Construction Plans Book. S.A.S.E. more information.

*postpaid items

KR NEWSLETTER
PO BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 136 AUGUST 1988



EARL TEPORTEN
 PO BOX 579
 LAKEVILLE, MN 55044





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



KERRY VAUGHN'S KR-2, RECEIVED 'BEST BUILT KR' AWARD

A VERY SPECIAL GATHERING

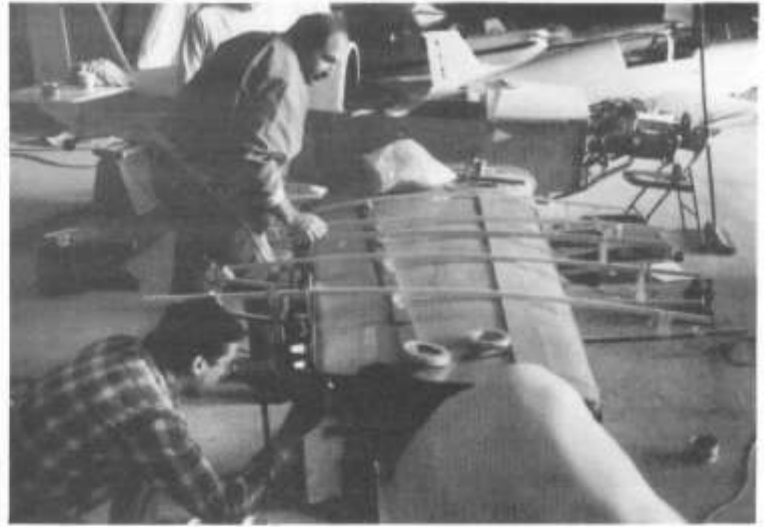
by Jim Faughn
1988 Event Chairperson

On October 8 and 9, 1988, the small town of Covington, Tennessee opened its doors to a very special gathering. There were over 150 KR enthusiasts along with 13 of the fastest and unique experimental aircraft on the market today. The attendees represented 26 states from California to New York and from as far away as New Zealand and Canada.

The fourth KR gathering, quickly becoming an annual event, was held for the purpose of bringing KR enthusiasts together to learn more about the airplane, how it is built and how it flies. We wanted this year's gathering to be a 'hands-on' event. We thought that not enough emphasis has been given to the builder who is just starting, so we wanted to offer hands-on workshops to help the new builder actually work with the building materials that they will be faced with later in their projects."

The gathering began early the morning of the 8th with a Composite Workshop sponsored by Wicks Aircraft. Thirty enthusiastic aircraft builders started with wooden ribs and ended up with a fiberglassed "mini wing" at the end of the day. Wicks provided the materials to run the workshop, and a hearty "thank you" goes to their company. Griff Pickett, a technical assistant at the workshop stated, "I have never been to a workshop, that this many participants, actually worked with materials that will help them to progress on their airplane...many of the people had started the project, but had only read about fiberglass and finish work."

Later that morning Dan Dlehl of Diehl Aeronautical, Jenks, Oklahoma, presented the first of its kind, Wing Skins Workshop, where Alfred Morrison of North Little Rocks, Arkansas, trailered in his partially built KR to have the Diehl Wing Skins installed for the participants. "To my knowledge, this is the first of its kind workshop where the new builders get a first-hand look at building and were even able to assist in the actual preparation and construction of the parts", stated Diehl.



WING SKIN FORUM

The day was filled with flying and participants saw first-hand how well the aircraft can perform. Steve Alderman from Longmont, Colorado, thrilled the crowd with his 200+ mile per hour passes which he attributes to a well-built plane and the 100 HP Continental Engine.

During the afternoon sessions, 12 pilots spoke to the group on building and flying KR's. They talked about the enjoyment and problems of building. Throughout the pain and frustration of building, the group did agree on one point, completing the aircraft is definitely worth the effort...it is definitely worth the effort. A statement of one of the KR pilots summed it up, "Flying a KR is as close to flying a 'fighter' as you can imagine".



STEVE ALDERMAN NEXT TO HIS KR-2

Terry Craig of Wicks Aircraft Supply Company in Highland, Illinois spoke about the services Wicks provides. The company stocks 90% of the items listed in the catalog and these can typically be shipped within 2 days. Rush orders can get same day service if necessary. Terry stated, "We want to be the supplier for your experimental aircraft, we recognize your need for prompt and friendly service and hope you will call Wicks for your supplies. We appreciate the opportunity to be part of the 1988 KR Gathering and plan to be back next year."



RAY HILL'S KR-1

cont'd page 3



DAVE SHIRLEY'S KR-2



KEN COTTLE'S KR-1 1/2, WITH FIXED GEAR



BOB MUSE AND HIS KR-2

Steve Bennett of Great Plains Aircraft Supply Co. gave a dynamic talk on engine failure analysis, showing slides of failed engines that his company has had to rebuild due to poor parts, improper installation or maintenance. Bennett has just developed a new 90 HP Top Bug engine for homebuilders. Steve said, "I have recently seen a real need for an economical larger horsepower engine for the homebuilt market. This was designed to meet the needs of those builders who wanted more horsepower than a standard Volkswagen engine could deliver."

The entire gathering and workshops emphasized safety and the proper building methods which lead to accident-free flying. There were 154 total participants who observed, listened, sanded and fiberglassed their way into a better understanding of how the KR is built and flown. At a banquet held on Saturday night at Peeler's Steak House, Kerry Vaughn of Hamilton, Ontario, won the award for the best built KR. Kerry also received that honor at Oshkosh this year.

The 1989 KR Gathering will be held in Covington next year. The town of Covington was exceptionally gracious in hosting the gathering. Chuck Grammer, who served on the site selection committee stated, "We have never encountered a place that opened their hearts and town to an event such as this. The city provided not only numerous tables and chairs, but a very large hanger for the airplanes, meetings and workshops."

Due to the tremendous success of this gathering, we are planning to have the next one at the same location October 7 and 8, 1989. We hope to see many more homebuilders take the opportunity to attend.... see you next year!

Jim Faughn
5615 Botanical
St. Louis, MO 63110

THOUGHTS ON 1988 NATIONAL GATHERING

This year's Covington gathering was an outstanding success! Whatever your interest in KRs may be, there was something for you at Covington.

Griff Pickett and others let us see for ourselves how easy it is to work with fiberglass. Dan Diehl showed us the ease of installing wing skins and Steve Bennett helped us understand why engines fail. Steve Alderman and Dan Diehl were among the pilots that gave many of the participants their first ride in a KR...there truly was something for everyone.

For many of us, however, Covington had a value far beyond the technical knowledge we gained. As we work on the construction of our aircraft, the days quickly turn into months and it's easy to lose sight of what our project will someday be. At Covington, the sight of so many beautiful KRs and the ability to talk with their builders, helped us realize that at one time, many of those beautiful airplanes looked like ours and that our efforts will someday result in a truly magnificent creation.

Covington also helped me realize what a close knit group of people KR builders are. Everyone's eagerness to exchange ideas and help each other, showed a camaraderie that I hope will continue in the Newsletter.

A very special "THANKS" to Jim Faughn and everyone who worked so hard in preparing this year's event, as well as everyone who attended it. Although you won't find the Concorde or B-1 at this event, there's something about it that none of the others can match....

this one is ours!

See you in Covington next year!



TERRY CRAIG, DAN DIEHL, STEVE BENNETT
[KR-2 IS STEVE ALDERMAN'S]



JIM FAUGHN, CHUCK GRAMMER

COVINGTON VIDEO AVAILABLE

Catch the excitement of this year's National KR Gathering via video tape! The 60 minute video tape includes many of the workshops, forums and aircraft that made this year's gathering such a huge success.

If you are interested, please fill out the enclosed form, along with \$29.50. Profits from the sale will be donated to the organizers of next year's event.

FIBERGLAS GAS TANK

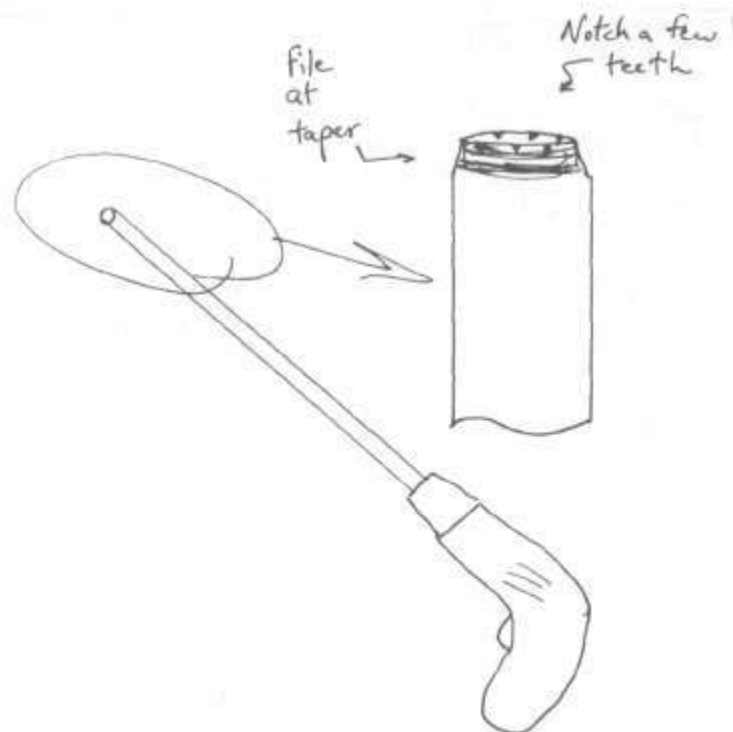
I agree with Jeannette Rand's comment in the last Newsletter regarding the use of Safe-T-Poxy for fuel tanks. I had the two tank halves and to make sure the tank would hold together, I first made some tests. I rough-sanded the top of the tank half to remove any gel coat or mold release, if any. Then I applied small strips of fiberglass, one with Safe-T-Poxy, one with T-88 Epoxy and one with four year old polyester resin. After 48 hours, the two epoxied strips peeled off clean with no epoxy left on the tank. The strip with polyester was pulled off without difficulty but left the pattern weave of the fiberglass. I was beginning to have my doubts with this tank and decided to try one more approach. Next, with a good stiff, powered rotary brush (steel) I brushed off a spot on top of the tank to remove the top layer of polyester resin down to the top layer of fiberglass, then put on a patch of fiberglass with Safe-T-Poxy...excellent results. I thereby wire-brushed all of the areas where the joining strips of fiberglass would be epoxied to close the tank halves. I used sloshing compound in the tank to seal any possible leaks. I was surprised to find large leaks coming through the large radiused areas. I looked closely and could see the top molded half of the tank had minimal fiberglass in the corners and they were porous (lack of polyester). Therefore, the whole tank was then wire-brushed and covered with more fiberglass and Safe-T-Poxy and sloshed again. Now I have a solid tank! Thought you and the other builders might like to know what had to be done to get the Safe-T-Poxy to stick.

Sam Sayer
2709 Madison Ave. S. E.
Grand Rapids, MI 49507

EXTENDED HOLE DRILL

Here's an idea we could call an extended hole drill. I needed to drill a hole thru the elevator rib and spar to pass the trim tab control cable thru. I used the Diehl tailfeathers, and so had a hard skin on the elevator assembly to cut thru, also. Well, after some chinscritchin, I came up with a 1/4 inch diameter brake tube about a foot long or so. It's a lot easier if the tube (pipe?) is nice and straight. Chuck it up in a drill, and using a file or two, cut a head on it (see sketch). To use, I powdered my thumb like a pool shark and guided the turning tube right on thru the skin and the wood. The whole thing couldn't have taken 15 minutes. Looks like a longer tube could be used to cut holes the length of the wing stubs, so a person could run a fuel line, antenna coax or electrical wire. Til later.

Griff Pickett
404 N. Jackson
Raymore, MO 64083



Great For Me!

IDEAS FOR PAINTING YOUR KR

Submitted by Sam Sayer

All surfaces on my KR were finished with Safe-T-Poxy and glass spheres to fill in all the fiberglass weave and other defects. I did not use the "featherfill evercoat" as it is a polyester primer which absorbs moisture. I have seen disastrous results from the use of this product in the form of large bubbles appearing underneath the paint. The hot sun causes the moisture to expand and wham-o, more bubbles. A friend of mine used the featherfill and has been sanding and patching for the last three years. The featherfill lifts right off the fiberglass. Other people have had good results using featherfill in dry weather, but I wouldn't recommend using it in humid weather.

I do not have access to a good paint booth, therefore, have been doing my painting in a plastic sheet lined garage with two fans and air filters and was having trouble with fish eyes, etc. in the paint. I consulted a paint expert with my problems and he recommended the correct reducers to be used with the DuPont Centari paints that I was using.

First, use Dupont 131S "Grey Fill and Sand" acrylic lacquer primer reduced with 3602S acrylic lacquer thinner and spray on for a good coverage and heavier where pin holes and other defects show up. Wet or dry sand with 360 and 400 grit paper until most of the primer is removed. Go back and examine again for pin holes and unfilled weave. Spot-in with primer and sand again. Repeat as required for the degree of finish desired.

Next, spray on a full coat of Dupont 1986S Valvaseal (neutral grey acrylic lacquer sealer). Let dry for at least 20 minutes and lightly sand with 400 paper to remove any roughness from overspray mist. Note: The acrylic enamel should be sprayed on over the valvaseal within 45 minutes after the valvaseal has been applied for the best result, so have your enamel ready for spraying.

Dupont Centari Acrylic enamel was reduced with 8093S acrylic enamel reducer. 259S paint additive (for reducing fish eyes, etc.) was then mixed in the paint.

The spray gun cup was then filled with the mixed enamel and then the 793S Centari acrylic enamel overall gloss hardener was added into the spray gun cup and mixed ready for spraying. Note: I mixed the hardener in the spray gun cup for just the amount of paint that was to be used. I didn't want any hardener in the unused paint for obvious reasons.

Since my paint booth was not the best, my consultant suggested that I put on 6 or 7 coats of paint with a 1/2 hour between coats.

When the paint has thoroughly dried, it can then be wet sanded with 600, 1000 and 1500 abrasive paper until perfectly smooth and the polished with fine rubbing compound and a good polisher.

This method could not have been done with the old enamels, but with the new acrylic enamels and hardeners, they will polish up like lacquer paints do.

Be sure to follow instructions on the various paint and thinner cans. Also, be sure to use a good respirator as the fumes are highly toxic!

Good Luck!

Sam Sayer
2709 Madison, S.E.
Grand Rapids, MI 49507

IMPROVISED DISC SANDER

When I started building, I immediately found I needed a disk sander but couldn't afford the price. Improvise, my dad had always told me, so I took an old 10" table saw blade, dulled the teeth a bit more and covered both sides of it with adhesive sanding disks (one coarse and one fine). I then put the old blade into the saw, but mounting it so that it rotated backwards to keep the teeth from cutting should they inadvertently touch the work. This set-up allows me to use the adjustable table guide for angles and the table guide with the blade angled for dual angles.

Jack Messer
1104 S. Mitchell
Cadillac, MI 49601

FOR SALE

KR-2 All woodwork done and on retractable gear, includes Rand glass aft turtle deck and Rand fixed landing gear and 5.00 X 5 goodyear wheels and axles. Fixed gear is undrilled and never mounted. Revmaster engine mount, all bolts, gauges...about all you need except glass and foam for the wings. \$1750.00.

Meritt Crabtree
358 N. Elm
Colville, WA 99114
(509) 684-5970

KR NEWSLETTER ADVERTISING

Due to the limited space and the fact that I don't like advertising companies or products just because they send money, I'm ending paid advertisements in the KR Newsletter. However, I do want to promote, free of charge, companies or products that are beneficial to the KR Community.

As always non-commercial ads are free to subscribers, along with a photo (space permitting).

While I'm on the subject, I'd like to mention three individuals, and their companies, that have earned our respect and support. First, of course, is Jeannette Rand of Rand Robinson Engineering, along with Dan Diehl of Diehl Aeronautical and Steve Bennett of Great Planes Aircraft Supply Co.

Competition in the kitplane industry has become fierce. In fact, the latest issue of Kitplanes lists over 375 different aircraft currently on the market. As more and more companies enter the market, market share and profits are reduced.

What I'm saying is the next time you need to order something, try to support the companies that have worked so hard to support all of us.

FOR SALE

"Lil Pretender" KR-1. 675 Flight proven hours. Features 1700CC VW engine, sliding canopy, retractable gear, center stick, olive drab paint with invasion stripes. Have owned aircraft for ten years ...selling because I'm building another. Asking \$4,500.00.

Keith Campbell
1617 14th St.
Boone, Iowa 50036
515-432-3660 day or 432-5709 evenings



FOR SALE

KR-2 Tricycle (Defreeze), slide back canopy, 1600CC VW, fuel injected, starter, full electric. \$6,000.00

Mel Luepke
R.R. 8, P.O. Box 592
Bemidji, MN 56601
218-759-1927



THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
SUBSCRIPTION RATES ARE \$12.00 PER YEAR --
U.S., \$20.00 PER YEAR CANADA AND \$30.00
PER YEAR FOR OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES [OVER
100] for \$60.00. INDIVIDUAL COPIES \$1.00
EACH.

FOR SALE

KR-2 Canopy - brand new - still has
protective coating - light green tint -
\$100.00 or best offer.

Myron Freeman
1925 South Temperance
Indianapolis^, IN 46203
317-356-4152 -

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 138, NOVEMBER, 1988





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



LOUIE BROCHETTI'S BEAUTIFUL FIXED GEAR KR-2

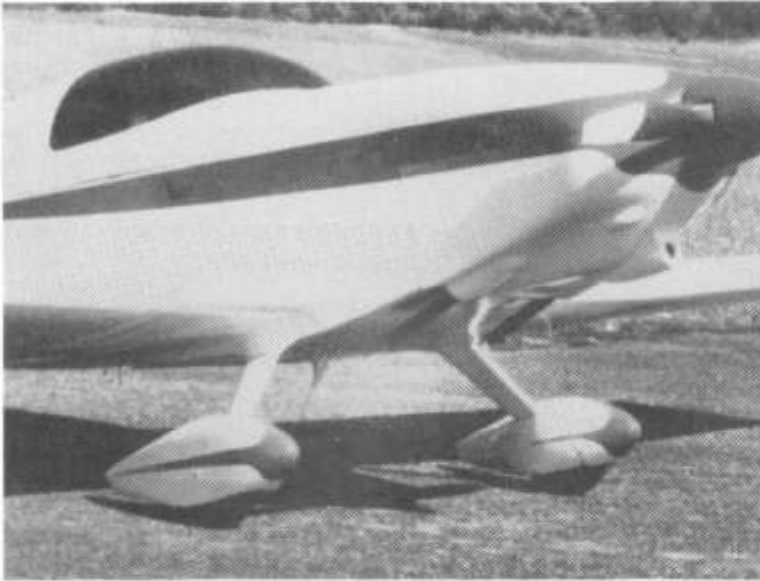
FIXED CONVENTIONAL LANDING GEAR FOR KR AIRCRAFT

Rand Robinson is now offering a fixed conventional landing gear assembly for the KR aircraft. I talked with a couple of people that have installed the fixed gear onto their KR's.

The first interview was with Louie Brochetti of Carlsbad, California. Louis was the first person to retrofit his stock KR-2 with Rand's new fixed gear set-up. Interviews begin on page two.

WHAT WAS THE TOUGHEST PART IN RETROFITTING THE GEAR?

Well, the toughest part is taking the engine off and flipping the airplane upside down so you can work on it.



HOW MUCH TIME DOES THE RETROFIT TAKE?

Only about two weeks of part time work.

HOW WAS THE PLANE'S PERFORMANCE AFTER THE RETROFIT?

Right off the bat it was obvious that the performance was better...I gained speed and gained a little climb. Thus, there is less drag than the stock retract system if you fair-in the gear and put nice wheel pants on it.

IS THERE MUCH DIFFERENCE IN GROUND HANDLING VISIBILITY?

Well, visibility is a little less but it really doesn't make much of a difference because you couldn't see before anyway. When I retrofitted the landing gear, I also added a speed brake and have had a chance to compare the effectiveness of both flaps and speed brakes. I have found speed brakes to be much more effective. I can hold the nose down and have visibility right down to flare.

ARE YOU ABLE TO USE THE STOCK KR WHEELS?

Yes, the only thing that is different is the wheel rim. The rims that Rosenhaun or Cleveland make for the gear legs are machined 1/4" on each side to allow them to fit inside the gear legs. You use a stock 5" rim now because you don't need to narrow it.

HOW ABOUT GROUND HANDLING CHARACTERISTICS?

Now I feel 100% confidence in the ground handling characteristics of the airplane. Before the retrofit, the weight on the tail wheel was only eight pounds and it didn't take much of a gust of wind to pitch the tail up and throw it over. Now with the new gear, I have 33 pounds of pressure on the tail wheel. I have hydraulic disc brakes and I can tromp the brakes at 25 MPH and not bring the tail wheel up!

ANY FINAL THOUGHTS ON THE FIXED GEAR?

I'm very impressed with the fixed gear arrangement for the KR's. It's the way a airplane should look and handle. You sit the plane next to another KR and people argue that its not a KR! The plane's appearance on the ground and handling characteristics are 100% better. My plane now has versatility. I can now land on dirt strips or pull the wheel pants off and land in the desert. I also can land it shorter, slower and in a full 3 point stall... something I couldn't do with a fully-stocked KR (it was always flying).

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$12.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

COMMERCIAL AND NON-COMMERCIAL ADVERTISING
FREE TO SUBSCRIBERS [INCLUDING PHOTO].
INCLUSION OF ADS SUBJECT TO AVAILABILITY
OF SPACE.

**SET OF ALL AVAILABLE BACK ISSUES (OVER
100) FOR \$60.00.**

INDIVIDUAL COPIES \$1.00 EACH.

INTERVIEW WITH KEN COTTLE
3306 Martha Dr., Columbia, MO 65201

Ken Cottle refers to his plane as a KR-1.5 because it looks like a cross between a KR-1 and KR-2.

TELL US ABOUT YOUR LANDING GEAR.

The gear is a Sonera design that I put on my plane when I built it...long before Rand had their design on the market.

DID YOU HAVE ANY TROUBLE ADAPTING IT TO YOUR KR?

There were aluminum brackets that bolted to the main wing spar that I had to modify. I took the brackets to a local welding shop to have them heliarced. I didn't realize that when you weld metal that has been heat-treated, you destroy the effect of the heat-treatment and the metal becomes considerably weaker. The brackets failed after the first 40 days of flight. I learned anytime you weld heat-treated metal, you must have it heat-treated again.



WHAT KIND OF PERFORMANCE DOES YOUR PLANE GET?

The engine is an 1835 and when I got back from Covington, I put a 54-47 Ed Sterba prop on it and I'm getting about 140 cruise out of it now. I just installed an Ellison carburetor and it really works great!



WHAT KIND OF CANOPY IS ON YOUR KR?

The canopy is a Star-Lite design.

ANY OTHER MODS YOU PLAN ON IN THE FUTURE?

Well, I plan on putting strobes on the outer wing tips and I'm going to put a capacitance fuel gauge in it.



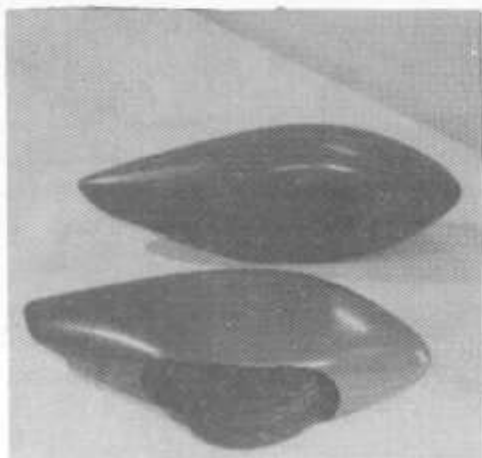
NEW FIXED SPRINGBAR LANDING GEAR AND HYDRAULIC BRAKE PACKAGE OPTIONS #4E AND #8B

Rand Robinson Engineering Inc. is offering a new fixed landing gear package to those of you who want 6" more ground clearance, soft field capability, and the additional capability to retrofit existing retractable planes.

- [1] pre-bent 7075-T6 aluminum landing gear
- [3] cast aluminum gear castings
- [2] 1-1/4"x 5" axles
- [2] axle nuts
- [4] axle bushings
- [2] sets wheels and hydraulic brakes
- [4] 1/4" hydraulic fittings
- [2] master cylinders
- [2] Lamb tires and tubes
- [15'] 1/4" hydraulic lines
- [1] all AN hardware, bolts, nuts and washers for complete installation
- [1] aluminum toe brake kit
- [1] instructions

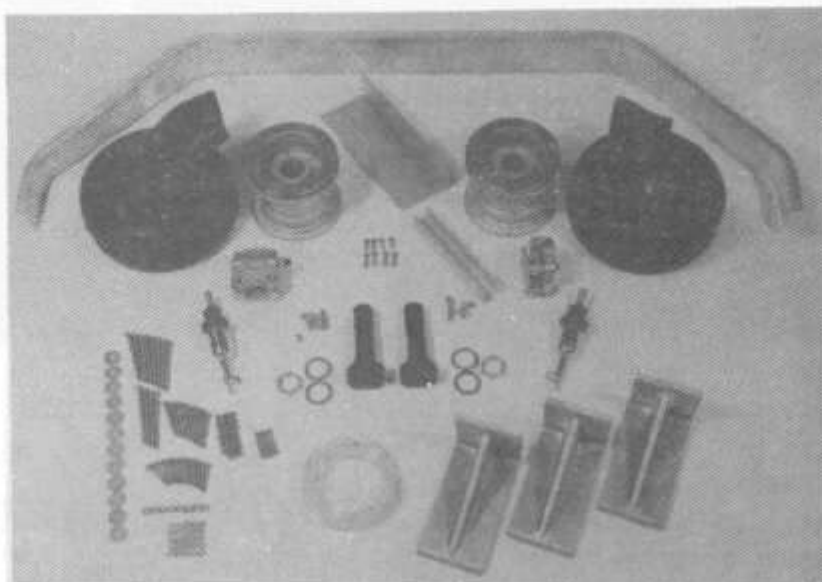


NEW!



Item #32

Fiberglass wheel fairings for
KR fixed gear



FLIGHT REPORT C-GSJS

Hi Earl,

Thanks for the opportunity to get back amongst the ranks of KR building enthusiasts. I have had medical problems arising from too much exposure to the epoxy I first used. A partially cured sliver of five-minute epoxy stabbed my left leg and within 30 minutes, I was a babbling shivering basket-case who had to spend eight days in intensive care and two months off work because of a severe case of Nephritis caused by a dormant reaction to the epoxy I had worked with. And this—two years after I had completed C-GSJS.



I've included an early photo of my KR-2, which was completed and test flown in May, 1984. She is one beautiful flying machine...believe me! Not near as pretty as most, she is painted by roller coater with Ferrothane, plus 10% Verithane varnish mixed in, with one coat, over one coat of Ferrothane aluminum, with practically no fillers used anywhere. She has three hinges twist fin and rudder, four twist elevator and stabilizer, insides of the outer wings glassed twist forward and rear spars, has speed brake hung off the main spar, dual controls, "sting" exhaust and was powered with a homebuilt 2180cc V Dub balanced engine sporting a R.R. early 3 blade.

Instrumentation is minimal, a small motorcycle battery powers an Alpha Genave 100 and electric oil pressure and temp gauges, visual fuel indicator, alt., rate of climb, and horizon and attitude by Jeep "Lev 0 Gauge". Tachometer is by induction pickup from David Carr and gear retraction is Charles Wells. By the way, absolutely no excess epoxy was allowed to remain around glue joints, skins, anywhere.

Weight and balance came out perfectly as per plans, at 4041 Ibs MT including three quarts oil and upholstered seats. Since then, I have removed the comfortable seats and replaced with individual cushions and leatherette side panels. Cruise has been 155 mph indicated @ 7500' and 2500 RPM, prop @ mid pitch. Flat out over a 15 mile course @ 2000' it indicated 197 MPH. Stall clean—38 MPH indicated, straight ahead. Dirty—30 MPH with a vicious snap to port. Fuel usage has averaged 3 (Imp) gallons per hour @ 155 MPH or 1.8 (Imp) gallons per hour @ 120 MPH. It has been flown to 14,500' (because of extreme rough air over 9,000' mountains, but has very little climb remaining at that altitude. Glide ration atl, 000RPM idle appears time and again to be about 15/1 clean.

All in all, were I to do it again, I would not hesitate to build the same design, but I probably would lengthen the fuselage, beef-up the fire wall and engine mounts, and add a Continental O-200. But that, at this time, is pure conjecture and wishful thinking!

Thanks for taking on a tough job, Good Luck!

Don Leitch
1695 Ridgewood Dr.
Castlegar, B.C. CANADA

I LEARNED FROM THAT

It was a nice early October day...the salmon fishing was good and now it was time to head back to Minneapolis. Our two planes were loaded to max gross weight and we departed Sturgeon Bay, Wisconsin via our usual military take-off and departure (side by side). The trip was basically uneventful. 5500' MSL 145K I.A.S., clear air and total relaxation. Suddenly, with no warning my aircraft banked violently to the left, approximately 30 degrees... situation corrected and settled back relaxed. AGAIN!! it happened and this time it required a little more effort to settle things down. Went through a check list and found nothing wrong. Suddenly, a third severe bank happened. At this point, we were about 30 miles east of Eau Claire, Wisconsin. Called flight service station and stated a control problem but no emergency. Requested a straight-in approach. FSS cautioned all aircraft in the vicinity of our problem. I elected to land with full electrical shut off. On final approach I saw the fire engines and foam truck in position and ready for us. Landed without a problem.

Did an evaluation of the situation and after an inspection by local FBO and a test flight, everything checked-out okay. Still a little nervous, we departed EAU and proceeded to Crystal, Minnesota airport. Only after a good hard look and test flight of the problem was I able to track down the culprit...the invisible force of vortices from my companion's airplane was attacking my plane. Remember, they are **SILENT KILLERS**.

Clyde Kocur
Delano, MN

FOR SALE

KR-2 wing attach fittings -- 32 pieces plus jig for boring. Guaranteed accurate \$100.00.

Claude Icard
P. O. Box 274
Rutherford College, NC 28671
704-874-2033



GREAT PLAINS
AIRCRAFT SUPPLY CO. INC

PH. 312-359-6558 • PALATINE, IL 60078
P.O. BOX 1481

A TIME OF THANKS

This is a special time of the year, a time when we look at what we've accomplished over the past year and thank those who have helped us.

I just want each of you, who have sent me notes of goodwill and encouragement, to know how much I appreciate them.

To those of you who have taken the time to share your ideas with all of us, a very special thank you.

In the coming year, I hope more of you will become involved in the Newsletter. Beginning with this issue, there will be a column titled "I Learned From That". I hope this column will allow many of you to share your experiences in building or flying with all of us.

If you wish to remain anonymous, that's fine. If you have a story you would like to share but just don't have time to write, please give me a call—I can transcribe the information over the phone.

The next year should be exciting for all of us in the KR community. Steve Bennett of Great Plains Aircraft Supply Co. is working on an exciting new engine and Rand Robinson is moving forward with the KR-100.

I've always heard that pilots are dreamers...well if that's true, then KR builders and pilots are people who make those dreams come true!

Thank you and have a HAPPY HOLIDAY!

Earl Teporten

ENGINE WANTED: VW 2100 cc or 1835 cc—MUST HAVE mods for aircraft use and FORGED crankshaft. Prefer elect, etc. and prop hub (HAPI or REVMaster). Do not need mag, pos, etc., prefer dual plug set-up. Need for spare engine for the All Metal KR-2 (low time). Written up October's Newsletter. Maximum price is \$1500. Delivered area to Manchester, NH. Incidentally, the KR-2 has flown 3.2 hours, few bugs, but flies well. Thanks for your letters on same. MLE

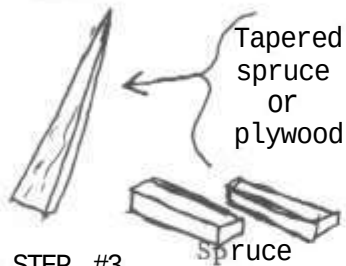
Mark Edwards
P. O. Box 586
Nashua, NH 03061

A TIP FOR GLUING TAPERED WOOD

SUBMITTED BY JOHN CROMWELL
1217 TEAL PLACE, EDMOND, OK 73034

After trying hard to find out how to glue tapered wood on the rudder, stabilizer, templates etc...I came up with this easy way to do it...

STEP #1



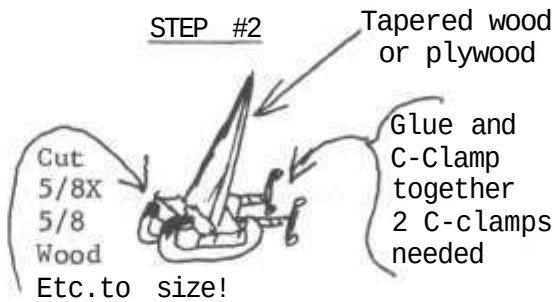
STEP #3

Cut the wood & or plywood to size...Glue & C-clamp together. Let the glue dry before removing clamps.]

STEP #5

After sanding flat and all the glue removed...you can C-clamp it where needed, 5 C-clamps needed (2" C-clamps or larger).

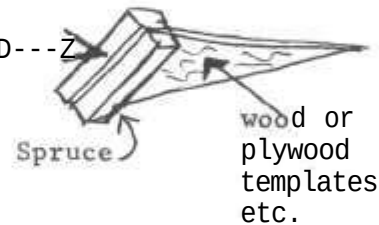
STEP #2



STEP #4

After glue is dry, remove C-clamps. Sand the wood flat and level to remove glue.

SAND---



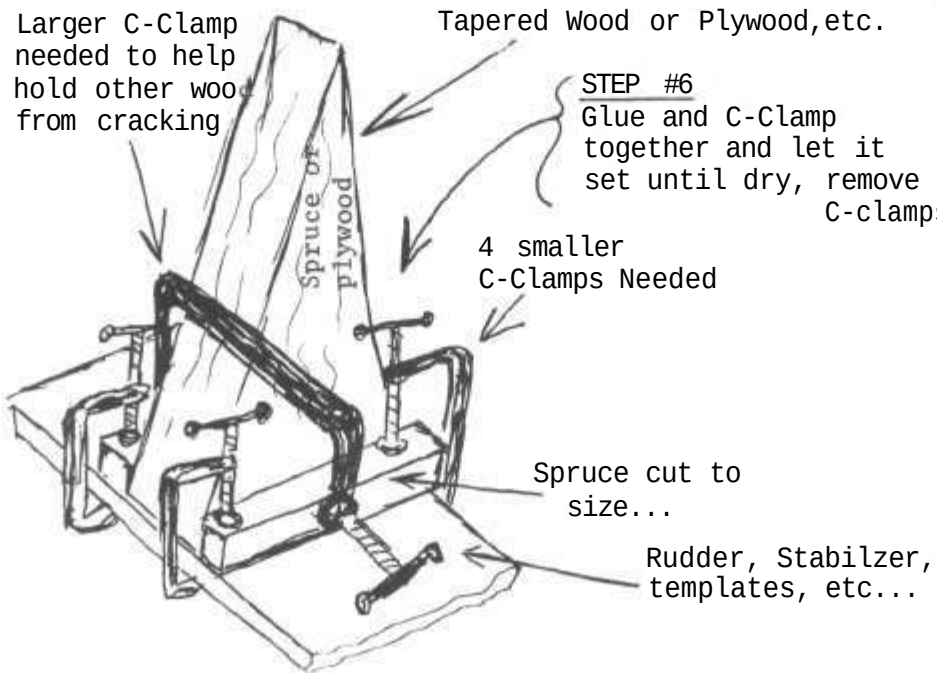
1 Larger C-Clamp needed to help hold other wood from cracking

Tapered Wood or Plywood, etc.

STEP #6

Glue and C-Clamp together and let it set until dry, remove C-clamps,

4 smaller C-Clamps Needed





APPROACH...THIS IS NORTH POLE 1...WHAT DO YOU MEAN, I NEED MODE C ???

FOR SALE

Great American, VW 52-46, excellent condition. \$150.00 or best offer.

K. P. Rice
2020 S. Susan "0"
Santa Ana, CA 92704
(714) 545-0125

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 139, DECEMBER 1988



KR NEWSLETTER

ISSUE NO. 141
FEBRUARY 1989



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



M. T. "SPARKY" SPARK'S GREAT LOOKING KR-2 N122MS

Hi Earl, I now have over 310 hours on my KR-2. It's powered by a 1824 VW and cruises 155 MPH at 3,000'. Empty weight 520 lbs. I just made a change on the locking mechanism on my landing gear. Although I have never had a failure with it, it did wear and rattle a bit so, I put in the positive-locking, spring-loaded pin type designed by Rex Taylor of MAPI ENGINES (it sure does work much better). I will soon be flight-testing another KR-2 and will send you a report on it later. Fly safely and have fun! "Sparky"

M. T. Sparks
10232 Kit Carson Place
Santee, CA 92071

KR'S FEATURED IN PUBLICATION

The new "May" issue of Sport Pilot's "Hot Kits and Homebuilts" features an eight page spread on KR's, along with some of the people who build and fly them.

It was a real thrill to see such a positive article, as well as, fantastic looking KR's.

It was also nice to see so many people taking the time and effort to share their ideas and experiences.

I just want to thank those who were highlighted in the the article, including Louie Brochetti, Ken Cottle, Kevin Kelly, Mike Smith, Steve Bennett, Al Campbell, Monte Miller, Joan Dickey, Dan Diel and a special thank you to wing-commander Otto Glidewell, who wrote the article.

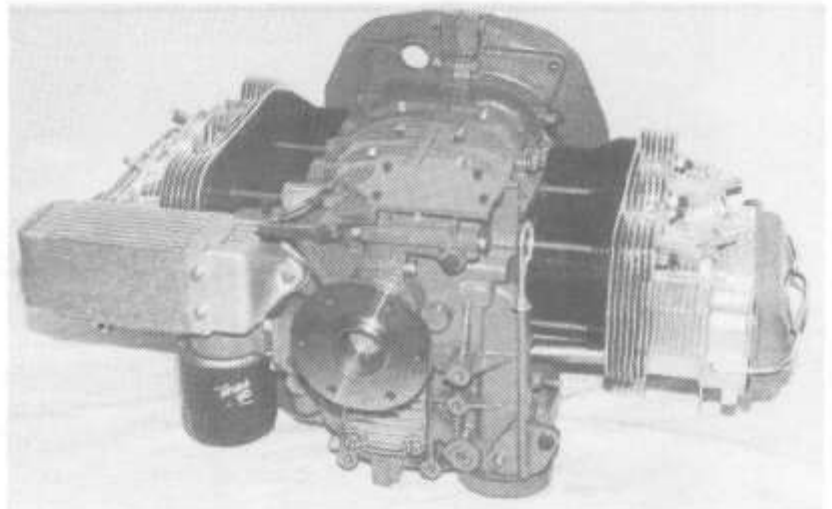
To Jim "Zoom" Campbell and all folks at "Sport Pilot" a sincere thanks.
You've made us all very proud!



GREAT PLAINS OFFERS NEW ENGINE

Steve Bennett at Great Plains is now offering its new 2.6 Litre VW/Porsche 411/914 based aircraft engine. The engine develops 92 HP at 3200 RPM and 65 HP at 2700 RPM. It features a heavy-duty aluminum engine case with through bolts, stock hydraulic or solid lifters, side mount fuel pump, front mount oil cooler, an oil filter, exhaust ports on the bottom of the heads, 20 AMP alternator, hi-torque geared starter, dual ignition (optional), force one prop hub and main bearing. Weight, including starter is 208 pounds.

Great Plains Aircraft Supply
P. O. Box 1481
Palatine, IL 60078



SUN *N FUN '89

For those of you who are going to this year's Lakeland, Florida gathering April 9-15, the KR dinner will be at the Holiday Inn South, April 12. The menu includes your choice of Southern Fried Chicken or Roast Beef. Sign-up early at the Wickes Booth. For further information:

Virgil Salisbury
5445 S.W. 89th Place
Miami, FL 33165

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$12.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

COMMERCIAL AND NON-COMMERCIAL ADVERTISING
FREE TO SUBSCRIBERS [INCLUDING PHOTO].
INCLUSION OF ADS SUBJECT TO AVAILABILITY
OF SPACE.

**SET OF ALL AVAILABLE BACK ISSUES (OVER
100) FOR \$60.00.**

INDIVIDUAL COPIES \$1.00 EACH.

FROM DON LEITCH, B.C.. CANADA

Earl, once again, I've enclosed an article I found that underscores the need for safety when working with resins.

RESIN CATALYST EYE HAZARD

by Handley Ward, EAA #74733
8702 Highgate Road
Alexandria, VA 22308

At a safety conference held in Vancouver, B.C. an eye specialist described a hazard that could effect each of you and your families. That hazard is the catalyst or hardener that is added to fiberglass resin before the resin is applied. The eye specialist stated that a drop of this catalyst in the eye will progressively destroy the tissue of the eye and result in blindness, unless immediate action is taken (WITHIN 4 SECONDS) to wash the catalyst from the eye. Furthermore, once the chemical has started to destroy the eye, THERE IS NO KNOWN WAY OF STOPPING THE DESTRUCTION or repairing the damage.

The specific toxic agent involved in MEKP (methyl-ethyl-ketone peroxide). In tests using laboratory animals, MEKP in solutions of varying concentrations was found to cause eye problems ranging from irritation to severe damage. The maximum concentration producing no appreciable irritation was a solution containing only 0.6 percent MEKP. Material published on the subject indicates that washing an affected eye within 4 seconds after contamination prevented injuries in all cases, but no known chemical neutralizer has been reported. Suggested protection for catalyst users is protective glasses and the immediate availability of a source of bland fluid (such as water) for thorough washing of ocular tissues.

Reports on one experience described disastrous results. The victim had both eyes contaminated while fiberglassing a chair at home. Though he did make an effort to wash out his eyes, several minutes apparently had elapsed before he found water. One eye was lost immediately; the other was lost gradually over a period of about eight years. The deterioration was described as resembling that from WWI mustard gas burns.

The hazard associated with fiberglass resin was previously unknown to those attending the conference, although many had used fiberglass resin at home or work. The hazard may be unknown to you also, and to your wives and children, who may use a similar kind of resin and catalyst when working with fiberglass or hardeners in liquid casting plastic.

Before using any of these catalysts, check their chemical composition and take appropriate measures. The cost of a pair of safety goggles is a very small price to pay for the protection of eyesight.

REACTION TO "KR ANALYSIS" ARTICLE

Dear Earl,

I've been a little hard to catch...having spent six months in Montreal and then returning to Utah in December.

I received a lot of mail and phone calls re: "A CRITICAL ANALYSIS OF THE KR-2" published in Sport Aviation, January 1988. The reaction was 90% positive and 10% sour grapes. The sour grapes were from guys who don't understand small airplanes with small engines and have an incorrect concept of the KR plane.

The article brought out of the woodwork a couple of real nuts who are doing some very dangerous things to and with their KR's. I warned them, but it won't do any good.

Through all of the KR/Bingham "Saga", stemming back to 1985, I haven't found that I need to adjust my thinking about the KR. Done right, it is a very satisfying aircraft to fly. Taken beyond it's niche, it can be all the way from disappointing to dangerous.

N81NB, per se, was "de-registered" with Oklahoma City. The engine was removed with the instruments and installed in a new Baby Lakes biplane. The Baby Lakes now has the N81NB tail number. The original KR-2 is being fitted with fixed gear and a Great Plains 60 HP engine. It is being converted to a single place aircraft, also. I'll test fly it late '89.

Best of Luck, Neil Bingham

MONTE MILLER'S FIXED GEAR KR-2

Earl,

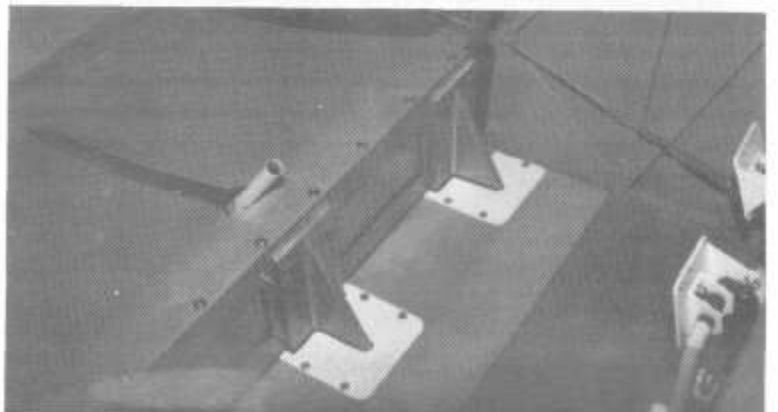
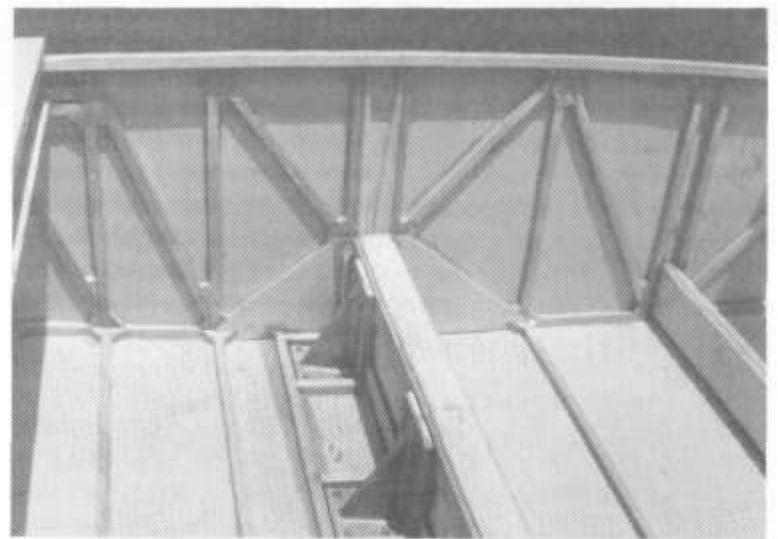
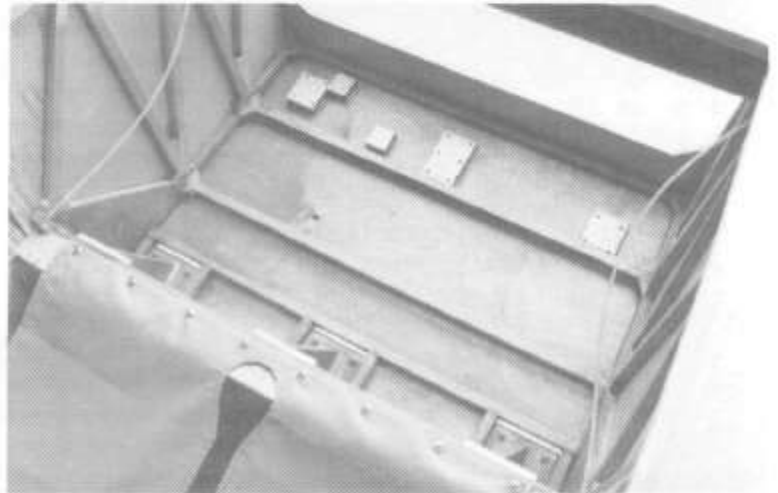
Really enjoyed the December issue of the NEWSLETTER and the coverage of the KR fixed gear aircraft. I'm using the Rand fixed gear package on my KR-2 and as the articles involved a retrofit and a non-Rand gear, thought I'd share some of my experiences as how the Rand gear goes into the aircraft during the construction period. Creative writing is not one of my strong suits, so your readers will have to suffer along with my style.

I would strongly recommend that a builder purchase the FG (fixed gear) option as early as is financially possible during the construction of a project. The FG option requires a 1/4 inch plywood doubler on the spar face and 3/32 ply webs in the triangular bays both fore and aft of the main spar. Trying to go back into a project and retrofit the FG option can be done, obviously, but it is a bear of a chore, due to very limited access to the main spar and the precise drilling that must be done.

The drilling brings up another point. Use a good drill press. There are 48 different holes poked through the spar, the three main castings, and the spring bar itself. Each one must be accurately drilled so that the bolts will be able to take their designed loads. The buzz word here is precision work. Those little taper shims sold are not going to correct a woefully out-of-alignment landing gear track. Builders should be sure that the casting installation bolts pass through the main spar caps. There is room for project-to-project differences in this area and you'll want all the spar strength possible.

To prepare the cockpit for the floorboard installation, 5/8 square spruce is used to reinforce the openings where the gear castings protrude. Some light plywood cover plates can be fabricated and will clean up the floor while allowing future inspections. Without all the retract mechanism in the cockpit, you'll have additional "living" space.

cont'd page 5



The bolts that attach the castings to the spring bar will protrude, along with the springbar itself, below the bottom skin of the aircraft. When the fuselage is upside down for the center section glass work, bond a one inch thick slab of foam to the bottom skin from the spring bar to the firewall. Shape this to the curve of the bottom and taper to a feather edge at the firewall. One layer of glass and you're through here.

While we're busy spending your money, might as well have your choice of control stick assembly on hand. The Rand design will work if you simply flip the mounting brackets so that the "ears" extend outward. This is necessary due to the castings having a different drill pattern than the RG hinge blocks. Might as well drill these holes at the same time as the casting fittings.

The Rand FG package is a nice product and well made. Combine the option with the Cleveland disc brake package and you'll be the envy of the Gathering. You'll also have spent a large chunk of change as it doesn't come cheap.

One last thought and I'll let ya'll get back to working on your project. The gear alters the looks AND the effort required to get into the cockpit. With the greater ground clearance, comes the need for some sort of wing walk structure built into the wing stub. Unless you plan to use the modern version of Roy Rodgers mounting up old Trigger, better check out the February 1987 issue of KITPLANES for a neat wing walk structure. I built one into my port side wing and will be forever glad I did.

I would be glad to supply any additional information, semi-educated guesses or swap jokes with other builders. Best evenings at 817-566-5871...that's outside Dallas, ya'll.

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871 (RES) 387-5613 (RECORDING)

P. S. IT'S EASY TO TELL WHEN YOU'RE
PRETTY FAR ALONG WITH YOUR KR PROJECT...
THE NEIGHBORS QUIT ASKING YOU ABOUT YOUR
BOAT!

SAFETY: USE OF PROTECTIVE GLOVES

My KR-2 is about 60% complete. I stretched the cockpit/fire wall two inches and covered the wings and wingstubs with one layer of kevlar and one layer of KR7533 fiberglass. The gear is fixed; Bill Rosman's design/plans. Fuel cells in each wing are made of Vynylester Resin. The ailerons are both balanced 5in/lbs nose heavy. The rudder is balanced only 20% and I've not even attacked the elevator yet. Other than the above, my KR is pretty much stock. I have G. L. Robinson's canopy plans, but have not completely decided to go that route. I still like the forward hinge arrangement. I also plan to install a 0-200. Might be a tad on the heavy side, but it should go like stink!!

I also suffer from epoxy allergy and exhibit all the usual symptoms, from blisters to cracked/bleeding skin. So far, none of the chemical barriers have worked and neither does disposable latex gloves. Butyl rubber gloves work well for protection, but are a little too thick to afford the "Feel" required for fiberglassing operations and are a tad on the expensive side. I have found a glove thin enough to afford "Feel" and not too costly...less than \$3.00 per pair. They have worked with T-88, Dow DER 330 and Safe-T-Poxy. Directions: Wear the gloves when working with wet or green fiberglass/epoxy - - always. No Exceptions. Clean up with Epo-Cleanse before removing the gloves. If you're a cheapskate like me, use gasoline first, then mineral spirits or denatured alcohol. Okay, Okay, I can hear the safety buffs protesting the unsafe application of gasoline. My only comment to them is that 90 percent of the materials we use are dangerously caustic and potentially hazardous to your health, making gasoline seem ho-hum, right? As always, use common sense and proper precautions. Check your local safety house for a Best Manufacturing Co., Nitrile Glove, product code no. BL-730-10. If there is no safety house near you, call or write Best Manufacturing Co., Nitrile Glove, product code no. BL-730-10. If there is no safety house near you, call or write Best Manufacturing Co., Menlo, Georgia 30731, phone 404-862-2302.

Joseph Adams
Start Rt. 1, Box 199C2
Abita Springs, LA 70420

HI Earl,

Enclosed are photos of my KR-1. I have widened the cockpit to 24" and raised the height of the tail by 4". The canopy is a stock Rand Robinson design. I completely mounted it externally and then sectioned it 12" from the forward end in order to insure a good alignment. Airframe has been increased to 14'6" and reinforced in high stress areas with Kevlar 49. Gear is made of 1" diameter 4130 steel tubing. Fuel tank is 5052 aluminum .050 thick. Engine is 1800cc Porsche type 4. Prop is 52" x 46 pitch. So far, the plane weighs 404 lbs., its finished weight should be about 560 lbs. At this time, the engine has 27 actual running hours on it. I have done low speed to mid range taxi testing on it with the wings "removed" and I have a word of warning...DON'T EVER TAXI A FIXED GEAR KR-1 WITH THE WINGS OFF FASTER THAN YOU CAN WALK, because it could become airborne, as mine did. There is enough wing there to become airborne. In my instance, as I raised the tail, the plane lifted at least 12" off the runway and I was lucky to get away from that one, "free-of-charge". The experience ended with a ground-loop that luckily caused no damage. I am hoping to have it flying by mid '89 and will keep you informed on the progress.

Jim Evan's trail of comments received at an air show he attended with his "Bondo Bomber" just goes to prove that we KR owners need to have a good sense of humor when it comes to our aircraft. To prove this, I submit a list of comments made to me this past summer by "Hangar Observers".

"My, your a good father to make that for your kids!"

"Gee my son has a radio controlled model just the same size as yours."

"Is that for display or what?"

Then, one day as I was testing my engine, a fuel truck driver stopped his truck by my KR and, with an eye dropper in hand, he exclaimed, 'FILL'ER UP SIR?'

Dick Dougan
2317 Hedge
Pontiac, MI 48054



FOR SALE

1835 VW ENGINE 175 HOURS TT. 5 HOURS ON
CIMA FORGED PISTONS, CYLINDERS, GERMAN
DUAL PORT HEADS, GERMAN RODS. BALANCED,
SCAT CAM, DIEHL ACCESSORY CASE, 20 AMP
ALTERNATOR, STARTER, SLICK 4216 MAGNETO,
COOL TIN, OIL COOLER. \$2,000 INCLUDES
SHIPPING U.S.A.

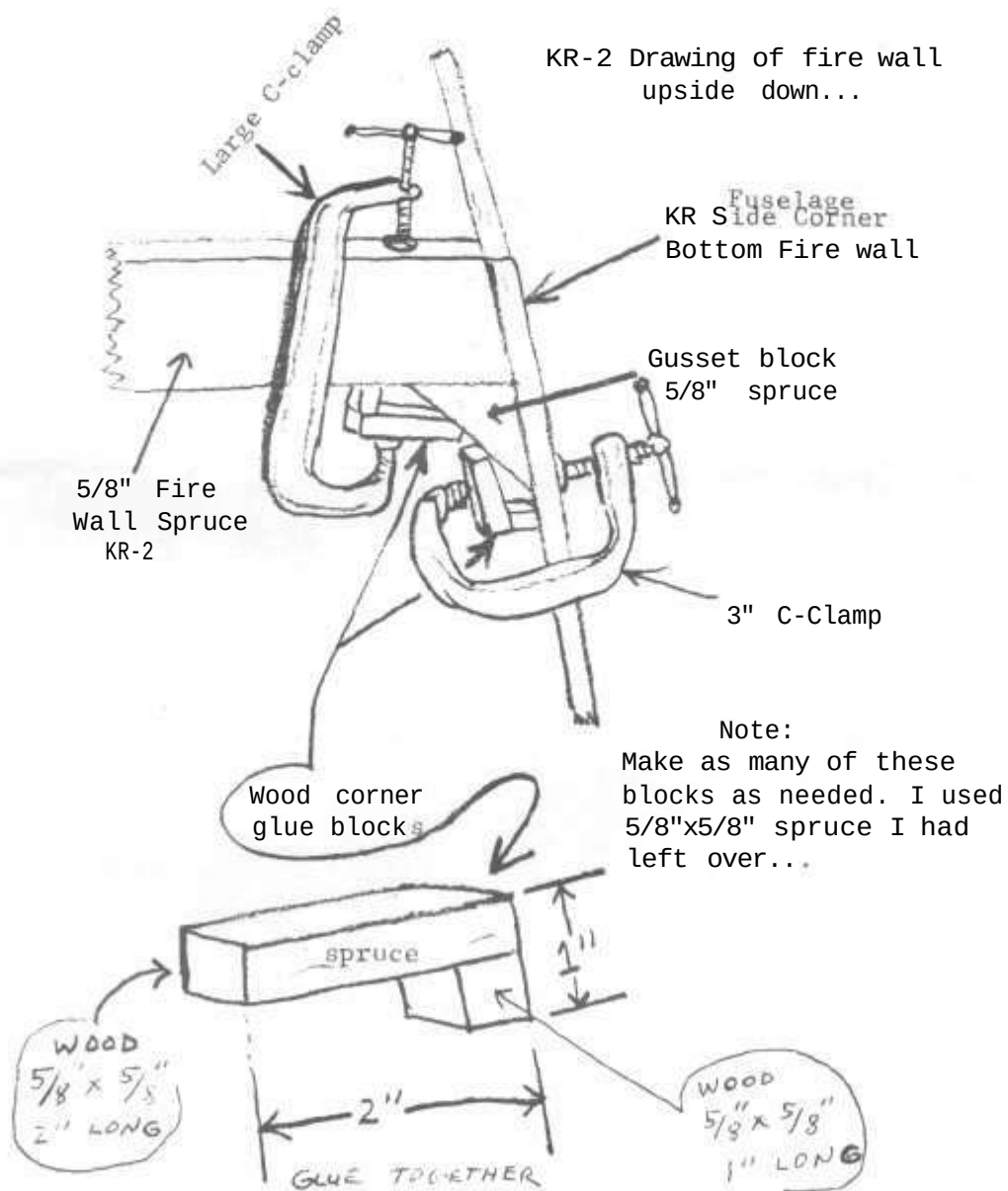
PAIR OF NEW KR WHEELS, BRAKE DRUMS AND
SHOES. 5" DIAMETER FOR 5/8" AXLE. \$50.00
INCLUDES SHIPPING U.S.A.

JOHN SHAFFER
4501 S.E. 38TH ST.
DEL CITY, OK 73115
405-672-4520

GLUING TIP

SUBMITTED BY JOHN CROMWELL
1217 TEAL PLACE, EDMOND, OK 73034

EASY WAY TO GLUE IN THE CORNER BLOCKS ON THE KR FIRE WALL. . .
May be helpful to new builders. These little blocks are helpful
in other places during the building process of KR's.



THE "SUPERCASE"

This is a self contained unit designed to supply a full electrical system, including starter, alternator, mag drive mechanism, and mounting attach points for the VW conversion. This assembly requires little or no machining for its installation. The unit will fit all VW engines from 1200cc to 2200cc. The Lycoming mount attach points are located so as to enable the builder to use the Rand/Revmaster engine mount. This case will also enable the builder to use the original KR engine mount using the VW mounting bolt pattern. This unit has the alternator inside so there are no V-belts, thus, the turbo installation will fit with no problem. Entire weight of the case and all accessories is 24 Ibs,

The case is designed to use the Slick 4016 or 4216. The Dual Bendix D-2000 mag will also fit. The small .4 hp starter designed for snowmobiles, weighing only 4¹ Ibs, will work fine on 1835 cc engines or smaller. The 1.2 hp geared starter, we now offer, will work for the larger engines. If requested, we can machine the case so the starter will be on top to allow installation in tri-geared planes.

Specify when ordering whether the stock crank with four dowels or the stroker crank with eight dowels is to be used in your engine. Drilling the flywheel for eight dowels is \$10 extra. Please allow 3 to 6 weeks at least for delivery.

Prices for the components available from us are as follows:

Accessory case (machined and ready for installation)	\$135.00
Flywheel	95.00
Mag Drive	45.00
20 AMP Alternator	110.00
Small Starter (.4 hp for 1835cc and smaller)	90.00
Geared Starter (1.2 hp for big engines)	new 180.00
(Adapter for geared starter to fit cases	rebuilt 120.00
shipped prior to 4/24/88 - \$20)	

KR NEWSLETTER

P.O. BOX 579

LAKEVILLE, MINNESOTA 55044

ISSUE NO. 141, FEBRUARY 1989



KR NEWSLETTER

ISSUE NO. 142

MARCH 1989



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



KEVIN KELLY'S "SLEEK" KR-100 N1004K

Earl,

I enjoyed our conversation tonight and look forward to the Newsletters. I think you have taken on a huge job and it seems you're making it work. Thanks!

The importance of a Newsletter that passes on the improvements and ideas of the builders is paramount to the future of the KR's. It's through the collective information of the group that we can improve and perpetuate the aircraft.

To give you an update on the KR-100, let me provide the following:
(cont'd next page)

...Since July 1987, the airframe has 360 hours and is the same as it was on its first flight except for a new paint job and wheel pants in April '88.

...The engine is a stock Cont. 0-200 with 2320 hours SMOH and besides leaking a bit of oil, is still running.

...The prop is a story in itself! After flying behind a Props, Inc. 57 x 71 and a Great American 60 x 68 I bought a Sterba 60 x 68 and was pleasantly surprised!! It increased the climb by about 200 FPM and cruise by 5 MPH, and get this...the RPM spread between static and cruise is only 300 to 350 RPM (2500 ST 2800+ CR). That's almost a constant speed. Congrats and thanks to ED STERBA!

To contact Ed, call (414) 728-1367.

...THE FIGURES GO LIKE THIS:

Empty Wt. 680+

Gross Wt. 1000+

Cruise:

205 TAS MPH at 10,000 ft 2800 RPM

Climb:

1500 FPM at 140 IAS to 5,000 ft

1000 FPM at 140 IAS 5-9,000+ ft

Because of my higher wing loading and short span, the climb decreases rapidly in thin air.

Fuel Consumption 5.5 GPH at 2600 RPM

6.5 GPH at 2800 RPM

The fuel gauge has quit (actually the sender did), so I'm flying by stop watch until I get it fixed.

...Steve Alderman was out here in California lately and I had the opportunity to fly with him and his 0-200 KR-2 and was amazed. His KR-2 is equal to the KR-101 in cruise and climbs about 50 to 100 FPM better (love that conger span!) It would be great to see a 0-200 KR-2 with Dan Diehl's wings and about 2' more tail length! It should be great.

I'm in the process of finishing the design for a 125-160 HP 2 seater that should keep up with the best and, funds permitting, will start construction in the next six months.

cont'd page 3



ANOTHER VIEW OF KELLY'S KR-100



KR-100 COCKPIT



RICHARD SHIRLEY'S KR-1 ALONGSIDE KR-100

The KR-100 drawings, parts lists, manuals and tech drawings are done and delivered to Jeannette between April and August '88. She said she's in the process of kitting it.

There are five manuals for the five kits, 17 construction drawings, numerous tech drawings for manufacturing, templates for plugs and detailed (bolt for bolt) parts lists.

Anyone wishing info on the KR-100 is welcome to contact me through you if they wish or call me direct at (209) 532-4326 in the evenings.

AS TO OTHER BUILDERS IN THE WEST:

..Roger Hanson of Livermore, CA has just completed his 0-200 mod to his KR-2 (0-200 TURBO) and I hope to get results soon.

..Elwood Harding of Columbia, CA has just redone his cowl and picked up 5+ MPH.

..Jerry Robinson of Yakima, WA is finishing a Cont. C90 installation in his KR-2. He is also putting out a quarterly Newsletter "Western KR Group" For info, call (509) 966-4449.

..Richard Shirley of Seal Beach, CA is still flying his extremely modified KR-1 (1800 cc 185 MPH+).

..Bill Rice of Grants Pass, OR is installing a 2100 Revmaster in his 1800 KR-2.

..Tom Endicott of Yakima, WA is about 60% through a totally scratch built KR-2.

..I haven't heard from the crowd of KR's in the Hemet area of CA for awhile.

..There are quite a few other KR's flying around the West Coast and I hope they've gotten your Newsletter.

If you need any help or information, please feel free to call anytime.

Kevin Kelly
22039 Fallview Lane
Sonora, CA 95370
(209) 532-4326 (evenings)

Jeannette Rand invites builders and enthusiasts of the KR-1, KR-2 and KR-100 to attend the KR Forum at Sun 'n Fun on Wednesday, April 12, 1989 at 11:00 a.m. Check the Sun 'n Fun program or the forum schedule boards for the tent number. The annual Sun 'n Fun KR Dinner will be held that evening, Wednesday, April 12, at the Holiday Inn South in Lakeland. Tickets will be available at the Wicks booth.

As the March issue of **SPORT AVIATION** reported, one of the topics covered in the KR Forum will be the upcoming KR-100 kit. Jeannette says interest is high and every effort is being expended to get the kit on the market. She also reports that, interestingly, since the introduction of the fixed gear option for the KR-2, it is being chosen 10 to 1 over the retractable gear. Many owners of existing retractable geared KR-2's are retrofitting the fixed gear. The gear, which is an aluminum leaf spring type, is available in a basic package consisting of the gear leg, itself, and the mounting hardware...or, complete with wheels and brakes.

For more information on the dinner, contact:

Virgil Salisbury
5445 S.W. 89th Place
Miami, FL 33165

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$12.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
COMMERCIAL AND NON-COMMERCIAL ADVERTISING
FREE TO SUBSCRIBERS [INCLUDING PHOTO].
INCLUSION OF ADS SUBJECT TO AVAILABILITY
OF SPACE.
SET OF ALL AVAILABLE BACK ISSUES (OVER
100) FOR \$60.00.
INDIVIDUAL COPIES \$1.00 EACH.

FLIGHT REPORT N28AK "WHITE LIGHTENING"
(FOR SALE)



Earl,

Finally got my prints back yesterday, so here's one and info on my KR-2, N28AK. The plane is pure white all over.

I started flying this KR in the early part of 1985. To-date I have flown it for a total of 225 hours. In 1987 my wife flew with me to the East coast and later to Oshkosh. We have flown it to several other states on shorter trips.

The engine is a Revmaster 2100-D that has a forged crank shaft. It is equipped with a Revmaster geared starter, dual Bendix mags and a large aircraft battery.

ENGINE GAUGES INCLUDE:

Oil pressure
Oil Temperature
Oil low pressure lite
RPM gauge
Cylinder head temperature
Exhaust gas temperature (two)
Ampmeter

Three gas gauges (one of these has since been replaced by a voltmeter)

OTHER PANEL ITEMS:

Compass Airspeed
Clock Turn & bank
Rate of Climb Altimeter
Hobbs meter Vacuum Gauge
Loran-C (STS) Not included in price
Com. Radio (Terra TPX 720) Not included in price

Two fresh air outlets supplied by the two NASA vents on the sides of the cowling.

There are two defrost outlets for the windshield. Air for these is supplied by the cabin heat muff.

OTHER ITEMS:

Red flashing beacon lite on the top of the vertical fin.
Running lites.
Heated pitot
Two strobe lites
Three metal fuel tanks, 7 gal. in each wing and a 14 gal. header tank (28 total).

An electric fuel pump transfer fuel from the wing tanks to the header.

The main wheels are equipped with Lamb tires. Tail wheel is a Dan Diehl wheel.

It has dual control sticks with heel brakes on the pilot side (drum type).

Prop is a 52 x 52 Bernard Warnke. Almost constant speed (efficient with no vibration).

Each passenger has a seat belt and dual shoulder harness. Each belt is individually connected to the tail wheel mounting spring bolt by a 1/8" steel cable.

The retract gear has a positive locking pin on each side in both the up and down position. There is a red lite for the up position and a green lite for the down position. If the throttle is completely closed or the carb. heat is pulled on with the gear in the up position, a loud horn will sound to remind you to put the gear down.

There is a good sized baggage compartment behind the seats with a cover lid. You can hang a clothes bag from the top of the turtle deck down into the baggage compartment without any folding.

The front deck and windshield come off in one complete unit exposing the header tank and the rear of the instrument panel for easy maintenance.

The canopy is hinged on the right side. In the down position it also slides forward 1/4" into a rubber sealed groove in the windshield. Two canopy locks pull the canopy forward and lock. There is one more canopy lock on the left side.

There are two tie down rings, one under each wing that are removable. These are also used to jack-up the plane if necessary.

This KR weighs 700 lbs. Most of the extra weight is due to the three fuel tanks, their related hardware, metal reinforcing cage behind the firewall, metal on top of the top longerons clear to the tail and a metal roll "bar". This extra weight eats into the planes carrying capacity but it also makes it more stable in the air especially during crosswind landings.

The finish coat of paint and stripes were put on in March of 1986. The paint is Ditzler Starthane. The plane has always been hangered, most of the time in a completely closed hangar.

The reason for selling is that I also now have a Cherokee 180-D. Had to have more room for grandchildren and such. If it weren't for paying two hangar fees and my wife, I sure wouldn't sell "White Lightning". Wives just don't seem to understand that a man needs "two" airplanes.

For about three years I have flown the above with a POSA carburetor. Top speed was 150 MPH. I usually cruised at about 130 MPH and it would burn at 4.5 GPH. I know that the Revmaster is capable of giving me another 15 MPH as the POSA only gave me a max. RPM of 3000. The peak HP for the Revmaster comes at 3250 RPM. I have just recently installed a Mikuni carburetor which has given me a real sweet sounding idle at 850 RPM and reduced the fuel consumption to 3.5 GPH (the POSA always did run way too rich). To-date, I don't have the top RPM where I want it. I will not sell the plane until I get everything performing to my satisfaction and well tested. I am retired and now that the holidays are over, I plan to concentrate on this project.

I have well over \$10,000 in this plane but, being realistic, I will sell it for \$7,500.

Last year I spent a lot of time on Don Lott's KR-2 that was at Covington, TN (N74DL). This year I have another friend's KR-2 in my basement that will take about a year to restore. I am also helping a small group build a VP-2 every Tuesday evening. As you can see, although I'm selling N28AK, I will still be very active in the KR group.

Again, we appreciate your efforts on the KR Newsletter. Best regards,

Max Calkin
P.O. Box 149A, Rt. 1
Omaha, AR 72662
(501) 426-5307

HELP!!!

Earl, would it possible to publish a note of inquiry to the readers regarding the use of "in tank" fuel pumps, like those used on GM automobiles. I would like to use one of these pumps in the wing stub tanks for transferring fuel to the header tank. I am not certain how to install and mount the unit in the tank as these should not reach into the tank sump in order to prevent water and foreign material ingestion. I would appreciate anyone's help regarding this installation. Please contact:

Carl Rink
807 Loudonberry Dr.
Sunnyvale, CA 94087
(408)245-4932

FOR SALE

KR-2 Fuselage on gear wing spars, stabilizer and elevator, fuel tank, canopy, wing tip, most other materials.
\$1,200.00

Revmaster 2100 D Turbo Engine. All extras and factory updates. Never run. Maloof Propeller, \$4,200.00.

Eric White
HC 32, Box 293
Owls Head, ME 04854
(207) 594-5212 after 6 p.m.

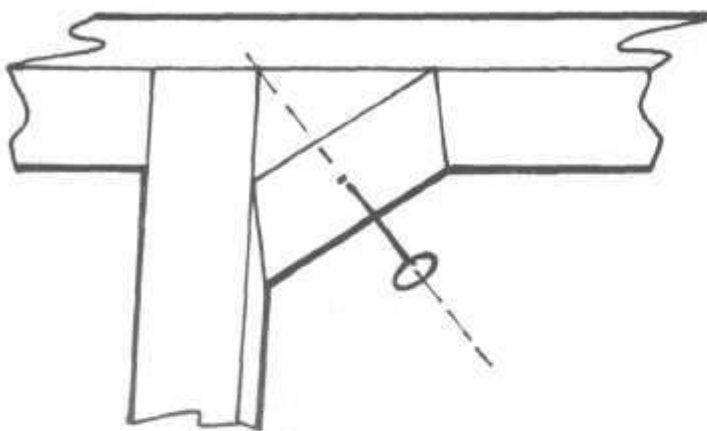
GLUING PESKY GUSSET BLOCKS

I've read the past two issues builders tips about gluing those pesky triangular gusset blocks. All of them require some sort of clamping device. I've done a little study on epoxy adhesives and after being involved in my project for awhile, I've learned some things that I'd like to share.

One thing I found out, pertains to the pressure required to produce a correct and full strength joint. The bottom line is that you must be careful not to exert excessive pressure when clamping pieces together. The joint or part being glued requires only moderate pressure. Current epoxy adhesives develop full strength with only moderate clamping pressure and if the epoxy is squeezed out too much, can actually be weaker than a correctly clamped joint. This info pertains to the APCO Safety-Poxy that I utilize. This same glue pressure info has appeared in Tony Bingelis's SPORT AVIATION articles.

At any rate, here's my contribution to the gusset gluing guidelines (see sketch).

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871 (RES) 387-5613 (RECORDING)



DRILL GUSSET BLOCK USING
WIRE GAUGE BIT FOR SNUG
FIT OF WIRE GAUGE NAIL.
ALLOW $\frac{1}{8}$ " OF NAIL TO
EXTEND. REMOVE AFTER
EPOXY CURE.

JERRY ROBINSON'S CANOPY MOD

Earl, attached you'll find a photo of my KR-2 that shows a canopy modification that I have detailed in an instructional manual that I am offering for sale to KR builders.

The copywrited manual covers the completion of the front deck, fuel tank, instrument panel, luggage compartment and rear deck. It includes 14 pages of written instructions, along with 14 pages of photos and drawings.

My manual makes the mod very simple. I have found that this mod makes my KR faster, more aerodynamic and I believe it looks better. I don't have to worry about the loss of my canopy. The cost for the manual is \$50.00.

I am presently installing a C-90 in my KR, which has now flown a total of 450 hours. The C-90 should up my cruise and climb a bit. The climb figures should be 1200 to 1400 FPM at about 150 to 160 and cruise at approximately 190 TAS. For information, contact:

G. L. Robinson
P. O. Box 88
Yakima, WA 98907
(509) 966-4449



CANOPY QUESTIONS AND ANSWERS

Source: Glen Breitsprecher
GEE BEE CANOPIES, INC.

Q: If you need to work with a canopy that has already had the protective coating removed, is there any way to protect the plexiglass when you begin to cut and fit it?

GLEN: The cheapest thing to do would be to put a few layers of Syran Wrap over the canopy. The material does a good job of clinging to the plexi and will offer some protection against the dust and grit that could scratch the canopy. You can tape the edges down with masking tape. Make sure you don't leave the tape on the acrylic for more than a couple days or the glue in the masking tape will etch itself into the acrylic and be very difficult to remove. You can also contact a local plexiglass dealer or one that deals in sign-making products and get a quart of liquid masking and apply a few coats of that.

Q: Is it possible to add tint to a clear canopy after it is produced?

GLEN: Not really, about the only thing you could try is to purchase some mylar-type film and cut it into fairly thin strips, due to the compound curves of the canopy. Dick VanGrunsvan did that on his prototype RV-6 and he said it was difficult getting it in but it seemed to work adequately. The only other way to do it would be to make up a thin piece of darker acrylic and stick it inside with little suction cups. There's really no satisfactory way, other than ordering the canopy tinted to begin with.

Q: Some pilots are apprehensive about purchasing a tinted canopy because it might interfere with night flying. What are your thoughts?

GLEN: The tints that I use are FAA approved for windshields and that I have on my Mustang II. I have no problem flying at night...it's a light enough tint. If you get the real dark tint, you might have some problems. Although anyone flying at night is just kidding themselves

if they expect to fly other than reference to just lights down below. The little reduction of light transmittance in the tinted canopy isn't going to affect you at all.

For further information, contact:
BEE GEE CANOPIES, INC.
18415 Second Ave. So.
Seattle, WA 98148
Phone: (206) 242-0332

KEVLOR WARNING

In a recent conversation with GRIFF PICKETT of Raymore, MO, I was told of a serious problem regarding the use of Kevlor.

At Griff's Local EAA Chapter meeting, a representative of T.W.A. explained why that airline is spending millions replacing Kevlor pieces in their aircraft, with fiberglass. According to the spokesperson, they found many Kevlor sections delaminate due to the fact that Kevlor "wicks" water. As long as Kevlor is completely encapsulated by resin, everything is fine. But if any of the epoxy gets chipped away and exposes the fiber to the air, the fiber will soak up water either in vapor or liquid form. The water is then transported through the fiber system, down into the interior of the piece, and there it will stay permanently! As the aircraft gains altitude, the water freezes, expands and the section delaminates.

I contacted an official at Northwest Airlines and he echoed everything that Griff said. He also stated that Boeing no longer uses Kevlor in any of its aircraft; opting for fiberglass instead.



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD. OSHKOSH. WI 54903-3086
PHONE 414/426-4800

WITH GREAT SADNESS...

I read of the death of Peter Nieber, owner of W.A.R. REPLICAS, Santa Paula, CA.

As reported in this month's issue of SPORT AVIATION, Peter died February 4, when flight testing his half-scale Mustang Replica.

According to witnesses, Peter had made a series of passes over the runway in order to work-out some problems he was having in retracting the landing gear. Witnesses stated that as the aircraft approached for it's first pass, with the gear retracted, the plane appeared to develop aileron flutter, lost control and crashed.

Peter's war replicas encourage much of the spirit and nostalgia of an era that many aviators hold dear. He was also active in advancing our sport, most recently in his work with Rex Taylor of HAPI Engines in adapting the Honda Prelude engine for use in aircraft.

Those of us in the KR community have a special understanding of what a tragedy like this means.

We extend our heartfelt sympathy to the family, friends and associates of Peter Nieber.

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 142, MARCH 1989



KR NEWSLETTER

ISSUE NO. 143

APRIL 1989



P.O. Box 579.
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



MAX CALKIN (LEFT) AND DON LOTT, WITH DON'S KR-2 N74DL AT COVIN6TON '88

Earl,

Don't know if you heard or not, but when Max Calkin and I left Covington in our planes and started home, we waved our wings to all on take off and headed West. We were talking to each other on the radio, getting all set for a nice trip home, so I just left my gear down since I was busy. When all was well, I decided to tuck my gear up but it didn't seem right, so I decided I had better try putting it back down. I had made sort of a rough landing when I had arrived in Covington, but didn't think it was enough to damage anything. I had —repeat— HAD a type of gear latch with the arch bracket and pins that click into holes in both up and down position —that is, unless the pin is bent just enough so that you can hardly see it with your eye.

(cont'd page 2)

You know what you do then? You do what I did: You call your old buddy Max and say, "Hey Max, I don't seem to be able to put my gear back down." And old Max, in a loud voice says, "What did you say?" After turning my headset down I repeated my message. "What are you going to do?" says Max. "Let's head back to Covington", says I.

I was thinking of that nice soft AG strip alongside the Covington strip. So we started back and I started in earnest to get the pin back in the hole. It would almost catch, then slip out. So I took the only tool available, my sneaker, and started pounding on the pin. I almost got it a couple of times. Had I been wearing cowboy boots, I think I would have made it.

We got back to the strip as planned and Max landed. I kept a little altitude and circled for awhile, still working on the pin and all the time, there was an echo sounding in my ear. It was John Shaffer saying, "Fly the plane, fly the plane". The talk he gave at Covington was still fresh in my mind, and I mean that John. (Editor's Note: John had recounted a chilling experience that he had when his canopy blew open in flight.

'He had become so distracted with the canopy problem, that he forgot to fly the airplane which resulted in a near fatal crash.) All that was left was a belly-landing, so I set it up and slowed the little KR down as slow as I could and at about ten feet above touchdown, I switched off the engine. The prop stopped exactly vertical and I was trying to bump it over when I touched down. I had heard that KR's "belly well", and they do. We measured the distance after all had settled and I had gone 75 feet from touchdown to stop and my shoulder harness didn't even tighten.

There were enough people still around to help lift her up so we could drive the pins back in with a cowboy boot—or maybe it was a hammer. Anyway, I now have one of those weird-looking gear latch "guiz whizzes" that Ken Rand came out with on his first plans. Looks like a mouse trap, you know, but sounds like music when those two little aluminum bars snap into place. All it cost to learn this was a new prop and several hours glass work on my front cowl. Had it not been for John Shaffer's talk, it could have cost me much more. Thanks, John. Keep giving that good advice.

COCKPIT OF DON LOTT'S KR-2



More thanks and much appreciation goes to Chuck Grammer and his wife for driving me around while I was in Covington. Of course, I'll never forget my old buddy Max who flew home and drove my van and trailer back to pick up the plane while I was taking off the wings.

You see what happens when you leave early? You miss the air show!!

Don Lott
Rt. 8, Box 53
Harrison, AR 72601
501-741-9827



**EXPERIMENTAL
AIRCRAFT
ASSOCIATION**

WITTMAN AIRFIELD, OSHKOSH, WI 549033086
PHONE 414/426-4800

A TIME OF TRANSITION

As most of you know, during the past four years there have been two newsletters serving KR community.

Although the KR Newsletter has been a monthly publication since 1975, approximately four years ago the timeliness of the publication began to slip, due to its previous publisher becoming stricken with Multiple Sclerosis.

Knowing how important the exchange of information is to the KR community, Steve Bennett of Great Plains Aircraft Supply began publication of the "QUARTERLY" Newsletter.

A few weeks ago, Steve called me and said he would be ceasing publication of the "QUARTERLY" because the KR Newsletter was again being produced in a timely manner and he felt it was not necessary to have two publications serving the KR community.

In total, Steve produced 16 issues of the "QUARTERLY", with each issue containing a wealth of information on the building and flying of KR aircraft. Through the years, Steve has earned the respect and trust of hundreds of builders and pilots throughout the world.

Steve has said he will continue to keep in touch with many of us through "The Beetle Flyer", a publication put out by Great Plains, devoted to VW powered aircraft. I also hope Steve will share some of his ideas in this publication as well.

I hope you will join me in thanking Steve and his wife, Linda, for the wonderful job they did in not only producing an excellent newsletter, but for their continuing support to the KR community.



HELP!!

I would like to know if anybody lives within 300 miles of Southern Indiana that has a KR-2 flying. I have built a KR and would like a ride in one. I would like to see and get some idea as to how they handle. Contact:

Jerry F. Johnson
R. R. #2, Box 192
Petersburg, IN 47567
812-354-6779

TIP ON GLASSING WINGS

I've just finished glassing the wings on my KR-1 and thought I'd pass along a couple of things I discovered in the process.

When shaping the foam blocks, use a long straight board like the manual says, but get some adhesive-backed anti-skid material from the hardware store and stick it to the board with one edge butted to the corner of the board. The anti-skid is nothing but sandpaper and comes in assorted widths. Cant the board as per the manual and sand grooves in the foam from rib to rib about one inch apart. Go easy because you can take off a lot of foam in a hurry and even sand a notch in the ribs. The bottom of the groove is the desired contour of the wing skin. Now use a Bondo body file and carefully scrape away the foam in between the grooves but stop while the groove is still barely visible. Use the board with the anti-skid to sand the rest of the foam down to the rib contour. The result is a perfectly smooth foam base in no time at all.

Also, Bondo makes a filler called Dynalite that is extremely light weight and easy to work with. Auto paint supply houses carry the stuff at around \$13 a gallon. It can be used as low as 55 degrees but takes somewhat longer to set up. Put it on just like regular Bondo, wait five to ten minutes for it to begin to harden, then use a body file or cheese grater to knock off the high spots. The trick is to apply more Dynalite than necessary and take off the excess with the scraper. When it finishes hardening in another ten minutes, get out the orbital sander and finish the job. The reason it is so light? It's got micro balloons in it.

Tom Bagnetto
4817 Reginald
Wichita Falls, TX 76308
817-691-1902

FREE!!

Set of Lamb Tires and wheels 500 x 5 with manual brakes, "YOU PAY SHIPPING".

CONTACT: Dick Dougan
2317 Hedge St.
Pontiac, MI 48054
313-666-1185

A TRAGIC ACCIDENT WE CAN ALL LEARN FROM

I feel the most important aspect of this Newsletter is in regard to safety.

In the last issue of the "**QUARTERLY**", Steve Bennett reprinted a chilling account of an accident that involved the pilot of a MONI aircraft. (For those of you who already read it, please bear with me. I think the information is well worth repeating.) Steve also asked that I continue the "train of thought" regarding what we can learn from it and prevent such accidents in the future.

What follows are excerpts of the article that appeared in the "**QUARTERLY**".

John L. Shaw	FROM THE MONITOR
1080 Hartford St.	Newsletter for
Cambria, CA 93428	MONI Builders

Carlos, I finally received the FAA "Air Traffic Accident Package" concerning Jim Lewis's, Moni N8123, William Fox Airport, Lancaster, CA, October 15, 1988 crash. He had trailered the Moni from his home (about 50 miles) and was going to have it on display for an airshow the following day. I will condense the **FAA REPORT**.

Wx clear	visibility 50 miles
Temperature 70	winds calm
Time GMT 17:27:24	cleared for take-off

17:28:30 N8123 advised tower that an engine problem had occurred and he was turning left and going to land.

17:28:36 Tower advised that he could land anywhere at his discretion.

17:28:42 N8123 crash on the left side departure end of runway 24.

The three controllers on duty reported:

(Controller A) N8123 departed runway 24 with about 150 ft. of altitude and about 500 ft. of runway remaining (runway 24 is 5,000 ft. long). Pilots advised he was experiencing engine problems and was returning to land. While attempting a left turn, the aircraft crashed and burned in the area between runway 24 and the parallel taxiway.

(Controller B) ...advised he had engine problems and would try to land. The aircraft made a steep bank left turn and crashed...

(Controller C) ...advised tower of "engine problems" and advised something to the effect of "returning to the runway". I advised the pilot to "maneuver your discretion". The aircraft turned sharply to the left, then crashed. The aircraft hit at a high angle of attack and started to burn.

END OF FAA REPORT.

The airport manager told me he was the first person at the scene. The plane was a ball of flame and he was surprised to see Jim jump out and run away from the plane. He received 3rd degree burns to 90% of his body and 1st degree burns on the rest. He was rushed to a hospital in a chopper and was still conscious at the hospital. He lived three weeks, dying from burns. The doctor said he had no other serious injuries.

I am afraid we will never know what Jim's engine problem was and we will wonder why he made the frequently made pilot's error, the sharp turn at low altitude.

JOHN SHAW

NOTE FROM CARLOS EMMONS. EDITOR OF MONITOR NEWSLETTER: John, thanks a lot for taking the time to do all this investigating for us. As in most accidents, we will never know what exactly happened. Please and I cannot over emphasize this, if you have an emergency, always fly the aircraft first. Talking to the tower or whomever should not be high on your priority list. While not the cause of the accident (apparently), but certainly the cause of Jim's death, having a fiberglass fuel tank between your legs does not appear to be a good idea. This is just my opinion, but I believe that the welded aluminum tank would not have broken up the way the fiberglass one did. The fiberglass tank simply isn't as strong and apparently shattered on impact. An aluminum tank may rupture which would cause a fuel leak, but it wouldn't instantly spread fuel all over the cockpit. I would recommend anyone flying with a fiberglass fuel tank in the cockpit to reconsider this decision.

STEVE BENNETT'S COMMENTS: Well, that article can lead to some heavy thought. The reason I chose to publish it in this issue is because it ties in very well with the article from Howard Kaiser on Crash Survivability and the current Homebuilt Corner in Sport Aviation (March 89).

An old flight instructor of mine once said that "Perfect practice makes perfect". Enough cannot be said about mentally and physically rehearsing solutions to different "Problems" that can be encountered during flight. Notice the very small amount of time between Jim's call to the tower and the time the aircraft impacted.

THINGS TO PRACTICE

What to do if:

1. Electrical fire on ground.
2. Backfire resulting in engine fire.
3. Engine quits just after take off.
4. Engine quits at cruise.
5. Engine quits on approach to landing.
6. Fire in aircraft at altitude.
7. Major structural failure at altitude.
8. Flight in icing.
9. Flight into 00 visibility.
10. Partial electrical failure in flight.

The list could, of course, go on and on. What we may need to practice though is our reaction to some of these unplanned actions. If your engine quits on take-off from your home airport, do you know the surrounding area well enough and do you have predetermined off airport landing areas? When you fly into a new airport do you look over the surrounding area to see where you could land in an emergency? If you have a fire extinguisher, can you get to it in flight, easily, with two people and a cockpit full of smoke? Do you know where your switches are by feel? Have you practiced exiting your aircraft quickly (on the ground) if you wear a parachute? Are the clothes you plan on wearing for your first flight made of cotton or nylon? Can you wear a crash helmet?

The article in this issue that was reprinted from the MONITOR, was not meant as a condemnation of fiberglass fuel tanks. It simply was meant to show what happened to a builder/flyer in ONE particular application.

Perhaps Earl wouldn't mind continuing this train of thought in the KR NEWSLETTER and each of you could send him suggestions of other items to practice that pertain to KR flight.

FROM KR NEWSLETTER EDITOR

Thanks, Steve, for publishing the article. What bothers me most about this senseless accident is the pilot's ill-fated decision to do an engine out 180 degree turn at only 150' AGL.

It's a scenario that happens all too often and seems prompted by the pilot's first "panicked" thoughts to "save the plane".

To prevent an accident like this happening to you (and don't think it can't), you first must ingrain in your mind that your plane is expendable and not worth your life. I can hear you "groaning" because it's an obvious statement but it's people who haven't really thought about how important their life is, that die running back into their burning homes to retrieve a picture of their cat. Pilots who have not gotten their priorities in order, may make a tragic error in judgement because their first thought may be to save the plane rather than their life.

OK, enough of that... next, what is the minimum altitude you should attempt an engine out 180 turn on climb out? Well, as you can imagine, it depends on a number of factors but in discussion with a number of high-time KR pilots, the consensus of opinion is **DO NOT ATTEMPT AN ENGINE OUT 180 DEGREE TURN LOWER THAN 800' AGL.**

In order to help you remember where 800' AGL is on your altimeter, consider purchasing a Altitude Alerter from someone like Sporty's that will simply clip onto your altimeter (cost is about \$30.00).

So that's it, if you're engine quits on climb out and you're less than 800' AGL, establish a safe glide ratio, look for a place to land (if time permits, try restarting the engine) but remember above all, **FLY THE PLANE!** As you approach your touchdown, turn off all electrics and consider unlatching all but one of your canopy latches (you won't have time to fumble with them on the ground).

If you have any other suggestions, I'd like to hear from you, let's all work together to eliminate tragic accidents like the one we've just read about.

HOW I SPENT MY WEEKEND
OR
FORTY-FOUR HOURS OF FIGHTIN'
FUSSY FOAM

As I sit here filling up a kleenex with foam dust that still gets through a mask, I'm thinking about the center section of my KR and what little tricks I learned during the foam/glass operation. I made a New Year's resolution to share with others what I have gotten myself into. Maybe it'll save a builder some time or at least provide a chuckle..either can't hurt.

The one-inch foam called out in the plans turned out to be only seven-eighths...way too thin to fit the upper profile of the wing. Even if you have some one-inch stock, it becomes so thin after sanding that it's likely to collapse during the "glass work". Better to use two-inch for the areas forward of the aft spar. You'll have enough grief with the unsupported trailing edge as it is. Jury rig a support of some type or you will sand a wavy trailing edge, sure 'nuff.

As each of the multiple foam pieces are cut and sanded to fit, go ahead and bond them in place. The slight wedge effect of the blocks against the thin plywood ribs will help hold the next piece in position as the epoxy cures.

Epoxy...I've developed a real love/hate relationship with the stuff. You too can fill the shop with green dust and blue air...just try and get those fragile slabs of foam in position before the called for five-minute variety sets up harder than your ex-wife's biscuits. Get around this little dilemma by using the same kind that's holding your dream together. The structural epoxy can be brushed on using a cheapy acid brush and won't go off too soon. A couple of strategically placed dabs of five-minute will keep your carefully shaped foam from slipping out of alignment. I used to pitch out the acid brush until I discovered that lacquer thinner will wash them out good as new. I got by with using one twenty cent brush for the entire center section.

The best material I've found to use as a sanding board is from the lumberyard's offering of redwood. Shop the indoor stock as it's usually better even if it is a bit high priced. Nice thing about it is the radiused edges saves mucho gouges in the foam. A one by four is just fine for our needs.

Use some 100 grit and do a good job of attaching it with contact cement. Any little corner or snag in the sandpaper will be spotted just as you're making the last pass over the shaped foam too late.

One last very important tip...wipe your feet before you go back into the house. My bride has some sort of formula where she counts the foam-dust footprints through the carpet, divides by the number of my helpful friends, multiplies by some weird factor and can tell the exact number of beers we've consumed... I bought a doormat the next day.

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871 (RES) 387-5613 (RECORDING)

FILLING "DINGS"

Just a few lines to tell you that I enjoy your excellent Newsletter and to tell you about a gimmick I came across. If there are people out there that are doing everything the hard way, like I am... Foaming up everything instead of buying the wing skins, tail skins, etc. Instead of filling "dings" and hollow places with pieces of foam or canned foam. I have tried using a light weight spackling compound, which is a patching material (ready mixed) and will not shrink. It can be purchased in paint stores and hardware stores under various trade names. Put it on with a wide knife and wipe clean, needs no sanding and becomes part of the foam. This compound is actually made using micro balloons. Sincerely,

Vernon A. Cheney
8607 E. Thornwood Dr.
Scottsdale, AZ 85251

KR-2 WINS BEST HOMEBUILT

Louie Brochetti of Carlsbad, CA won "Best Homebuilt" at this year's "Cactus Fly In" at Casa Grande, AR. Thirty planes entered the competition but Louie's KR-2 N7786L was awarded best homebuilt.

Louie's plane was featured in Issue 139, Dec. 1988 of the KR Newsletter. He said he's going to try to have his plane at Oshkosh this year for all of us to see. Congratulations, Louie!

0-200 ENGINE WARNING!

In the last issue of this Newsletter there was an article that referred to builders who either had or were, contemplating putting Continental 0-200 engines in their KR's.

The article resulted in a rather poignant discussion between myself and Jeannette Rand as to the maximum engine size a KR's stock structure can safely handle.

First, I need to correct a statement about Steve Alderman's KR-2. The article stated he has a 0-200 in his KR-2. In my discussion with him he stated that he does not have a 0-200. His engine is a Continental C-90-8. The difference is the C-90 is as much as 50 lbs. (depending on options) lighter than an 0-200.

The article also mentioned Roger Hanson of Livermore, CA who has just completed an 0-200 installation in his KR. I contacted Roger and he has modified his KR-2 so much to accomodate the 0-200, that it's officially referred to as a KR-2"M" (for modified). He will be sending information for later publication.

The bottom line to all this is that we must realize that the KR's are aircraft that have limits, as to how far we can safely "push their envelope". The 0-200 engine in the KR-100 is a fine match because the plane was designed around that engine.

The 0-200 engine in a stock KR-1 or KR-2 is just too heavy for the structure to handle and places the airplane outside of its allowable safety envelope.

ANY USEAGE OF A CONTINENTAL 0-200 IN A STOCK KR-1 or KR-2, IS FLATLY OPPOSED BY RAND ROBINSON ENGINEERING AND SHOULD BE VIEWED AS AN EXTREMELY UNSAFE SITUATION!

If you have any questions regarding this subject or if you are not sure whether a particular engine is within the safe limits of your KR's design, I suggest you contact:

Rand Robinson Engineering
5395 Industrial Suite A
Huntington Beach, CA 92649
704-898-3811

I AM SORRY TO REPORT...

that Julia Bull, the wife of Herb Bull, passed away November 2, 1988.

At Covington, we learned Julia was hospitalized and in critical condition due to a cerebral hemorrhage.

Throughout the years, Herb Bull has been a wonderful resource for KR builders and has helped make the Oshkosh KR dinner a big success with his slide shows, featuring KR aircraft.

Recently Herb sent me a letter informing me of Julia's passing.

Herb expressed thanks "To all the gang at the Covington fly-in for the thoughtful gift when Julia was hospitalized".

We all extend our sincere sympathy and prayers to Herb and his family.

(Home address is 1450 Northwoods Dr., Deerfield, IL 60015.)

FOR SALE

KR-2 Retractable gear. New everything but retract handle. Gear legs and hinge castings, springbar, needed aluminum. No holes drilled. \$250.00, I'll pay shipping.

Randy Carrels
2210 Brown St.
Flint, MI 48503
303-232-7725

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$12.00 PER YEAR- U.S., \$20.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS.

NON-COMMERCIAL ADVERTISING FREE TO SUBSCRIBERS [INCLUDING PHOTO]. INCLUSION OF ADS SUBJECT TO AVAILABILITY OF SPACE. SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$60.00. INDIVIDUAL COPIES \$1.00 EACH.

KR SPORT AVIATION INDEX

Earl,

First of all, I have subscribed to the "new" KR Newsletter since your presentation in Covington last Fall -- and, I'm NOT sorry that I did. I think we all owe Steve Bennett a great big THANKS for taking up the slack for awhile. Keep up the good work!

During the short time that I owned Steve Bennett's KR-1 (had a "ball" with it), I did a great deal of letter writing to KR pilots from which I received a lot of good, useable knowledge before flying it. But that's another story.

I think it would be interesting to ask KR pilots to send you just a couple good tips for flying the KR's and then include a few each month in the newsletter. Most would agree that it helps to get as much info as possible before making that first flight.

While getting ready to fly the KR, I also did a lot of researching for building and flying tips, articles on the VW and other related stories or pictures in Sport Aviation. I ended up with an accumulation of nearly 200 annotated references for the KR enthusiast. All of this before I learned that I could buy indexes for Sport Aviation! It still would spare a person a great deal of time, money and effort if he would like a copy. It is a bit lengthy (about three pages) to include in your newsletter but I could send a copy to anyone interested for \$2.50 postage paid U.S. My address is:

Ed Janssen
601 Heinze Dr.
Rock Falls, IL 61071

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 143, APRIL, 1989



KR NEWSLETTER

ISSUE NO. 144

MAY 1989



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



STEVE MAKISH WITH HIS "BEST KR" AT SUN 'N FUN '89

Steve's aircraft is powered by a 2650 cc Type 4 VW/Porsche engine conversion. It swings a 52 x 62 propeller. Steve's engine features MAP1 electronic secondary ignition. Steve is from Boca Raton, Florida. He has tried to make it to Sun 'N Fun in past years but was always been weathered out.

The KR forum was conducted at Sun 'N Fun on Wednesday, April 12 by Jeannette Rand. A very large crowd, with standing room only, filled the tent to find out about the standard KR aircraft and the new KR-100. Jeannette said the KR-100 will be offered in five different kits. Many of the questions asked concerned the use of alternate powerplants in the KR (alternate being other than VW) such as Rotax, Subaru, etc... Jeannette stressed the fact that the KR's firewall is intended for the engines under 100 hp, with the primary engine still being the VW.

(Continued page 4)

POSITIVE GEAR LOCKING

Earl,

About seven or eight years ago, in the KR Newsletter, a builder came-up with the idea of locking the landing gear with "pins" instead of the "mousetrap" arrangement specified in the plans. I saw this and agreed with the idea right from the start. I built the latching system almost identical to his, however, he had never flown his airplane so it had yet to be dynamically proven.

That is when I discovered two major problems with the design, which incidentally seems to be the same problem Don Lott had.

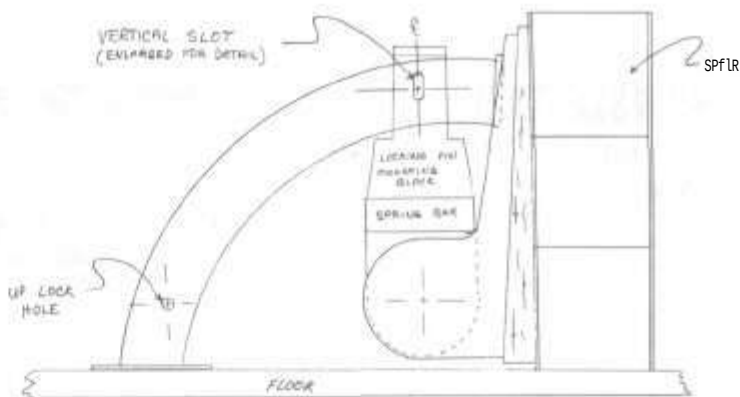
Keep in mind that the dynamics of a spring require movement, that is why you have shackles on a car/truck leaf spring because you have to provide for that movement.

A hole the same size as the locking pin in the retraction rail does not provide that room. When that spring moves through it's jounce, I know some of you are thinking to yourself... "mine is bolted solid and I have a 3/8" pin to hold it in place... it won't bend. Trust me, SOMETHING HAS TO BEND IF YOU TRY TO RESTRICT THE "VERTICAL" SPRING MOVEMENT.

I went through many different designs trying to make things "rigid", with no success. Finally, a good friend of mine, an airline captain and designer, suggested milling a vertical slot instead of drilling a whole... I thought about it for a while and said to myself "this is too good to be true"... well, it wasn't. The modification worked perfect the first time and every time since.

The other change was in the material of the retraction rail... originally the material was 6061 T-6. That proved inadequate since the pins elongated the down lock holes and allowed the gear to "flop" back and forth (remember the spring dynamics). The next attempt was to install steel bushings in the aluminum rails. This worked until the bushings, which were press fit, elongated the aluminum hole that they were pressed into! That is when I decided to make the entire rail out of mild steel. It worked much better and was extremely easy to fabricate. This is when I also milled the vertical slot in the down lock holes.

I believe the diagram will depict what needs to be done. The slot is milled on the center line at a right angle to the surface of the spring bar. Mark the



center of the locking pin hole, on the retraction rail, by using a transfer punch inserted temporarily in place of the locking pin. Strike the transfer punch with a hammer **when you have the gear in the correct location**. This method works great for the up lock hole too, although there is no need to mill a slot in the gear up position since it carries very little loads in that position. Remove the rail from the aircraft after you have marked the center line of the hole to be milled. Remember to use a square placed on top of the spring bar to establish that line. **THIS IS VERY IMPORTANT.**

If you do not have access to a mill, take it to a machine shop. It is important to have the slot with only .003" to .005" side clearance since this is what controls the fore and aft movement of the gear while in the down position. I would also note that the material you use for the locking pin should be relatively hard, like a grade 8 SAE bolt (mine is a ground MS 5/16 bolt). I DO NOT RECOMMEND USING STAINLESS STEEL SINCE IT IS RELATIVELY SOFT (MALLEABLE) IN MANY OF THE COMMON ALLOYS. If you get too much clearance every time you apply the brakes, the gear "clunks" back and forth... eventually, this will either "beat" out the holes or **shear** the locking pin... need I say more!

The slot does not have to be that long. I milled mine from the center point up .125" and down .060", just make sure you mill **it ON THE CENTER LINE!** The diagram is enlarged to show detail and is not to scale. If you haven't had a similar problem and you are using the pin lock system, it's only a matter of time.

Think about this article the next time you make a **HARD** landing. Hope this information will help... the change in my aircraft sure added to my flying enjoyment and peace of mind.

Roger Hansen
2517 Aranda Dr.
San Ramon, CA 44583
415-830-1842

USEFUL FLYING TIPS

Earl,

I mentioned to you that I thought it would be nice to have a few KR flying tips in the newsletters. The following is my contribution of a list of a comments from KR pilots that I found very useful and full of common sense. Readers should be cautioned that KR's can vary quite a bit in handling characteristics due to building differences, etc.

"...fast taxi with tail up should be about 40 mph or so -- slower will not give you good rudder response..."

"...when landing, plant the tail wheel on the surface with aft stick as soon as possible because if you allow speed to gradually bleed off in even a slight crosswind, you may be veering off the side of the runway before the tail settles..."

"...on take-off, hold tailwheel on surface until you reach about 40 mph which should give you good rudder response, the let it fly off..."

"...don't fly with hard shoes - use tennis shoes - you need to be able to feel what you are doing. Think of slight rudder pressures rather than definite movements of the pedals..."

"...rest your forearm on thigh of leg and fly with your thumb and first two fingers..."

"...when you fast taxi, don't shut power down all at once or you are likely to loose control because of the "P" factor..."

"...pick an evening (no bumps) with little or no wind - straight down runway for the first flight. Rehearse what you want done in case of emergency..."

"...chock the wheels (real well) and tie tailwheel down with enough slack to allow "flying" the airplane in level flight on the ground. This will help you get a feel for the elevator which might otherwise cause porpoising and over-control on take-off. Remember to allow for engine cooling - your engine will not be getting as much airflow as in flight..."

"...if you land just to the side of the white centerline on a wide runway, you can use the line to help you to go straight down the runway - can't see well over the nose..."

"...get some hours in a taildragger. The KR is not an airplane for pilots without tailwheel experience..."

"...beg, borrow or steal a ride with an experienced KR-2 pilot before you fly your KR. It's worth an airline ticket, if he seems too far away..."

"...downwind at 100 mph, base at 90 mph, 80 mph over the fence, VW rpm at 1500, using power to very end of runway and gradually ease-off power to touchdown..."

"...it wheel lands great. If there is any crosswind at all, I wheel it on..."

"...I talk to myself on landing checklist - don't want to land with wheels up..."

Ed Janssen
601 Heinze Drive
Rock Falls, IL 61071



Photo of Dave Feiger's KR-2 N39426

Completed 7-84, 480 hours as of 1-89.
639 lbs without fuel, net. MAPI 1835cc
with dual-port auto heads. Cruises 140+
mph, tops 160 mph.

Dave Feiger
P. O. Box 581
John Day, OR 97845
503-575-0766

Thanks to **STEVE BENNETT** GREAT PLAINS AIRCRAFT SUPPLY, for supplying the information and photos for the Sun 'N Fun article.

The Sun 'N Fun KR dinner was held Wednesday night, April 12 at the Holiday Inn South in Lakeland. Virgil Salisbury made the local arrangements for the KR dinner. A total of 64 people showed up for a great dinner of either chicken or roast beef. Virgil awarded about 40 door prizes which were given to him by various vendors at the fly-in. Awards were given for "Longest Distance" and "Best KR" in attendance at the Sun 'N Fun '89 fly-in.



N86QT HERB BULL, Deerfield, IL. Much modified, Bill DeFreeze Tri-Gear Conversion. Owner built 1835cc VW engine, Sterba propeller. This is a 100% scratch built aircraft except for canopy and the other usuals. This was Herb and "High Times" first major cross-country trip. Herb flew to Sun 'N Fun with Jim Wendel, Clyde Segar and Ed Sterba (Sterba Aircraft Propellers) and all hail from the Chicago area. Enroute flight times was about eight hours. Look to see Herb's innovative KR-2 at Oshkosh this year. Colors are white, with an orange and gray stripe. The interior features an Avenger Loran, a kit built RST 720 nav/com and a very neat swing over control yoke assembly.



N28RM BOB MUSE, SR. from Marietta, GA. This is another KR-2 that is almost 100% owner built using only the necessary pre-made parts. Bob's engine is a 2100cc VW with a GPASC Force One Prop Hub Assembly. Bob's KR is seen at many local and regional fly-in's in the southeast and in past years has been to Oshkosh and the KR Gatherings in Covington, TN. At Sun 'N Fun this year, Bob's canopy was blown open by a sudden gust of wind (while on the ground) and he unfortunately had to make an emergency repair to the canopy. Color is light cream/white with large blue stripes and small red strips. Prop is a Bernard Warnake "Almost Constant Speed Prop".





C-GKAV KERRY VAUGHN, Hamilton, Ontario, Canada. White with red and gold stripes. Power is by Limbach. Many KR enthusiasts first saw Kerry's beautiful KR-2 last year for the first time at the KR Gathering in Covington, TN, where he was voted the "Best Of" award. At Sun 'N Fun, Kerry received the "Longest Distance KR/Class" from Rand Robinson Engineering. Kerry said the trip from Ontario was about eight hours flying time.



N395DS DAVID STEEVES from Miami, FL. Engine is a GPASC Model 21C equipped with an Ellison Throttle body. This is Dave's first Sun 'N Fun appearance. Dave says his KR will cruise in the 150 to 160 " range. It has a GPASC/Sterba built propeller. Dave's aircraft currently has about 80 flight hours. It is a very clean/well built KR.



N85SH - OWNER UNKNOWN. Looks like this aircraft has a 2100 Revmaster. Aircraft never stayed on the ground long enough for me to find out who owned it/built it. Was giving rides the whole time I was on the flight line the day I was doing this.

BUILDING AND FLYING TIPS

Earl,

I've read enough articles over the past four years in the Newsletter that I think it's about time I sent in a contribution.

I've been inching along with my project for sometime now and I've made a number of mistakes that I'm sure others can benefit from. For a little while, I even managed to make a few mistakes flying a KR-2 that I purchased from another builder.

First, and foremost, as tempting as it is with KR-2s, **DON'T MODIFY THEM.** Nothing will delay your project from completion more than changing things. The KR-2 that I flew was about as stock as they come and it flew wonderfully. There's nothing wrong with the original design... except one thing... the gear. Unless you're an exceptional pilot, opt for the fixed gear. With less than an inch between the spring bar ends and the upper surface of the wing root, any landing that is not **greased on** stands a very good chance of punching holes in your wing when the spring bar flexes.

Also, the 3/16 bolts that hold the gear castings to the spring bar may be inadequate. I had the misfortune of having a gear casting come off on touchdown (a little hard, but only 2 G's on the G-meter), which resulted in a less than perfect roll-out. (The other casting came off a few yards later.) I was able to find all the bolts because they were still in the spring bar. Some were shaved-off and some were bent. I believe that some of the bolt threads may have been damaged from misaligned holes, requiring the bolts to be tapped into place with a hammer when the castings were first installed. I installed the castings with 5/16 bolts and made sure they popped into place easily. I think the extra piece of mind is worth the extra few grams of weight. Just a couple more comments about flying the KR before I talk about building one:

1. A KR-2 with two people in it is a much different bird than when you're alone. Watch out for a large increase in sensitivity. An additional 170 lbs of humanity in the right seat is a very large percentage of the total weight. That weight is almost guaranteed to move the C.G. aft.

2. The KR-2 is pretty squirrely on the ground. So, unless you've got a very long, wide runway, don't bother with any high speed taxi practice. High speed taxiing down the runway is much more difficult to perform than a take off and landing. Your high speed taxi will probably result in a take off anyway, like it did with me. I'd rather be a little more mentally prepared for my first flight next time.

3. Wheel landings are the way to go with a KR. Any increase in angle of attack will probably make your KR start to climb again, even at very low air speeds. It always seems like that second or third touchdown during a landing, hits a lot harder than the first.

Now, about my KR-2 project. I've got all sorts of modifications on mine, which is why it's still not finished yet. I've built the wing root section three times. Each time, I've been disgusted with the result and started over. In Newsletter #143, Monte Miller mentions that two inch foam instead of one inch for most of the wing section is preferable. I say, whenever you can use a thicker piece of foam anywhere, do it. Also, I am using all of Dan Diehl's wing skins and tailfeathers. The wing roots provide plenty of foaming and glassing experience and the less of that the better. The wing skins are very easy to apply and I am quite happy with the result. I've got all of Rand's premolded stuff also. I have installed an early version of the Rand Robinson fixed gear and it is built extremely tough. I am sure I would break the main spar before the gear broke. I also have push/pull tubes everywhere except the rudder which is cables. I have

installed a large tailwheel (the "Long" as used on the Christian Eagle) to complement the Cleveland wheels and brakes and 5.00 x 5 tires. My KR should be able to handle some fairly rough terrain. The result is about 8" more ground clearance than a stock KR-2! Of course, this means a wing walk is necessary. To provide for a wing walk, I took a large piece of one inch foam and glassed both sides. Then I simply cut the ribs out of the resulting foam and glass sandwich. I glued the ribs in place (six ribs closely spaced) with a cotton floc/epoxy mixture and they provided a very strong box structure to walk on for the entire wing root.

One of the areas that I am having a lot of trouble with is fairing the trailing edge of the horizontal stabilizer to match the leading edge of the elevator. I'm sure the other control surfaces will give me the same problems. If anyone has any tricks regarding this, I'm sure many readers could benefit.

Unfortunately, for various reasons, I'm going to have to sell my project before I can try the advice. I really am gratified to see the Newsletter looking so good. I plan to continue subscribing even after my project is gone. I have a good friend that is just starting a KR-2, so I'll be able to keep my hand in. Keep up the good work...thanks,

BELOW IS THE AD FOR MY PROJECT

KR-2 on fixed gear, Cleveland wheels and brakes, 5:00-x 5 tires, 0 time Revmaster 2100D with all accessories. All available premolded parts and Diehl wing skins. Complete set of KR Newsletters, many extras. \$4,500 B/O.

Mike Kimball
3522 Geneva Dr.
Santa Clara, CA 95051
408-246-2491



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD. OSHKOSH, WI 54903-3086
PHONE. 414/426-4800

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$12.00 PER YEAR- U.S., \$20.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS.

NON-COMMERCIAL ADVERTISING FREE TO SUBSCRIBERS [INCLUDING PHOTO]. INCLUSION OF ADS SUBJECT TO AVAILABILITY OF SPACE. SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$60.00. INDIVIDUAL COPIES \$1.00 EACH.

OSHKOSH KR DINNER

The KR Dinner at Oshkosh will be held on Sunday night, July 30 at Butche's Anchor Inn, Lower Deck. Format will be a family style dinner with cocktails at 6:00 p.m. and dinner at 7:00 p.m. Cost is in the \$10.00 range for adults and about \$6.00 for children. Sign-up with Scott at Great Plains Aircraft's Booth. You must pre-pay for this dinner. We need to have a head count no later than 12:00 p.m. on Sunday, July 30-

For more info, contact:
Great Plains Aircraft Supply Co.
P. O. Box 1481
Palatine, IL 60078
312-359-6558

FOR SALE

Complete KR retractable landing gear. Assembly includes bar, hydraulic brakes, wheels, gear doors...everything! Contact:

Roger Hansen
2517 Aranda Dr.
San Ramon, CA 94583
415-830-1842

FOR SALE

Make your KR faster. New, unused Edo-Aire 0-300 mph airspeed indicator. Has Bede logo on face. Trade for like condition 0-220 mph/kt or sell for around \$120.00. Too fast for me.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871 (evenings)

FOR SALE

Revmaster 2100D turbo charged engine. All extras and mount. Factory up-dated, never run...\$3,500.00.

Eric White
Owls Head, ME 04854
207-594-5212 6 PM - 8 PM

FOUND MINI-CHOCKS AT COVINGTON

A set of mini-chocks that were left at last year's Covington Gathering. It is believed the plane was a C-182, number 2070G. If anyone knows who they belong to, contact Chuck Grammer and he will be glad to send them to their owner.

Chuck said the Covington Airport will be starting their expansion program soon. They are going to build a new terminal building, some new T-hangars and extend the runway 1000 feet. The place may be hard to recognize by October, however, they promised they won't outgrow us!

Chuck Grammer
807 E. 3rd St.
Leland, MS 38756
601-686-4491

FOR SALE

KR-2 project; meticulously built mahogany boat (by cabinet maker) on gear; brakes and controls installed; tail completed; Diehl wing skins still in crate; premolded turtle deck, canopy frame, forward deck and instrument panel, VW cowl, gas tank, clear canopy; Rand engine mount; original Rand 3-bladed ground adjustable prop (for your wall). Foam and fiberglass for standard wings with premolded tips. Nearly all flight and engine instruments (new and reconditioned; position lights, rotating beacon, spinner, antennas and much more than can list here. Over \$4500.00 invested plus lots of building time. Send SASE for complete list. Will sacrifice (no kidding). Price negotiable. VHS video available for \$5.00 deposit (refundable, less postage, on return).

Ed Janssen
601 Heinze Dr.
Rock Falls, IL 61071
815-625-4898

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 144, MAY, 1989



KR NEWSLETTER

ISSUE NO. 145

JUNE 1989



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



JAMES CALDWELL'S KR-2 N5364J "FIRST FLIGHT" FLOWN BY "SPARKY" SPARKS

Earl,

Here is that "first flight" report I promised you, along with a picture of the plane. The KR-2 was built by James Caldwell of San Diego, CA, who is retired and learning to fly. The first flight was short because as soon as I came up to speed and leveled off, the engine would just die until I pulled back on the throttle and slowed down, then it would run ok at about half throttle. It seems the problem was that he adjusted the POA a little on the lean side, on the ground at full RPM. When I got up speed, with all the ram air, it leaned out even more. There was also a vibration that we corrected before the second flight (it turned out to be a "loose prop flange").

(Continued page 2)

The engine was purchased from a leading manufacturer and was run on a test stand but someone overlooked the big bolt in center of prop flange...it was screwed on but apparently not torqued and did not have the cotter pin installed. So even though you buy an "assembled" engine, it's good practice to check everything!

The second flight went well. The plane handles great and I think the speed is going to be around 150/160 MPH when we get the right prop. The one on there now is homemade and not the correct pitch.

The plane is built to about 99% of the blueprints and Jim did an excellent job. Engine is a 1835 VW with full electrics except lights. Est. wt. is around 550 lbs.

We have some more KR's in the area that are nearing completion so, I'll keep you posted on them.

I like the tips you have in the Newsletter and would like to add a couple: In the May issue, there was one regarding the landing gear locks with pins... I agree to elongate the holes slightly as per the sketch in the issue. I have the same set-up and had a little binding problem also.

Also, a couple items I like to carry in my KR are a pair of vise grips and a piece of approximately 1" diameter duct hose about two feet long. Here is why: I used the Vise-Grip once when a pin wouldn't go in to lock the landing gear, so I used the grips as a hammer.

Once I pulled very hard on gear handle trying to lower the gear but hadn't unlocked it and broke off the handle. Here again, the good old Vise Grip make a good handle in an emergency. Now for the piece of hose... My first gas tank was made with the early epoxy that I used on the rest of the plane. Well, I was using auto gas at the time and it sprung a bad leak while I was out over the mountains and the fumes began getting bad. Lucky I had a piece of hose under the seat that I had been using to experiment with air venting. So presto... I put one end in my mouth and other end in the fresh air inlet... it worked like a charm and got me home!

A couple more suggestions, I'm sure someone has already brought up:

1. If possible, go for ride in a KR-2 with someone and get a feel of it before you try and fly it for first time.

2. Never fly with C.G. too far aft. I did a couple times and once almost didn't make it. With myself 155 lbs. and passenger at 190 lbs., it was too much. Too scary to talk about!

3. On first flight, get some altitude and slow-up to around the stall and see what the A.S.I. says. Don't trust it until you've tried it. I test flew a formula "V" racer a few weeks ago and found that it was stalling a 90 MPH. Book said approach speed was 80 MPH. Well, you can see what would have happened. The A.S.I. static was hooked up to the wrong place and was reading 30 MPH high.

4. If you have a POSA carb, watch for vapor lock on hot days, especially if you have a very long ground run before take-off.

Happy KR-ing...until next time!

M. T. "Sparky" Sparks
10232 Kit Carson Place
Santee, CA 92071
619-448-4945

FROM THE EDITOR:

I'd like to take the opportunity to thank Sparky for all the help he has given to so many KR builders and pilots. If you would like to see a color photo of Sparky's plane, it is shown in the Rand Robinson ad appearing in the July issue of FLYING Magazine.

While we are on the subject of magazines, congratulations to Dave Shirley of Washington, MI, who is featured in the current spring issue of Sportsman Pilot. A special thanks to Jack Cox the Publisher of Sportsman Pilot for the wonderful exposure he has consistently given to the KR community. Sportsman Pilot is, in my estimation, one of the best values of all the aviation magazines. For subscription information, contact: Sportsman Pilot, P.O. Box 2768, Oshkosh, WI 54903.

I've received numerous requests for a KR Newsletter index, so next month's issue will be made up of a comprehensive index detailing contents of all KR Newsletter back issues. The index is approximately seven pages long and was painstakingly put together by Tom Lubben and Terry Surowy of Dover, DE. A sincere thanks to both Terry and Tom for putting together such a valuable reference. I'm sure it will be of great help to all of us.

Thanks also to all of you who have taken the time and effort to share your ideas and experiences in the Newsletter. Keep'em coming!!

A VERY SPECIAL BUILDER AND PILOT

In reviewing the Newsletter membership records, I ran across the following note by Butch Koppe "Bill Townsend has a life-time subscription to the Newsletter. Although he has lost the use of his eyes, he enjoys having the Newsletters read to him."

I wrote Bill a note asking for more information about himself and how he became involved with KR aircraft. What follows is his reply...I think you'll see why I'm so proud to have Bill Townsend a part of our family.

Earl, thank you for your note in which you asked me for information in regard to my becoming involved in the KR program.

My flying career started in 1937 and I remained active in the sport until I lost my eyesight in 1978. During my days of activity, I flew many types of aircraft, was also involved in the building of a Goodyear Cup Racer and restoring a J3 Cub and a 1941 Taylorcraft. Prior to my retirement in 1973, I read the first published article of Ken Rand's experimenting with Styrofoam in aircraft construction. I wrote to Ken and learned that he too was a native of Connecticut, having been born in Cromwell approximately eight or nine miles from my home. Ken was coming to Connecticut that summer and we arranged to meet at the home of his parents.

At that time, I arranged to purchase from him a set of plans for the original KR-1. I had planned on building this aircraft upon my retirement but after meeting Ken in Oshkosh the following year, and in subsequent visits with him at my home in Connecticut, he advised me that he was working up a set of plans for the KR-2. I immediately ordered a set of these plans to be delivered to me on their completion. When I retired, I immediately started building the KR-2.

The building progressed rapidly and I had taken some time away from the project to obtain a VW engine block and crankshaft, which I built up into a 1834cc engine and was tested and proven to be completely satisfactory.

About this time, I started having trouble with my eyes caused by rupturing of blood vessels way back in my head and at the time there was no way of controlling it. The condition worsened and I soon found that I could neither fly or drive a car. As time went on, my eyesight has failed almost completely.

This brought an end to my hopes and dreams of completing and flying the KR-2 ... so I found it painfully necessary to give up any hopes I may have had of flying it and was forced to sell it.

At the time I sold it, the aircraft was relatively complete and only a propeller and installation of my instruments was necessary. The aircraft was sold to an out-of-state buyer who finished and painted it and flew it successfully. I heard from him after he had made all of his flight tests and evaluations and he was very happy with the performance of the aircraft. Some months later I heard that the new owner over shot a landing attempt and wrecked the aircraft. I have heard nothing further on this.

I still belong to the EAA and my good wife, who has become an expert on reading and describing aircraft terminology, keeps me well-informed as do many of my flying associates of the old days who visit me and keep me informed.

I live on a hill overlooking the airport and although the passing planes are merely a blur, I still get a thrill from hearing the engines and dreaming dreams of the days gone by.

I have thoroughly enjoyed the KR Newsletter and feel the reports and information contained in them gets better with each issue.

My very best wishes to all KR builders and owners!

Bill Townsend
234 Charles St.
South Meriden, CT 06450

OSHKOSH KR FORUM AND DINNER

The KR Forum at Oshkosh will be held on Monday, July 31, from 10-11:00 a.m.

The KR Dinner will be Sunday night, July 30 at Butche's Anchor Inn, Lower Deck. Format will be a family style dinner with cocktails at 6:00 p.m. and dinner at 7:00 p.m. Cost is in the \$10.00 range for adults and about \$6.00 for children. Sign-up with Scott at Great Plains Aircraft's Booth. You must pre-pay for this dinner. We need to have a head count no later than 12:00 p.m. on Sunday, July 30... For more info, contact:

Great Plains Aircraft Supply Co.
P. O. Box 1481
Palatine, IL 60078
312-359-6558

FLIGHT REPORT
TODD GOUDEAU N151TG "MISS LILLY"

Earl, here are a few pictures of my KR-2, N151TG. The first piece of wood was cut on Thanksgiving Day 1984 and she received her Airworthiness Certificate on February 2, 1989. The first flight was on February 8, 1989 and was fantastic.

To-date I have 38.5 hours on it and have not had one problem with airframe or engine. The engine (which I built myself) has performed flawlessly. It is an 1835 60 HP with dual port heads, stainless steel exhaust/intake valves and a MAPI tuned crossover exhaust system. The carb is a HAPI Ultra Carb and works great. I have a full electric system with a Diehl Accessory case and starter. Ignition is a single Slick 4216R with a shielded harness. The propeller is a Sturba 52 x 48. The engine is under propped, so a 50 pitch prop is on order. I can turn 3200 static and 3600 in flight. Engine specs are as follows:

CLIMB

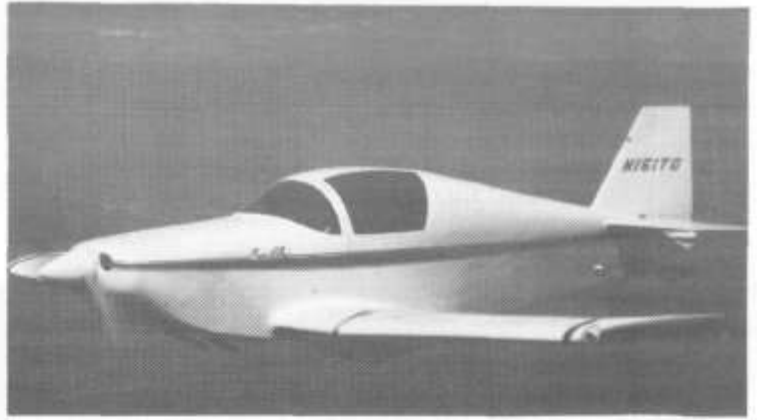
Oil Temp: 198 deg. @ 3100 RPM
Oil Press: 50 PSI @ 3100 RPM
CHT: 395 deg. @ 3100 RPM
EGT: 1300 deg. @ 3100 RPM
Fuel Consumption 4.5 GPH (break-in)

CRUISE

Oil Temp: 185 deg. @ 3000 RPM
Oil Press: 45 PSI @ 3000 RPM
CHT: 310 deg. @ 3000 RPM
EGT: 1225 deg. @ 3000 RPM
Fuel Consumption 4.5 GPH (break-in)

The airframe is built to the dimensions called for in the plans with the exception of the vertical stabilizer being swept an extra 3 deg. on the leading edge (for looks). Also, I accidentally built 4 deg. wash out into the wings instead of 3 deg., but it still flies great... in fact, I have superb slow flight and stall characteristics, probably due to this error. I designed my own positive pin lock system on the gear which works fine. The plane has upswept wingtips ala Dan Diehl design.

My canopy is also my own design. The forward section is actually a cut down Bellanca Viking windshield (the extra thickness helps a lot to reduce prop noise). The window and door are a stock KR canopy with the forward section cut off and the rest cut down the middle and turned around for windows. The left



window is the only door, opened gull style... internally latched and is fail safe.

The wheels and brakes are Rosenhan Hydraulic and are excellent. Once retracted, the wheels are completely enclosed and I have also made a tailwheel fairing.

The only premolded part of the aircraft is the HAPI style cowl which is attached with hinge pins. I have a landing light, position lights and a strobe light flush-mounted in the vertical stabilizer.

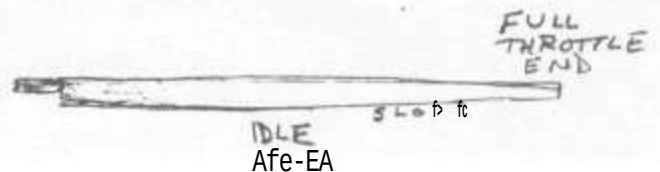
Performance wise, I have had my KR up to 185 in a shallow dive with no flutter. It will stall straight ahead at 42 MPH with no tendency to roll off to either side and has a gentle buffet about 3 MPH before it breaks. Solo rate of climb is over 1100 FPM and 750 FPM at gross at 90 MPH. Cruise is 155 MPH at 3100 RPM, sea level. Top speed at 3500 RPM is 170 MPH. Empty weight is 562 lbs. Fuel is in a 13 gallon aluminum header tank. My KR will fly hands off with one or two people on board but does take a little more runway to get off with two aboard.



POSA CARB TUNING SUGGESTION

Earl, just a word about tuning a POSA carb. The only way I could get mine to work (and boy does it work), was after trying unsuccessfully for hours every needle supplied with the carb and finally deciding to file my own "custom needle".

I started with one of the "supplied" needles that I could get to run properly at full throttle but anything less than full started getting lean. From there, it's just a matter of filing the ramp on the needle towards the idle end (without changing the full end) a little at a time and sliding it in the carb to try it. Within an hour of needle in needle out, file here and there, I achieved the perfect slope on the needle.



Now from idle to full, the response is crisp and it seems to be unbelievably perfect. What a contrast to anything I could get with the needles as they were supplied and it's really quite easy to do.

The engine just keeps responding better and better each time you file until you've got it all the way to a perfect idle.

"Piece of cake" to set a correct evaluation. Don't forget to hook your air intake hose and air cleaner up each time you try the needle.

You could also start with a needle that idles well but leans as you open throttle then leave the idle area on the needle alone and file the slope steeper to the full throttle end. Either way produces the same finished needle.

Steve Hewlett
1734 W. 12600 South
Riverton, UT 84065
801-254-2784

I'd like to thank everyone who helped to make my dream come true, with a special thanks to Jeannette Rand, Dan Diehl, and Steve Bennett for their patience with me during my endless phone calls for technical help.

Todd Goudeau
503 McKeever Rd.
Box 1511
Arcola, TX 77583
713-431-0724



**EXPERIMENTAL
AIRCRAFT
ASSOCIATION**

WITTMAN AIRFIELD, OSHKOSH, WI 54903-3086
PHONE 414/426-4800

SUN 'N FUN MYSTERY PLANE IDENTIFIED

In the last issue of the Newsletter, Steve Bennett had submitted a photo of a KR-2 that was at Sun 'N Fun but wasn't sure of the owner. After the issue was sent out I received this letter from Monte McLean of Ft. Walton Beach, FL.



Earl,

The KR-2 N85SH is my bird! I started it on July 85 and completed it on June of 87. Didn't fly until November of 87 because of carburetor problems. Finally threw all the junk away and got an Ellison throttle body injector. (Best life insurance policy I could recommend!) My aircraft is relatively according to plans except I built the Venturi tube into the wing root. I also have Rex Taylor's gear retraction system (very similar to the system as described in the May Newsletter). If anyone that you know of is putting that gear system in, be sure and have them beef up the "I" beams that mounts the lock pins. On my first landing, these "I" beams bent and had to be rebuilt sturdier. Other than that, I've never had any problems with the gear system and I have close to 200 hours with well over 500 landings logged. The little KR just won't make a bad landing!

I land hot (80 MPH on final) so as to see over the cowlings on landing. Wheel landings are easy once you get the feel of the elevators and stop over correcting. The same applies to rudder control on take-off and especially the roll-out on landing. Use "small" corrections. I have never landed on unimproved surfaces and don't intend to. With the 80 MPH final, a typical landing will take about 2500' so if you are going into a shorter field, you will have to 3-point it at a slower speed.

As far as performance is concerned, I have a dual port head 1835 with tuned exhaust and during the winter I see 180 MPH wide open. The bird will also slow fly at 40 MPH so as you can see, your envelope is huge. It also does acrobatics very well. The large ailerons give very fast roll rate. I would estimate that it will do a barrel roll in two seconds. Loops take around seven hundred feet and I start in at 160-180 and come over the top at 60, of course pulling the power off on the way down. All of these maneuvers can be done at 2-1/2 G's. If you want them tighter, I have gone up to 3 G's. However, 3 G's is my limit because of the lack of bearing surface on the front of the engine to absorb the gyroscopic effects of the prop.

Tell your readers to be very cautious of right crosswinds take-offs. My limit on crosswind take-offs and landings is 10 KTS. Take-offs with 10 KTS right crosswind can be done very easily if you keep the tail wheel on the ground and take-off in a three point attitude. Another limit I've placed on the aircraft is no passengers above 175 lbs. Above that may result in an unstable, aft C.G. condition and an aircraft that is not pleasant to fly. As far as maximum speed is concerned, I have never exceeded 200 MPH and don't intend to. The only difference at that speed is the cockpit noise level.

Cruise is usually at 150-160 MPH which would make it around 130-140 KTS true. My aircraft is equipped with a full compliment of instruments except attitude indicator, so I won't have the temptation of flying IFR. However, I have flown in the clouds on a filed IFR approach utilizing needle ball and airspeed. The aircraft has such a low wing loading that IFR flight is no joy. The first thing that happened was that the engine started running rough. Carb heat was pulled and it smoothed out immediately. VW's do ice-up... even with Ellison throttle body injectors, so build a carb heat box!

Another item, I do not have is wing tanks. I have only the 11 gallon header tank and that is 3 hours of fuel. After flying this bird for one hour, you are looking hard for a place to set down. So the extra fuel is not needed as far as I'm concerned. I also don't have flaps. I figure that they don't benefit you enough for the time, effort and weight penalty.

This aircraft slips very well and making a good approach on final is really no problem. I feel that if you designed and built spoilers on top of the wings like gliders... it would be the most beneficial improvement you could make. I also don't have NAV or landing lights on my aircraft since it is intended for daylight VFR ONLY!

When building your aircraft, think weight at all times. The lighter it is, the better it will perform. I was doing great until I had a friend paint it for me. Without my knowledge, he primed the aircraft with a clay base paint and it ended-up a 48 lb. paint job. The irony of the thing was that I had already spent \$100 on a gallon of Stearling Primer which was on the aircraft.

The final weight is 635 lb., which is average for the set-up I have, i.e. electrical system with starter, alternator, battery, escort II VHF Nav/Com (which I thoroughly love) Loran, and transponder with Mode C.

My future intentions are to make it a very roomy single seater with the stick between my legs where it should be. It is such a beautiful flying aircraft until you add a passenger, that it's just not worth the loss in performance. Insurance rates will drop along with the passengers.

Well, Earl, I hadn't intended to write a book but as you can tell, I really love the little bird!

By the way, N85SH won the title of Best KR at Sun 'n Fun '88"! So long Earl.

Monte McLean
319 Plymouth Ave.
Ft. Walton Beach, FL 32548
904-862-4834

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$12.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

NON-COMMERCIAL ADVERTISING FREE TO
SUBSCRIBERS [INCLUDING PHOTO]. INCLUSION
OF ADS SUBJECT TO AVAILABILITY OF SPACE.
SET OF ALL AVAILABLE BACK ISSUES (OVER
100) FOR \$60.00.
INDIVIDUAL COPIES \$1.00 EACH.

DAVE STEEVES KR-2 N395DS

Earl,

I'm writing to tell you something about my KR-2. I worked for 3-1/2 years part-time at home in the garage...a one car garage at that! I constructed the plane exactly by the plans except for the Dan Diehl wing skins. When the time came to build the outer wings, I had to tear down a wall in the house that leads into the living room and the idea of wing skins came in very handy.



I have a Great Plains 2180 CC VW with electric start and generator, one mag and Ellison throttle body injector. This combination works just great. The empty weight is 575 lbs. with only one header tank. (Kit tank holds 11.8 gallons if anyone is interested in its capacity.)

The finish is imron paint over the glass parts and the wooden body. The body is not glassed... just primed and painted mostly to save weight although I don't think imron is a very light paint.

When it came time to fly the KR, I was fortunate to have a very experienced pilot friend to help me because I didn't have any tail wheel time at all. He spent a lot of time with me before I started to fly it solo. Now I have no problem with the plane and it is just great fun to fly.

By the way, the 3-1/2 years I worked on the KR was the most enjoyable and worthwhile time I have ever spent.

As you know, I was at the Sun 'N Fun fly-in and want to say I really enjoyed meeting and talking with all the KR builders and pilots that came to the fly-in this year!

David Steeves
4901 SW 4th St.
Miami, FL 33134

FOR SALE

KR-2 project on wheels, wing spars completed, have fuel tank, cowling, elevators, rudder stick controls installed. Project is super buy for \$1,200, including 2180 cc VW engine. Have some foam Dynel and wood. Will transport reasonable distance.

Robert Craft
10724 Vista Lomas
El Paso, TX 79935
915-598-3372

Revmaster 2100D turbo charged engine. All extras and mount. Factory up-dated, never run.

Eric White
Owls Head, ME 04854
207-594-5212 6 PM - 8 PM

Complete retractable gear. Professional work done. Cheap. All fittings, etc. \$150.00...negotiable.

James H. Doyle, Jr.
6847 St. Rt. 229
Ashley, OH 43003
614-747-2791

FOR SALE

KR-2 Project; beautifully completed mahogany boat on standard gear with standard brakes; tail feathers completed; most flight instruments - compass; T/B; Alt., R/C, airspeed - mostly new and still in boxes; most engine instruments; omni and whip antennas; new primer; Rand flap handle; new rotating beacon; engine mount; clear canopy, Rand canopy frame; new Grimes position lights; spinner; shutoff valve; enough foam and fiberglass to finish airplane; premolded tips; one roll of Dynel cloth. More misc. parts. Send SASE for list. \$750.00 (or best offer) for the fuselage and 70 cents on the dollar (or best offer) for the rest, plus UPS postage.

Ed Janssen
601 Heinze Dr.
Rock Falls, IL 61071
816-625-4898

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 145, JUNE, 1989



KR NEWSLETTER

ISSUE NO. 146

JULY 1989



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



ROGER HANSEN'S KR-2 N200RH (PICTURE TAKEN BEFORE MODIFICATIONS)

Above is the KR-2 built by Roger Hansen of San Ramon, CA. When the photo was taken, Roger's KR-2 was VW powered. Since then, he has extensively modified the aircraft. Although there wasn't room in this issue to give a report on the mods, I wanted to use his plane as a cover photo.

As promised, this issue contains an extensive back issue index of past KR Newsletters. The index was compiled by Tom Lubben and Terry Surowy of Dover, DE. I want to again thank them both for this valuable reference. The listing was compiled on an IBM PC and if you would like a copy of the disc, contact Tom Lubben/Terry Surowy, 845 Woodcrest Turn, Dover, DE 19901, phone 302-678-2355.

Don't forget to attend the KR Dinner and Forum at this year's Oshkosh event. The dinner will be Sunday night, July 30, at Butche's Anchor Inn, lower deck. Social hour begins at 6:00 p.m. with dinner at 7:00 p.m. Sign-up with Scott at the Great Plains Aircraft booth. You must prepay for this dinner! Scott needs a head count no later than 12:00 p.m. on Sunday, July 30.

The KR Forum will be Monday, July 31, 10:00 a.m. to 11:15 a.m. in tent number 3. Hope to see you there!

KR NEWSLETTER BACK ISSUE INDEX

SUBJECT	ISSUE/TYPE	DESCRIPTION
subject	issue type of article notes	
accident	75 report	flat spin while doing aerobatics
aileron	13 Q&A	use 10/32 screws to attach hinge to aileron spar
aileron balance	86 Q&A	material for balance bracket is 2024 0.125 or 4130 0.090. fasten as for control horn
aileron crank	4 plans	this modification allows more separation between the cables at the crank
ailerons	9 plans	aileron balancing
ailerons	25	balancing control surfaces
allergy	66 report	allergic to powder in gloves
avionics	107 report	onboard computer code 64
brakes	3 tips	use Honda motorcycle cable adjusters on brake cables
brakes	6 plans	how to take toe brake pedals and hookups
brakes	9 tips	use VH brake cables for brakes
brakes	39 plans	differential braking while maintaining grab and pull brakes
brakes	46 tips	turn your brake drums to round
brakes	137 tips	brake building KRs with Rosenhan brakes
canopy	14 plans	sliding
canopy	19 plans	latch mechanism
canopy	33 plan	how to make a canopy like Dan Diehl's
canopy	66 plans	gull wing design
canopy	69 plans	gull wing design continued
canopy	71 tips	use brake fluid to remove adhesives
canopy	93 plans	roll bar for protection
canopy	124 tips	how to cut and treat a canopy without trashing it
canopy	125 plans	canopy lock mechanism
canopy	142 plans	photo of real nice canopy with plans available for \$50
canopy	142 Q&A	protecting canopy while cutting and tinted canopies
carb	100 plans	more Rosa adjustments
certification	107 tips	how to start applying for an N number
cold weather	69 Q&A	how to keep freeze/thaw from ruining your KR
control	134 plans	schematic for roll control system
control stick	31 tip/plan	simple drawing of control stick construction
control surfaces	7 tips	use DU garlock self-lubricating lead impregnated teflon bearings
control travel	4 Q&A	what is used for control stops and what is travel limits; attach points for stick
controls	35 tip	elevator control horn dimensions are off
controls	35 tip	use a VH heater control knob for a trii control
controls	36 plans/tips	real reason why cables go slack
controls	36 plans	how to use ball bearings on all rudder and elevator hinges and control arms
controls	46 tips	use eyebolts as rudder and elevator hinges (is the stress wrong?)
controls	46 plans	dual control sticks
controls	46 tips	use nylon shoulder washers to bush steel pins in aluminum holes
controls	47 tips	routing cables and closing the gap at control surface hinges
controls	49 Q&A	trii cable routing, how is aileron spar held in place
controls	50 tips	be sure your KR is in flight config when you adjust the cables
controls	50 tips	how to take a nice trailing edge
controls	52 plans	belt drive controls for throwover yoke instead of stick
controls	67 plans	bushed hinges for elevator and rudder
controls	91 plans	dual-control stick
controls	106 plans	pushrods instead of cables
controls	116 plans	electric trii for elevator see correction issue 124
controls	119 tips	make a long control stick
controls	124 correction	the right circuit for the electric trii
controls,radio	81 Q&A	adjusting control cable tension, fiberglass stickers on shop apron, radio interference
covering	48 tips	how to glass and keep it light, test flight tips

cont'd page 3

SUBJECT	ISSUE/TYPE	DESCRIPTION
Dan Diehl	39 tips	various tips and reflections from Dan Diehl
design	140 article	reprint of Jan 88 Sport Aviation article
dual controls	14 plans	with toe brakes
electrics	53 plans	wing tip nav lights
elevator	28 tip	how to make decent trailing edges
elevator cables	2 tips	how to get the elevator cables out of the center of the cockpit
elevators and rudder	72 plans	trailing edges
engine	21 plans	primer for VH
engine	23 tips	prime the oil pump before first start after sitting
engine	35 plan	flywheel dowel pin that drive nag can drift and ruin timing, convert then to allen bolts
engine	36 tip	oil leaks on VH may be due to slinger
engine	39 photo	Diehl supercase to mount starter and other electrics.
engine	43 note	you need to tear down that VH engine and inspect/overhaul it properly
engine	44 tips	torque spec for various VW bolts
engine	44 tips	drill and clean oil passages and engine exterior for better cooling
engine	46 tips	use part of the stock VH baffle for better cooling
engine	49 tips	how to adjust the Posca carb
engine	52 plans	front thrust bearing installation for VH
engine	55 B&A	longer bolt to spread the stresses at the prop hub and prevent crank breaking
engine	56 Q&A	engine baffles from Dan Diehl
engine	57 article	many parts make up a successful VH (or any) installation
engine	57 QIA	turbocharging critique and report by Dan Diehl
engine	57 plans	heat muff from a propane torch tank
engine	58 article	turbocharging manual, part 1
engine	61 article	turbocharging manual, part 4 and 5 (others in vol 59, 60?)
engine	62 report	a Posca will definitely ice up
engine	70 tips	how to adjust the Posca, again
engine	71 safety note	welding slag bits may be inside your intake manifold waiting to eat your engine
engine	72 plans	air oil separator
engine	96 plans	ease flow at outlet to help cooling
engine	113 plans	cooling baffles
engine	119 plans	magnetotimer
engine	120 tips	air cleaner for carb
engine	136 tips	O200 engine mounts available
engine	141 ad	new 2600 cc engine from Great Plains
engine	143 safety	Rand says O-200 is too big
engine cooling	28 plans	automatic cowl flap regulator using a VH part
engine, firewall	122 tips	O200 installation and strengthened firewall
epoxy	136 tips	what is Rands epoxy?
epoxy	141 safety	eye hazard-resin catalyst will blind you like mustard gas
fibreglas	93 tips	coffee can lid for squeegee, be sure foam is smooth
fibreglas	94 report	detailed instructions on how to do good layups
fibreglas	95 report	detailed instructions on how to do good layups
fibreglas	96 tips	how to use molds
fibreglas	110 tips	a cheap vacuum-assisted molding process
fibreglas	124 tips	how to flake dry ice use a lot easier
fibreglas	130 article	homebuilt composites-tools techniques and planning
flight test	91 report-	long-term report from Steve Bennet
finishing	50 tip	use contact paper for N numbers
finishing	32	temperature vs skin color chart
firewall	9 note	firewall material specs
firewall	74 plans	fabricating a through-fitting
firewall	77 Q&A	metal bracing for engine mount, 1/4 ply details
firewall	% tips	details on Al backing plate for firewall/engine mount

SUBJECT	ISSUE/TYPE	DESCRIPTION
firewall	99 plans	details on Al backing plate for firewall/engine lount
firewall	115 photo	KR2 split at firewall
flaps	39	first report on flaps
flaps	42 plans	all pertinent drawings of flap construction
flaps	55 m	inboard bracket need backup plate where it goes through the fuselage skin
flight	36 report	stall chracteristics
flight test	53 tips	fly the elevator with the tail tied down to get used to the sensitivity
flight test	61 tips	let an experienced KR pilot test flight yours
Flight test	79 report	a fill-in-the-blank fori for flight testing any plane
Flight test	80 report	a fill-in-the-blank fori for flight testing any plane (contd)
Flight test	81 report	a fill-in-the-blank fora for flight testing any plane (contd)
Flight test	81 tips	avoid power on stalls, get lots of taxi tiie to prove yourself and the engine
flight test	120 tips	more cautionary notes
flight test	141 tips	KR1 will fly with the wings off-be careful
flight test	142 article	Flight test on Kevin Kelly's krl00
flying	23 tips	crossuinds
flying	144 tips	various tips for initial flights 2 sections
foai	3 tips	buy foai' froi roofing and building contractors-very cheap
foai	9 tips	use liquid polyfoai to glue foai
foai	84 tips	glue foai with liquid foai by painting each part with one part of the 2-part iix
foai	144 tips	use 2" foai instead of 1" to prevent sagging, use rib sandwich for wing walk
foai and glass	16 tips	mylar and trailing edges and elevator pushrod and sanding and liquid foam
foai/epoxy/skins	21 Q&A	storage and working teips
fcan/skins	20 tips	teiperature extremes and skin separation-vent to avoid
foai/skins	20 tips	polypropylene?
fuel guage	91 tips	how to install and calibrate sending unit
fuel line	109 tips	use only tygon no. F4040A for fuel
fuel pimp	142 request	request for inforiation on GH in-tank fuel puips
fuel puips	109 tips	don't use Facet brand fuel puip
fuel tank	26 plans	low fuel warning system
fuel tank	116 tips	slosh the tank with sealer so you can use auto gas
fuel tank	117 plans	building a better fuel tank of foai
fuel tank	138 tips	more on autogas-proofing foai tanks
fuel tank	143 report	nasty crash burn and die in a MQNI with fibreglas tank
fuel tanks	5 tips	fuel transfer puips
fuel tanks	8 important note	do not use a Vega fuel pu«p-it will spark.
fuel tanks	20 tips	use gas-resistant laterials for plastic filler necks PVC okay
fuselage	9 Q&A	put drain holes in aft section of each fuselage box
fuselage	1B plans	use screws and wood scraps to sake clasps
fuselage	44 tips	make a set of 10 blocks with 20 angles to ieasure the right angle for the spruce corner gus
fuselage	48 Q&A	assemble fuselage side before plywood, Heldwood plastic resin is okay,
fuselage	48 Oia	pitot tube position, attaching turtledeck, CB radios
fuselage	56 Q&A	use 5/16 staples for fuselage skins
fuselage	66 plans	two ways of iaking accurate scarfs
fuselage	72 article	double check squareness-it nay shift froi assembly tiie to spar attachment tiie
fuselage	76 plans	plywood scarfer
fuselage	77 Q&A	how to cut top and bottoii cross members without wasting a lot of spruce
fuselage	87 Q&A	skin before or after assembling the frame halves, seal wood with sanding sealer
fuselage	91 plans	inspection panel for fuselage side
fuselage	96 tips	iodify spring clamp to hold gusset blocks when gluing
fuselage	112 tips	build both sides at once, on top of each other, jig for staight asseibly of halves, build e
fuselage	119 tips	when using birch ply, lake uprights further apart to allow for thicker plywood
fuselage	119 tips	wait on installation of cross piece at instrument panel
fuselage	141 plans	how to glue corner blocks

cont'd page 5

SUBJECT	ISSUE/TYPE	DESCRIPTION
fuselage	142 tips	another idea for clasping gusset blocks
fuselage	6 plans	how to square and beefup fuselage
fuselage	15 Q&A	skinning and scarfing
glassing	58 article	Hexcel peel-ply for layups beats airobaloons
glue joints	21 tips	sand to fit and get a flat surface for the plywood
glue/epoxy	8 tips	use 1:1- it is less probleaatic.
gluing	139 tips	how to glue tapered wood
gussets on fusela	3 Q&A	use either 5/8 spruce or plywood gussets at corners of frame
hardware	22	all the nuts and bolts in a KR2
hardware	106 tips	instructions on hardware installation froi uinature uetrics
hardware	124 tips	use sharpies to aark Al parts
hinges	96 plans	rudder and elevator hinges which use rod ends
index	22	suiiary of issues 1-21 topics
index	28	index for issues 1-24
index	100	index for 58-99
index	143 report	a annotated index of KR acticles froa Sport Aviation
inspection	30 tip	epoxy in plexiglas windows for inspection ports
instruaents	50 plans	a wing root venturi for a turn and bank
instruaents	52 plans	use auto antenna for pitot tube
Ken Rand	45 note	death of Ken Rand
landing gear	3 iaportant note	early castings were convex; would be strained on torqueing to flat spring bar
landing gear	4 Q&A	how is gear bar latched?
landing gear	6 Q&A	gear release latches
landing gear	16 plans	fixed gear
landing gear	19 plans	photos of positve latch aech for retracts
landing gear	24 plans	safety latch for gear
landing gear	29 plan	positive gear latch aechanissi
landing gear	29 tip/plan	positive gear latch
landing gear	43 tips	three addresses for the tricycle gear conversion
landing gear	102 plans	how to align the gear using 2x6s
landing gear	120 tips	drilling axle holes in gear leg castings
landing gear	131 plans	tricycle gear for KR2, contd in 132
landing gear	139 plans,article	fixed gear for KR2 froa Rand Robinson
landing gear	141 article	fixed gear KR2 with photos
landing gear	143 report	rough landing bent the gear latch; wouldn't lock down and next landing was on the belly
landing gear	144 plans	a slot instead of a hole in the retraction rail prevents pin jamaing
landings	144 tips	do wheel landings, two people aake KR squirrely, avoid high speed taxi
lights	104 plans	saall tail nav light
luggage	20 tips	use wing tanks only and put luggage up front
aaterials	21 tips	bending radii for aluuuinui
aaterials	21 tips	substitution of douglas fir for spruce-testing for strength
aetal KR2	137 article	all-ietal KR2
aods	56 tips	various aods for a light KR1
•uffler	7 plans	auffler fro« a propane cylinder
oshkosh	39 Q&A	suaaary of KR forue
Qshkosh 75	3 report	
paint	12 Q&A	auto acrylic
paint	28 tip	don't use carbon black to block UV, use aluainua powder
painting	138 tips	how to paint and priae and sand and chioce of paints
perforaance	135 article	computer analysis of KR2 flight characteristics
plans errors	6 tips	a list of aiscellaneous plans errors in early KR2 plans
plans errors	7 plans	wing spar/airfoil pains are wrong
plans errors	66 plans	errors in control horns and hinges
plans errors	101 correction	aileron and control horn drawing 71 and page 88

cont'd page 6

SUBJECT	ISSUE/TYPE	DESCRIPTION
plans errors	102 correction	page 21 and 36. aft spar uprights and gear lock an
plans errors	106 correction	drawing 1 has error for cross member I should be 29.75 in
preiolded parts	55 Qfca	stiffen canopy fraie, reinforce instrument panel
prop	8 note	three blade prop and turbo
prop	28 tip	prop failure of ground-adjustable unit
prop hub	6 QStA	max extension is 3'
prop spinner	10 plans	plans and instructions for a foam prop spinner
propeller	57 Q&A	Maloof props
propellor	135 tips	need to dynamically balance the prop
radio	69 report	needed an outside antenna for decent reception
radio	101 Q&A	foil attennas
radios	109 tips	use 1/4 copper tape for attennas
RAF 48	4 plans errors	contains coordinates for RAF 48 airfoil
Rand	137 interview	Jeanette Rand
rudder	3 Q&A	use 3/16 A/N screws to attach hinge half to rudder spar
rudder brakes	75 tips	when using toe brakes the added stress will deform the horn-reinforce it
rudder pedals	66 report	make the hinges of steel and mount thei on the floor where you can inspect then
rudder trii	15 plans	spring loaded rudder pedal for trii
safety	39 tips	inspect bellcranks for rock nicks, be sure you use a gascolator
safety belts	84 tips	use vw safety belt and harnesses, load-spreading attachment shown which uses cables
safety belts	105 plans	KR1 shoulder harness
safety, controls	61 article	move unibal on aileron control to prevent binding and push rod breakage
sanding	2 tips	Arco Disc rasp
sanding	84 tips	use a sailing tube with safety walk for abrasive
seat	15 plans	seat back with armrests
speed	73 article	exceed Vne and you may die
speed brake	12 plans	
speed brake	16 plans	with retract handle and hydryalic mechanism
stabilizer	104 safety note	reinforce the stabilzer attachment or it may separate from fuselage like dan diehls
tailuheel	28 tip	use a concrete bit for drilling through the spring
tailuheel	90 tips	use rubber washers to insulate noise
tanks	62 report	source for full-length Al wing tanks, epoxy ones crap up with autogasj
taxiing	68 Q&A	how to get it to track true
throttle	14 plans	linkage for Posa
tools	29 tips	dragon skin (Red Devil) and 2* drill saw sources
tools	138 tips	extended hole drill for foam and soft materials
trii tabs	18 plans	electric trim tabs
trip	117 report	Alaska trip in 117, 118, 119
turbo	20 photos	Rajay turbo for VH
wheels	66 reports	two cases of tailwheel failure
wheels	72 plans	improved tailwheel plans
wing	18 plans	folding wings
wing	25	lining up the 3 pieces of the center section rib
wing	1 tips	tips on how do sand and attach the skins properly
wing construction	5 iimportant note	skin must contact spar-do not put foam on top of the spar!
wing construction	13 notes	dihedral
wing fittings	17 Q&A	plate them or paint them
wing rib	56 Q&A	wing rib incidence on plans is wrong 3 1/2 degrees not 5
wing skin	17 safety note	don't sand thru skin
wing spars	74 Q&A	put drain holes in the wing spar bays, 1/8 to 3/16 inch holes
wing spars	79 tips	how to make a drill guide-use 66-69 240 ford pushrods for guides
wing spars	93 Q&A	how to laminate spar caps
wing tanks	5 plans	complete details for making wing tanks
wing tanks	7 Q&A	baffles needed on long tanks

SUBJECT	ISSUE/TYPE	DESCRIPTION
wings	21 tips	center rib section is incorrect
wings	24 tips	reaching wing attach bolts
wings	33 tip	the importance of staking sure your wing fittings are aligned
wings	52 safety note	dont put inspection plates on top of the wing
wings	64 QIA	undercut ribs by 1 inch and then lay one continuous piece of 1 inch foa«
wings	64 Q&A	how to make a log sanding block
wings	75 tips	use vinyl tubing as a water level to level wings
wings	82 plans	how to make diehl wing tips
wings	85 Qy	how to sake a straight trailing edge, be sure you put 2 layers of glass on wings
wings	107 plans	wing attach covers
wings	122 tips	dan diehls skins for wings and tail
wings	143 tips	sanding tips
wings	143 tips	another set of sanding tips; use 2 inch foait on center section
wings/skins/foa«	24 tips	sanding and basic techniques and primers
winter flights	56 tips	lots of ice, sounds hairy
wood	79 tips	structural spruce can be used if you inspect it
wood protection	7 Q&A	varnish surfaces to protect then. Do not varnish surfaces to be glued
workbench	132 plans	



KR FAMILY IN INDONESIA

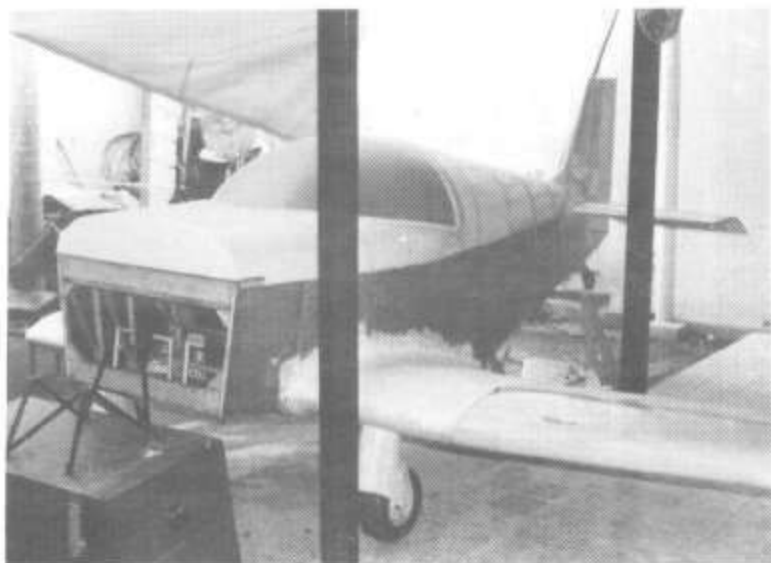
Earl,

Here is the news about the KR family in Indonesia. The PK SKR is built and owned by Mr. Djubair from Jakarta (capital of Indonesia, about 800 miles away from Bali). It took three years to complete and flew for the first time in the late 1987 and still is in good shape. It is powered by Revmaster engine. Once during the flight session, the engine quit at the altitude of 1500 ft. AGL and about three miles away from the port, it glided and reached the port safely. Mr. Djubair is now constructing a KR-IB.

The other photograph shows my KR-2 project. It was taken a few months ago. Now the engine has been installed and the cowling is under construction. It is in the second year of construction.

Thank you and best regards from the KR family of Indonesia!

Herry Rudyanto
c/o Satriavi Tour
Bali Hotel JL Veteran 3
Denpasar - Indonesia



FOR SALE

KR-2 project, fuse complete on customized fixed taildragger gear. Wings nearly completed ready for aileron cuts, pre-molded: Turtledeck, cowling, canopy mount (no canopy). Spinner, Hegy 54-44 prop, 1640cc VW engine w/POSA, Slick mag, misc. instruments, gauges and hardware, engine mountings, etc. Much info, most newsletters. Best offer.

Keith Crippen
1674 Hawthorne Dr.
Mayfield Hts., OH 44124
216-442-6128



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD, OSHKOSH, WI 54903 3086
PHONE 414/426-4800

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 146, JULY, 1989

WANTED

Set of Dan Diehl wing skins, KR-2 canopy frame, front deck and instrument panel, prefab and HAPI, Revmaster or G.P. VW engine for KR-2. Gotta be reasonable, reasonable!

Bill Berge
703 Otter Creek Dr.
Bow, KY 42714
504-433-7662 most anytime

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$12.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

NON-COMMERCIAL ADVERTISING FREE TO
SUBSCRIBERS [INCLUDING PHOTO]. INCLUSION
OF ADS SUBJECT TO AVAILABILITY OF SPACE.

SET OF ALL AVAILABLE BACK ISSUES (OVER
100) FOR \$60.00.

INDIVIDUAL COPIES \$1.00 EACH.





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



ELWOOD HARDING'S N42VK FLIGHT REPORT

I'm finally getting around to giving you a run down on my KR-2 42VK, plus a photo. Here is a list of what I have installed, plus mods: MAPI 1835, POSA Super Carb, Carb Heat, EGT, Hobbs Meter, Oil pressure and temp, volt meter, modified HAPI gear retract system, Ed Sterba 52-44 prop, inter-corn, elect, fuel gage, elect. T & B, VSI, airspeed, Alt, RPM, Escort II Radio, R.R. hydraulic brakes, Empty weight 524, gross 965.

(Cont'd page 2)

My first flight was in March, 1985. I now have 160+ total hours on it. Prior to this, I hadn't flown a tail dragger for about 15 years (which is not good). This includes most T.D. Models and 250 hours. Current time is a must as we can all agree.

Most of my flight time has been in high performance aircraft. Bonanza's 210's 206's and light twins. I owned a Bonanza for several years but sold it when I decided to build. This type of flying helped a little in some ways but not to the sensitivity, especially the first few flights. I manage to get through it, white knuckles and all. After about 90 hours, I installed the R.R. hydraulic brakes, which helped to shorten my landing roll. Our density altitude changes dramatically in summer. I am at 2100' but increases to 5000" and above many days. My approach speed is between 75 and 80 MPH, which is a little fast but it works for me.

For the first 130 hours, I made all three point landings. I now make all "wheel" landings. I see better, it's smoother and I stop quicker. I checked my airspeed by flying beside Kevin Kelly in his KR-100. We seemed to be within a mile or two of each other. He had to slow to a "walk" to stay with me. He cruises about 200. Kevin mentioned in one of the last Newsletters that I had modified my cowling, which doesn't reflect in this photo. This mod gained me a good five MPH. My top speed at 3600 RPM is 165+ MPH I.A.S. I cruise at 160 MPH I.A.S. at 3400 RPM.

Later this year, I'm going to reshape my gear legs to cover the hydraulic brakes. I may gain a little more speed. Every little bit helps as long as you keep in mind weight gain. My engine runs cool... no problems in this area. Our climate is on the hot side, but my C.H.T. has never gone over 395 deg. Oil temp about 190-195 deg. In winter I cover the oil cooler partially with duct tape to keep it close to normal.

I installed the Ed Sterba prop about 20 hours ago. I gained only two MPH due to the down pitch but I increased climb from 700' per minute at 100 MPH to 1100' per minute at 100 MPH. I decreased my take-off roll by 250'-275'. The best RPM I could get from my previous prop was 3100 RPM at full throttle. Because of the decrease in pitch from 52-46 to 52-44, I now get 3600 RPM.

I haven't installed an outside air-temp, gauge, so haven't calibrated my true air speed. Once you get used to this little airplane, it's truly fun to fly. The response is fast and smooth. It also makes you pay attention.

I'll try in the future to keep you posted on any changes I might make. The more input to you will help the Newsletter and possibly other builders. I have gained a lot by reading what others have done. I enjoy the Newsletter very much, Earl, keep it up. Fly Fast!

Elwood Harding
20832 Saratoga Rd.
Sonora, CA 95370
209-532-0260

FUEL TANKS

Like buckets, there's really only two kinds of fuel tanks... them that leak and them that don't. Skirting the long-winded experts arguing the merits of aluminum versus composite versus fiberglass, a good bucket can be fabricated using the Rand premolded tank parts. It's necessary to qualify the preceding sentence as there are a few spots along the way that will get you tight jawed.

The tank arrives in two pieces. It's necessary to scuff sand both sides of the tank halves to remove waxes or mold release agents and to prep the glue joints. Should you later decide to slosh seal the interior, you'll be ready.

Heavy cotton twine helps hold the tank halves in alignment. You'll have an easier time of it if you bond only a section at a time and let the epoxy cure. Re-tie the tank, realigning the next area to be bonded, and continue this process until completed. The radio stack area is a good place to begin. It's tempting to consider bonding the entire tank at one sitting but if you've ever tried to stuff a watch mainspring back into a too small case, you'll have some idea of the chore.

A strong glue joint will consist of a first coat of pure epoxy adhesive, followed immediately by an epoxy-flox mixture. A great gap filler and strong as your momma's love.

cont'd page 3

The latest tanks produced are laid up with polyester resins for assembly, Safe-T-Poxy is the weapon of choice. After cure, sand smooth and slightly round all joints. Sand the tank back at least two inches from each joint prior to overlaying a four inch wide bias cut fiberglass tape.

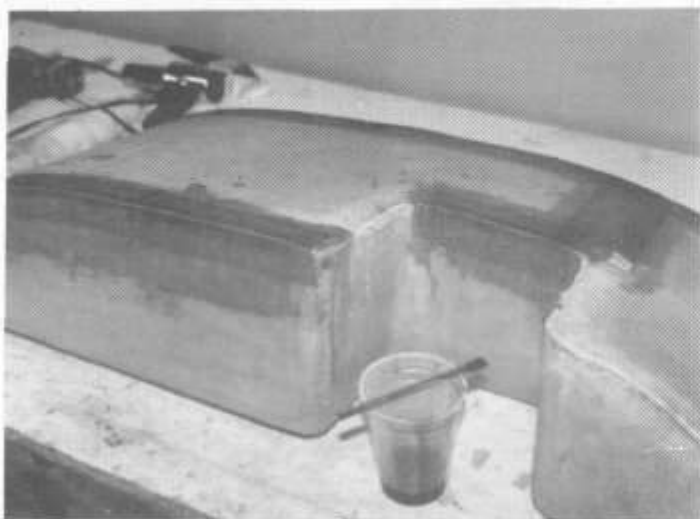
The tank flange can be floxed in position on the sump and reinforced with a minimum of three glass plies over the wet epoxy-flox. Modify a weldable aluminum tank flange by filing away the outer welding lip and drilling a few holes through the flange to aid in bonding. The sump area will be subject to stress due to the weight of a heavy brass fuel valve and it's frequent useage that will be concentrated in this location.



FIBERGLASSING TANK FLANGE



ALIGNING MOLDED TANK HALVES



FIBERGLASSING SEAMS

Before proceeding further, a leak check should be performed using your favorite technique or by filling the tank about one-third full of water and using a felt tip pen to mark any spots requiring attention. I would recommend strengthening the corner areas of the Rand tanks. My particular unit also had minute leaks out in the flats but not a single leak in the epoxy-flox-glass joints... be alert. This is one of those tight jaw spots. Depending on the number and location of the leaks in your tank, the thought of adding a full glass overlay on the entire project will certainly enter your head. Patches versus full ply. If, by chance, the tank does not leak after a pressure check, chances are it won't develop a leak in-service. Peace of mind is a mighty big factor. I glassed mine completely and quit worrying about it.

The fuel filler neck can be installed prior to bonding the tank in the airframe and attaching the molded deck. It's a bit more hassle but you can do a superior job bonding the parts. The filler cap I chose is from Wicks, Part No. FC100-001.

As I'm a charter member of the K.I.S.S. Club, you're on your own as to where and when to install any "just gotta have" extras like electric fuel gauge senders or lines from other fuel tanks. All will require leak testing.

I'm satisfied with my completed fuel tank even though I'm still torked about paying a hundred fifty bucks for a tank mold. At least I'll be haulin¹ around a good bucket.

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871 (RES) 387-5613 (REC)

The KR dinner was held on Sunday evening at Butche's Anchor Inn Lower Deck. 116 KR enthusiasts attended, including many foreign guests. We had KR folk from Canada, South Africa, Belgium and Israel. For those of you who were in attendance, the correct ending to the joke is "If given the choice, Al said he would prefer alligators over snakes, anytime!" Butches crew served up their usual fine selection of "family style" dinners. All in attendance introduced themselves and gave a project status report. Steve Bennett gave away about \$100.00 in Bozo dollars. (Bozo dollars are left over funds from no shows and the few extra cents left over from the meal charge.) In addition, a \$100.00 contribution was made to Jim Faughn who is the coordinator of the KR Gathering this year in Covington, TN.

The 1989 KR award for longest distance went to Louie Brochetti, for flying in from California. The Best KR award went to Todd Goudeau of Louisiana. Louie was also going to go a little farther east before going back to California. He is visiting the Smithsonian's Air and Space wing in Washington first.

Of the KR's at Oshkosh this year, three had fixed gear: Ken Cottle's KR-1 1/2, Louie Brochetti's KR-2 and Norm Leonard's KR-2. Dan Diehl's "Old Blue" had a Great Plains Aircraft's new Type 4 2600cc "Top Bug" engine installed along with GPASC's new Hall Effect secondary ignition system.

The Russians made a BIG IMPACT at Oshkosh this year also. The AH-124 seemed to be about 2 feet wider inside than the C5A we had there. Also the SR-71 looked quite impressive.

With the cooler weather this year than we had experienced in years past, it made for a very pleasant OSHKOSH '89. Looking forward to seeing all of the KR folks at Covington this fall, Sun N¹ Fun in the spring and at Oshkosh '90.

Steve Bennett
P.O. Box 304
St. Charles, IL 60174
312-513-5177

EDII'OR'S NOTE: Here are some of the photos that Steve sent. Sorry there's not room for all of them.



LOUIE. JEANNETTE AND TODD



TODD GOUDEAU N151TG
562 LBS, 1834, 150 CRUISE



**EXPERIMENTAL
AIRCRAFT
ASSOCIATION**

WITTMAN AIRFIELD. OSHKOSH. WI 54903-3086
PHONE 414/426-4800



LOUIE BROCHETTI N7786L
575 IBS, 150 CRUISE



NORM LEONARD N5826A
2180 HAPI, 150 CRUISE



COL. MIKE SMITH N2282B
650 LBS, 2100 REV. TURBO, 145 CRUISE



KEN COTTLE N335KC
550 LBS. 1835, 140 CRUISE



DON LOTT N74DL
604 LBS. 2100 VH. 140 CRUISE



ROGER BULLA N4207Z
588 LBS. VW, 160 CRUISE

Here's a construction tip which should yield rewards for any builder who can incorporate this feature: A removable forward deck/fuel tank.

This feature is best suited to any builder who plans to use the Rand Robinson premoulded component, but could be incorporated on a scratch-built part. It merely screw attaches with countersunk hardware to blocking on the top longeron and firewall.

The key to making this approach work is to make the instrument panel self supporting and separable from the forward deck. This is easy to do if your panel is built-up from plywood, aluminum, foam sandwich, etc., is supported on its lower edge by a cockpit crossbrace and is screw attached to the forward deck along its curved top edge. (Cope out all but about 3/4" of the premoulded instrument panel leaving a flange to attach to.)

A Rand Robinson premoulded tank or a scratch-built tank like mine can be bonded to the forward deck and braced at the sides near the top longerons without being attached to them. The sight tube for fuel level can be braced and made to slip into and out of a slot in the instrument panel along with the tank, or if your bird is electrified like mine, you can use a remote fuel sender and gauge. The fuel sump connection can be made with clamped hose after the shut-off valve. This way the tank can be isolated and disconnected for removal without a fuel mess.

Why all this bother?

1. Your instrument panel will never be quite complete no matter how much planning you do. The ability to repair (or improve) it without having to cram yourself upside down into the forward cockpit is a blessing.

2. Your fuel tank may get sick and need some attention. A fellow KR flyer who I know is faced with a second header tank repair job due to leakage. He did everything right: VE resin, Randolph sealant, and exclusively avgas, but it leaks and he is now considering major surgery on his bird.

3. If you have toe operated brakes, mechanical or hydraulic, its nice to be able to get at them (and the rudder pedals) easily for modification or repair.

Howard Kaiser
5205 W. Beryl Ave.
Glendale, AZ 85302
602-937-7556

I want to take this opportunity to thank Steve Bennett and Dan Diehl for supplying photos and information on this year's Oshkosh event.

I had looked forward to being there and meeting many of you but a few days before the event I was told that, due to a depressed aerospace market, the company I had served for over 21 years was eliminating my position. In other words, I no longer had a job. I am sure there are many of you who know all too well what I'm talking about and for those of you who don't, I hope you never will. I'm telling you this because you may have wondered why I wasn't at Oshkosh and probably will not be at Covington this year.

I have decided to form my own company that will offer various "media services" to companies in our area.

Although a number of my priorities have changed, there is one that hasn't... the publication of the KR Newsletter on a monthly basis.

There will, however, be a change in the U. S. subscription rate from \$12.00 to \$15.00. That rate has not changed in nearly ten years (foreign and Canadian will remain the same because they have already had a rate increase).



The 1989 COVINGTON, TENNESSEE GATHERING

will be held on Saturday, October 7 and Sunday, October 8. For reservation information contact:

Jim Faughn
5615 Botanical
St. Louis, MO 63110
Phone: 314-647-4012.

ADDRESS CHANGES:

RAND ROBINSON'S new address:
15641 Product Lane
Huntington Beach, CA 92649

GREAT PLAINS AIRCRAFT new address:
P. O. Box 304
St. Charles, IL 60174
New #312-513-5177

1990 OSHKOSH ROOM RESERVATIONS

It's time again to make your reservations for the 1990 EAA Oshkosh Fly-in. The dates are Friday, July 27 through Thursday, August 2. A deposit of \$25.00 is all that is needed to secure your room at this time.

All checks MUST BE PAYABLE to the University of Wisconsin - Oshkosh. All of the KR rooms are double rooms and contain two single beds and are equipped with a refrigerator.

The KR group meets in the central meeting room behind the elevator several times during the convention during the evening. This provides an excellent meeting area for exchanging information about KR's. This year we had about 40 KR folks staying on two different floors in Scott Hall.

For 1990 we have 50 rooms reserved. Transportation via bus, is available from Scott Hall to the airport. Mail all rooms reservations with a COMPLETED FORM WITH DATES to:

GreatPlairjfeAircraft
P. O. Box 304
St. Charles, IL 60174
312-513-5177

NOTE: CHECKS MUST BE MADE OUT TO THE UNIVERSITY OF WISCONSIN - OSHKOSH. THE FORM MUST BE FILLED OUT COMPLETELY OR IT WILL BE RETURNED TO YOU. A \$25.00 DEPOSIT IS ALL THAT IS NEEDED OR REQUIRED PER ROOM AT THIS TIME.

Checks must be returned to GPASC before September 31, 1989. The University of Wisconsin will bill you on or before May 1, 1990 for balance due.

1990 EAA RESERVATION REQUEST FORM

Last Name _____ First Name _____ M.I. _____

Street Address _____

City _____ State _____ Zipcode _____

DAYTIME Telephone Number _____

Please circle and write your desired **ARRIVAL AND DEPARTURE** dates.

Before	25	26	27	28	29	30	31	1	23		After
25th	Wed	Thr	Fri	Sat	Sun	Mon	Tues	Wed	Thr	Fri	3rd

Desired Arrival Date: _____ Desired Departure Date: _____

Number of Rooms: _____ Cost per room per night: _____

☐ Double (S) **\$25.00**
☐ Single (S) Amt enclosed: \$ _____

A minimum deposit of \$25.00 is due for each room reserved.

If full payment is not enclosed, balance is due on or before May 1, 1990. Make checks payable to: University of Wisconsin Oshkosh.

For medical reasons I wish to be:

_____ on the first floor of any hall

_____ in a hall with elevators

_____ in either a hall with elevators or on a first floor

Special Requests: KR Group!

TIP ON PIN HOLES IN SLURRY

It's easier to use a 1/4" or so drill in order to get a hole big enough to fill with the slurry. A lot of pin holes are bigger under surface, a pocket of air in slurry will expand under heat and pop the finish paint., ruining a nice job.

TIP ON GEAR LOCK

On the "Rand" type gear lock... the mouse trap springs are hard to get and not very strong. I made a tool...- made my own from piano wire. .090 about 4 turns. I'll try to locate wire to send you a sample.

Gene Darst
585 Iowa St.
Beaumont, TX 77705
409-835-1990

FOR SALE

KR-2, 90% complete, fixed gear, Revmaster 2100 D, zero time, wing tanks, full instruments less NAV/Com. \$5300.

Pete Peterson
3832 Cottage Grove Ave.
Des Moines, IA 50311
515-279-1215

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
&AR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
NON-COMMERCIAL ADVERTISING FREE TO
SUBSCRIBERS [INCLUDING PHOTO]. INCLUSION
OF ADS SUBJECT TO AVAILABILITY OF SPACE.
SET OF ALL AVAILABLE BACK ISSUES (OVER
100) FOR \$75.00.
INDIVIDUAL COPIES \$1.25 EACH.

KR NEWSLETTER
P O BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 147, AUGUST, 1989



KR NEWSLETTER

ISSUE NO. 148
SEPTEMBER 1989



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



HOWARD KAISER'S N39HK FLIGHT REPORT (DATED AUGUST 10, WITH UPDATE AUGUST 28. 1989)

I thought that your readers would be interested in a first flight report on KR-2 N39HK.

I always looked forward to flight reports of any kind. Each and every piece of new information regarding the air manners of this little bird put me one step closer to a safe and successful first flight. That's what I had on July 4, 1989.

N39HK is a basically stock KR-2. Departures from plans include toe operated hydraulic brakes, a Maule tailwheel, larger than stock flaps, Diehl wings, and a fixed windscreen with separate doors. The powerplant is a rebuilt Revmaster 2100 with tuned exhaust, a HAPI Ultracarb, and a 52-50 Great Plains prop.

(cont'd page 2)

I taxi tested the completed aircraft for almost ten hours before I even thought about flying. (I have very little formal training in a traildragger.) This was time well spent getting used to the effects of engine torque, crosswinds, and heavy braking. I would recommend to anyone that they spend considerable time doing ground work regardless of past experience. This aircraft has unique handling characteristics and not all KR's handle the same. Getting up the courage after several hours of slow taxi to get the tail up was probably the most difficult part of my "flight training". The transition from three point to two point on take-off and the reverse on landing is the trickiest part of flying and it requires complete attention and anticipation. Once airborne, this plane is a dream to fly. Even the very first flight was surprisingly easy. (I expected to be all over the sky trying to maintain control.) I found the controls to be quick as described by other builders but very manageable if you keep control inputs consistent with speed. (That is, the plane will tolerate abrupt and near full control changes at approach speed, but watch yourself at cruise speed!)

Most of my fiddling with the plane while flying off the restriction and exploring the envelope has been setting static trim to even out the controls (it had a slight right roll tendency) and to optimize the performance of the engine (much adjustment of the carburetor).

I am flying with the doors off (open cockpit) at this time so cruise speed is reduced. (It's HOT in the desert southwest and natural air-conditioning is a blessing even on morning flights.) I'm getting about 130 MPH indicated at 2800 RPM with the engine running near top of the green on oil and head temps. I can't get much over 3100 RPM flat out but I'm still playing with full throttle mixture (it's running too lean). Getting the mixture dialed in is proving to be the most time consuming task due to the effect of ram air in flight.

Climb performance is very respectable. At a solo weight of 820 lbs, I get 1100 FPM at 2900 RPM and 85 MPH indicated.

I'm proud of my baby. It took three years of sometimes difficult labor to deliver. It's not the prettiest KR-2 I've seen but she's mine. She is safe, reliable, and well-mannered. She is these things not because I am terribly clever

but because I've read every article written and pestered KR builders unmercifully at numerous fly-ins. Everyone has a good idea! If you hear or read enough tips and can sensibly apply some of them to your own project, you won't go wrong.

Thanks, Earl, and Jeannette, and all the rest of you clever builders out there for bringing me a kind of freedom and joy I would never have dreamed possible a few short years ago. If there is anyone out there who has gained something from this drivel, you're welcome.

UPDATE AUGUST 29, 1989

I have about 30 hours of flying time so far on my KR-2. That's not a lot, but it's enough to know whether some of the modifications I made were smart or stupid. The stupid mods require much more flight testing, of course. The others, I'll share. They are not new, or innovative. You have read about them in past newsletters.

I incorporated center section flaps, similar to those in the newer plans, at the time of construction. This was a painful decision as I knew that making them would add months to my building time. I also knew that their effectiveness could be limited by their short span. But I "bit the bullet" knowing that having but not needing, was far better than needing but not having.

Let me tell you they work and they help. Stalling speed in the landing configuration is reduced from 65 mph to 55 mph IAS. Over-the-nose visibility on approach and in the flair is far better than without. I can hold an approach at 75 mph carrying 2000 rpm and still get 500-600 fpm decent rate... solo! I can hold it off at touchdown to well below 45 mph. This makes for a very short landing roll.

I made the flaps as large as I possibly could with the space available between fuselage and outer wing panel, and aft of the spar. I rigged them to allow up to 55 degrees deflection and hinged them Fowler style so that they move well aft as they extend (very easy, just make the hinge brackets longer). But watch your ground clearance. Aircraft with stock retracts and tailwheel may not allow an oversized flap to be fully extended.

cont'd page 3

A nice bonus is that when carrying the added weight of a passenger (in my case sand bags), 25 degrees of flaps brings the tail up quickly and shortens take-off roll to that of solo.

The second improvement that I would strongly recommend is the use of individual foot operated hydraulic brakes. The decision to incorporate these was also painful as I already had the stock mechanical brakes in hand. I knew that installing either set would take about the same amount of time but the extra \$500 was difficult to rationalize.

This choice also paid off in dividends of greatly improved, hands-off, ground handling as well as the comfortable knowledge that in a tight situation, I could get it stopped in 500 feet under complete control. I read and heard too many reports of unpredictable handling to go with the stock brakes in a plane that would gross at 1000 pounds.

This ends the give. Now for some take. I would be interested in hearing from other builders regarding the pitch stability of their airplanes. Mine will fly trimmed, hands off in smooth air but is unstable. That is, the slightest disturbance gets it going either nose down or nose up with no tendency to return to straight and level. How can I correct this situation without major surgery?

Howard Kaiser (N39HK)
5205 W. Beryl Ave.
Glendale, AZ 85302
602-937-7556

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

NON-COMMERCIAL ADVERTISING FREE TO
SUBSCRIBERS [INCLUDING PHOTO]. INCLUSION
OF ADS SUBJECT TO AVAILABILITY OF SPACE.
SET OF ALL AVAILABLE BACK ISSUES (OVER
100) FOR \$75.00.
INDIVIDUAL COPIES \$1.25 EACH.

FROM DAN DIEHL

I haven't sent anything to the Newsletter for several years... mostly because I haven't changed anything on my KR-2. Recently both myself and one of my hanger mates changed engines. Not a swap... we both moved up. Martin Roberts N191MR had an 1835cc and went to a 2180.



MARTIN ROBERTS N191MR

Prop Sterba 52 x 54
Running 3200 RPM Static 3150 RPM
*Cruise Ind. 180 RPM- MPH at 3500 RPM
205 FPM
Climb Solo 850-1000 at 120 MPH 1000-1200
* Cruise speeds are about 20 MPH high due
to poor static port location.

My people have asked me what a bigger engine will do. Answer: About 20 MPH and about 200 FPM increase in climb. He has not yet carried a passenger.

For some reason to be determined, Martin's oil temp runs about 220-230 deg. (still working on this one).

On my plane, N4DD, I have installed a 2600cc Type 4, one of Bennett's engines. It does make more static RPM than my 2180, but haven't yet fitted the cowl and baffling... so haven't yet flown it. I'm planning on installing the Type 4 in a new KR I'm building. I plan on selling 4DD in the near future with the good ole 2180cc. I'll have more stats for you after I've flown it.

Keep up the good work. It's nice to see the Newsletter going so well again.

Dan Diehl
1855 N. Elm
Jenks, OK 74037
918-299-4444

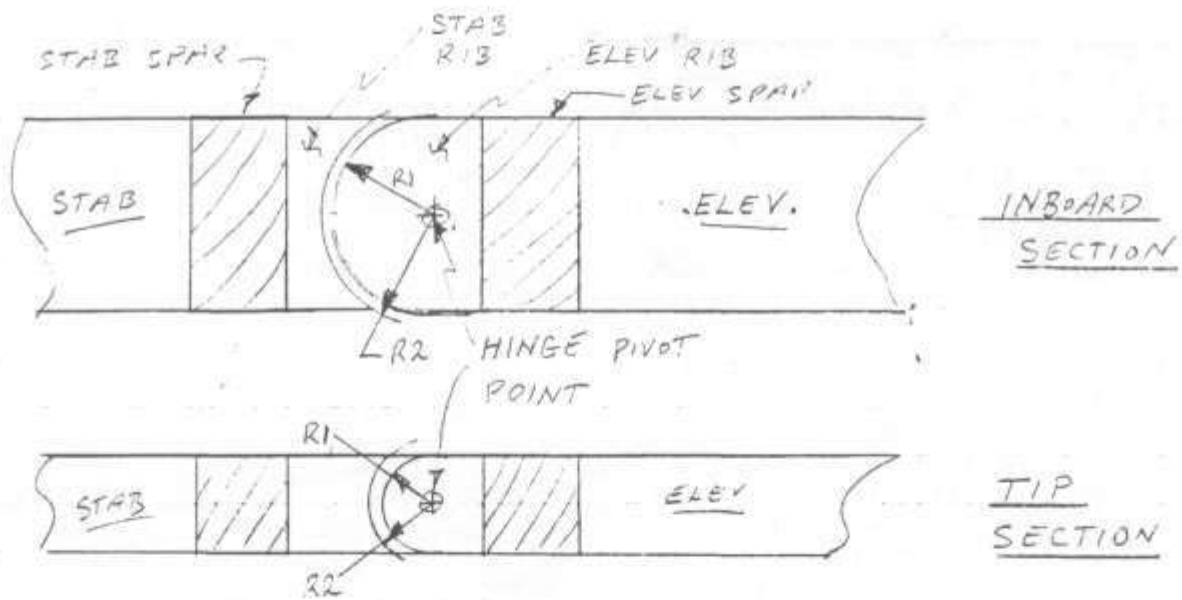


FIG 1. ELEVATOR/STABILIZER SECTION VIEWS

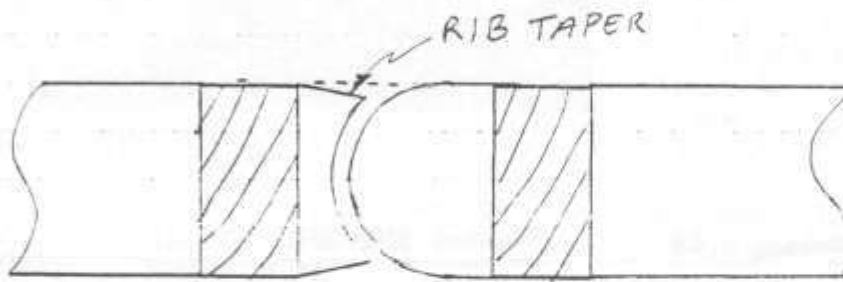


FIG 2. STABILIZER TRAILING EDGE TAPER

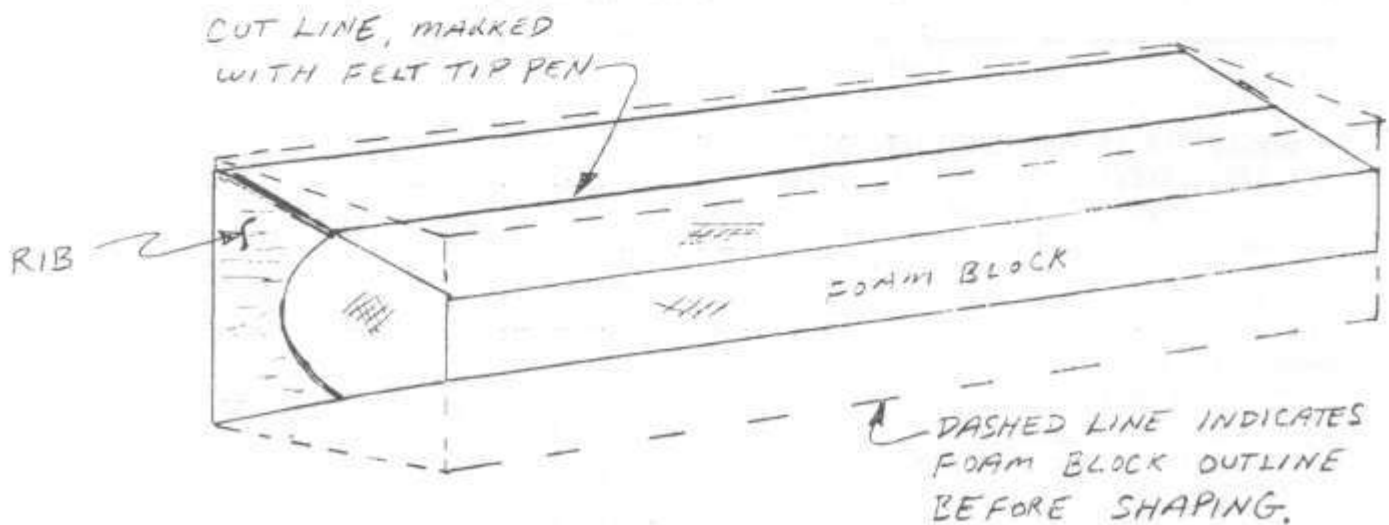


FIG 3. FOAM BLOCK SHAPING AND MARKING.

K.E.P.
8-17-89

TRAILING EDGE/ELEVATOR LEADING EDGE

Recently, someone requested info on making stabilizer trailing edge/elevator leading edge. Here is how I did mine (rudder also).

NOTE: I did not use the Rand hinges. I used rod end bearings attached to stabilizer spar, and angle brackets attached to elevator spar. This results in a greater distance between the two spars, so dimensions for mounting stabilizer to the airframe were changed.

First, draw full scale elevations of the stab aft spar, elev forward spar, and hinge pivot center for both center and tip locations (see fig. 1). Next, using width of stabilizer at the pivot point as diameter, draw an arc (R1) about the pivot point. This represents the elevator leading edge. Draw a second arc (R2) about $3/32$ " larger radius, to represent the trailing edge of stabilizer. Use drawings to template $3/32$ " plywood ribs. I modified the stabilizer ribs as shown in fig. 2. This will help airflow conform to shape of elevator (a straight gap induces turbulence) and allows an extra layer of fiberglass tape across this area.

NOTE: Using a small wood block in lieu of ply for tip rib allows outside edge to be rounded off instead of squared.

Cut a block of urethane foam to fit between knee (where taper starts) and tip of stabilizer. This foam block should extend back about $1/2$ " behind the ribs to provide support for fiberglass cloth. Glue a center rib to one end of the foam block, and a tip rib to the other end, then glue the block to stabilizer spar. Cut a foam block to fit between the first block and the center area of the spar where it will join the fuselage. Glue a center rib to the inboard end of this block, then glue the block to the spar, butted up to the first block. The ribs are used for guidance in shaping the upper and lower surfaces. Do not remove foam from rear surface yet. Use felt marking pen and straight edge to mark a cut line on the upper and lower surfaces between trailing edges of ribs (see fig. 3). Lay up fiberglass cloth. When cured, trim excess from trailing edge, back to the cut line. Now scrape away foam from between trailing edges, and fill with epoxy floc. Take care to not allow floc to protrude back past the contour of the ribs. In fact, it is not necessary that the floc

conform closely to the shape of ribs, it is only to reinforce trailing edge surfaces.

The elevator leading edge is made in a similar manner. Do not forget to mark locations of hinges, so access holes can be cut.

Another tip regarding the tail section - A straight $3/16$ " $1/4$ " dowel laid in a groove in the leading edge of horizontal and vertical stabilizers, helps in shaping the foam and adds reinforcement.

I hope these tips help get another KR flying!!

Bob Blackburn
P. O. Box 568
Ocean Springs, MS 39564
601-875-1183

HELP

Dan Freeman would like to know if anyone has installed a Dragonfly Canopy in a KR-2. If there is anyone who could help him out, please contact him.

Dan Freeman
1925 Temperance
Indianapolis, IN 46203
317-356-4152

THE SNAKE OIL SPECIAL

A few weeks ago, I had a very enjoyable visit with Col. R. W. Moore of Toccoa, GA. R. W. is the booking agent for a traveling side show that is entitled "THE LAST REAL MEDICINE SHOW".

The show travels to over 300 towns a year and can trace its origin back to 1890. They hold the original rights to the "SNAKE OIL" trademark.

R. W. purchased a KR-1 from Rex Taylor and plans on pulling it behind his motorhome as he travels from town to town. The tail of his KR-1 will display the "SNAKE OIL" logo (in white, red and yellow) but he has asked for some help in designing a unique paint scheme for the rest of the plane. If you have any ideas for R. W., send them to:

Col. R. W. Moore
P. O. Box 622
Toccoa, GA 30577-0622

BUILDING TIPS

My progress with my KR-2 has been slow with lack of money and time to work on it. To speed things up, I bought a partly built project from a man whose daughter developed a severe allergy to the epoxy. He had almost completed the timber work and had started fibreglassing the empennage when the trouble showed.

He had been using the original plans, which had many errors and omissions and had to figure things out for himself, but for the most part, had done a good job.

One of the things I had to check was the shape and positioning of the long wing ribs he had fitted. (He may have used the incorrect R.A.F. 48 dimensions when he made them.)

So to check that, I made a female rib profile that would fit over the wing (using the latest plans from the loose leaf book) and found all three pieces of the large ribs were all misplaced and the wrong shape. So I will have to cut them out, reshape and refit them.

I think there is a better system for checking wing profile and positioning than that shown on page 2 of issue No. 25. It also allows us to shape the top and bottom of both the spars more accurately to fit the profile.

The firewall reinforcing alum, angle as used in issue No. 99 is not available in Australia but I used a different method which was okayed by Rand Robinson and was passed by the Department of Aviation. I enclosed the copy of the modification. See drawing of the female rib profile. Material 1/4" masonite wallboard, backing strips (for stiffening profile), 1" x 1" timber (approx.).

I hope this is of some use to the KR-2 builders.

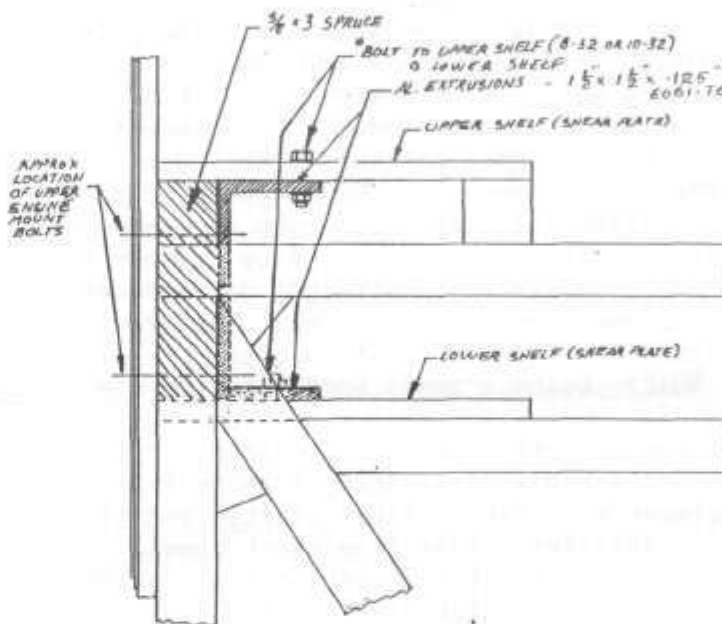
Denis Seal
Warruga
9 Sunart Lane
Maclean, N.S.W. 2463
Australia



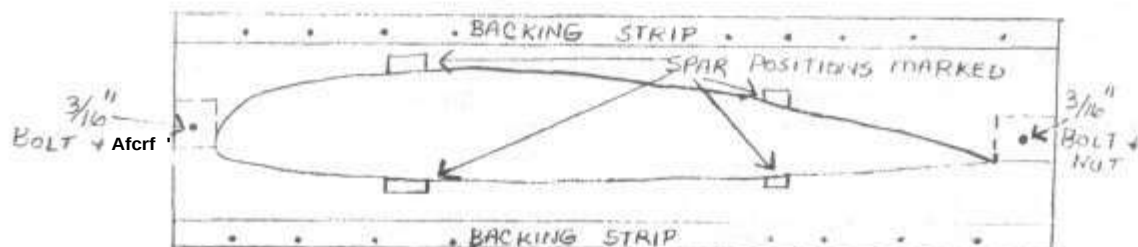
EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD, OSHKOSH, WI 54903-3086
PHONE 414/426-4800

Here is the firewall reinforcement drawing for increasing the strength of the firewall. Thanks to Lance Neibauer for this drawing.



NOTE: Aluminum extrusion should be epoxied to both 5/8 x 3 spruce and bottom side of top shelf (in addition to bolts) and top side of bottom shelf.



COCKPIT TRIM TAB CONTROL

Everybody says the KR is built just like a big model airplane... ok, what better place to buy parts than the local hobby shop.

A simple, effective and light cockpit trim tab control can be made up from scrap aluminum, a small wooden knob and a one dollar hobby shop purchase. Bet you've got some 5/8" square spruce left from the project so you're set.

Check the sketch and the photo for details. (NOTE: The zolatone finish on the cockpit walls. It's a Krylon brand spatter paint in a spray can available at most auto paint stores. Three different color choices, I think. Went this route... like many of the Rutan designs, to save weight. The finish is hard and gives a "molded" look to the structure. Hides glue stains and wood grain so the boat looks more like an airplane.)

The trim tab is driven by a Sullivan Products quarter-scale R/C pushrod and is plenty strong. Aft fuselage bellcrank is just like the cockpit and terminates in a cable-driven "golden-rod" to the tab. Secure the pushrod at each fuselage upright to prevent flex.

Glue the spruce mounting block to the fuselage skin and tangent to a fuselage member... remember to floc the bolt in place first.

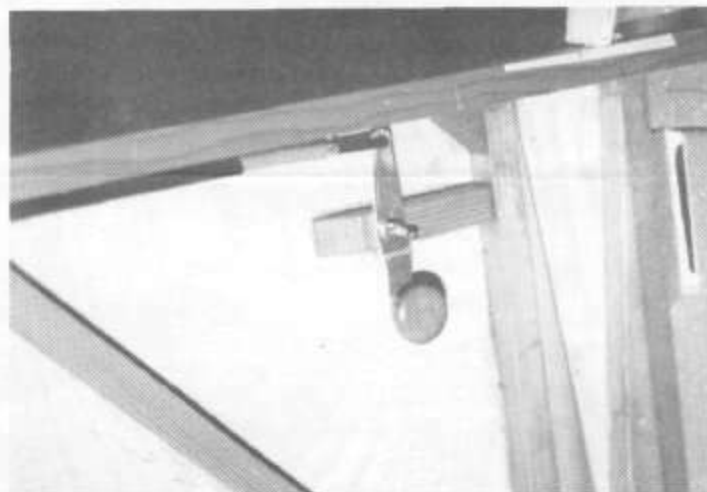
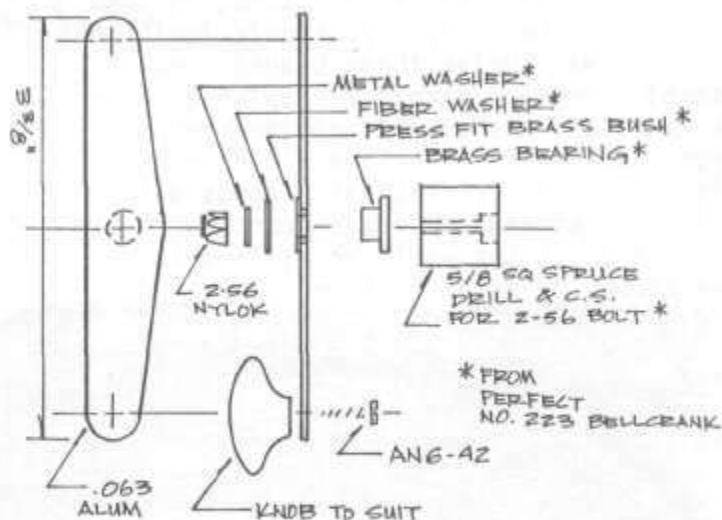
The dollar goes for a Perfect Brand No. 223 bellcrank. Push out the press fit bushing using a couple of small sockets and throw away the bellcrank as it's too thin for our needs. The rest is easy. Snug the nylok down for just the right amount of friction to hold your trim setting.

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871 (RES) 387-5613 (REC)

FOR SALE

KR-2, 90% complete, fixed gear, hydraulic brakes, 1835cc, wing tanks, instruments, nav. lights. \$5,000.00.

Burrell Tibbs
3531 E. Blacklidge
Tucson, AZ 85716
602-881-2694



1989 KR GATHERING, COVINGTON, TN

The 1989 KR Gathering will be on October 7 and 8 in Covington, Tennessee. This year's event will feature an action-packed weekend with talks and seminars for the new or experienced builder. For further information on this event, contact Facilities Chairman, Chuck Grammer, 801-686-4491 or Program Chairman, Jim Faughn, 314-647-4012.

FOR SALE

KR-2 single seater. Rosenhaun hydraulic brakes, 1915cc VW engine, all new parts except crankshaft and heads. These have all been rebuilt and the shaft magnafluxed and balanced by MAPI. Electronic ignition by HAPI. Warp Drive three bladed prop to resemble the P-64 warbird. I plan to have the cowling finished this coming month. Canopy changed to look like a P-64 with sliding action for fresh air, opens six inches. Lost medical. Have over six thousand in it but would be willing to take \$4,500.00 or best offer.

Bob Dunbar
46630 Worchester Dr.
Mount Clemens, MI 48044
313-247-8979

FOR SALE

Need replacement brakes for your KR? Limited supply of disc brakes that include tires, tubes and wheels. Brake and wheel assembly ready to install with KR axel bolt. Does not include master cylinder, lines, or fittings. \$185 set plus freight.
Used HAPI crankshaft, prop hub and rods. \$125.00

Dan Croy
7030 W. Redrock Dr.
Gillette, WY 82716
307-682-1363

FOR SALE

Monnett IS00cc turbocharged engine 0 hours S.M.O.H. Complete with new HAPI cowl, mount and ground adjustable three blade prop. All for KR-2. \$1500.00 firm.

Timothy A. Wildes
Rt. 5, Box 2326
Doughs, GA 31533
912-384-0399 after 7 p.m.

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 148, SEPTEMBER, 1989

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413



KR NEWSLETTER

ISSUE NO. 149

OCTOBER 1989



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



DAVE SHIREY'S KR-2 N55DS

For the second year, Dave Shirey of Washington, MI, has won "Best Custom Built Aircraft" in the non-certified engine category at the Midwest Regional Fly-in (MERFI).

Dave began construction on his KR in 1979 and finished in 1985. The plane's VW engine swings a Props, Inc. 52 x 49, it has hydraulic brakes and an ingenious custom canopy that can swing open from either side.

Performance... in the summer temperatures with no passengers and nine gallons of fuel on board, his KR can climb out at 1000 FPM at 80 MPH. After leveling off, speed will immediately build to 120 and then work up to about 165 MPH indicated at 3,200 MPH.

REDUCING PITCH SENSITIVITY

By Howard Kaiser, Glendale, AZ

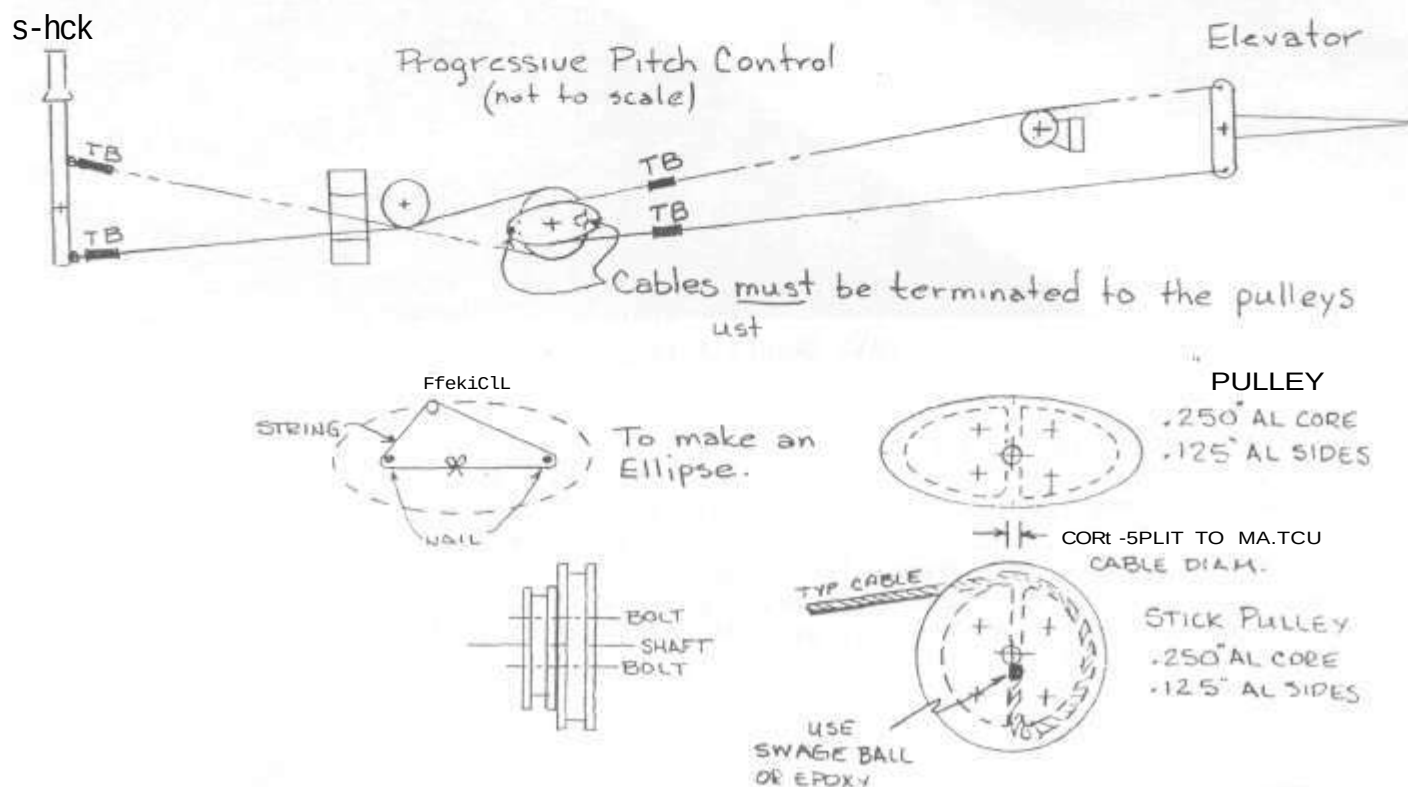
One of the most common observations to come out of flight reports is the high pitch sensitivity of the stock airplane. Many builders, when asked what they would do over, answer that they would stretch the fuselage to increase the pitch moment arm. This is an adequate solution to reducing pitch sensitivity assuming that a substantial length increase can be achieved without exceeding acceptable weight and balance limits. But this idea only helps those folks who have not yet built the fuselage. Furthermore, any deviation from plans, particularly airframe changes, should be discouraged unless thought out very carefully!

A simpler solution to reducing pitch sensitivity, applicable to finished airplanes as well as projects under construction, is progressive elevator control. This control scheme provides diminished elevator movement near neutral stick positions with progressively larger movement near full forward or aftward stick positions. (This concept was used on aircraft such as the FW190 and the DeHavilland Mosquito.) It allows the designer to keep the control system responsive, while reducing elevator sensitivity in high speed level flight.

This control scheme can be incorporated into the cable operated KR elevator. A special pulley assembly is fabricated and mounted behind the rear spar. The assembly consists of a circular pulley on which the stick cables are terminated and an elliptically shaped pulley on which the elevator cables terminate. The two pulleys are bolted together on a common shaft and are securely mounted to the rear spar or belly (see sketch). The system is rigged so that when the stick is in neutral position, the "E" pulley is nearly horizontal and the elevator cables pay off the flat sides where sensitivity is lowest. As the stick is moved to the full forward or aft position, the circular pulley rotates the "E" pulley, changing the mechanical advantage, until the elevator cables are paying off the peaked ends, the point of highest sensitivity.

The circular pulley to which the stick cables terminate is sized so that full fwd-to-aft stick travel results in 180 degrees of pulley rotation (in my case 3" diameter). The elliptical pulley is sized so that 180 degree rotation produces full stop-to-stop elevator travel (in my case 4" by 2").

Experiment first. Model the pulleys in wood. Try them out for proper size and action, then make the final product. Make the pulley flanges generously large to prevent cable loss. Also, be sure to incorporate turnbuckles on both the stick cables and the elevator cables to allow fine adjustment of both.



INSTALLATION OF EGT & CHT

By Howard Kaiser, Glendale, AZ

I was discussing the installation of engine temperature indicators (EGT & CHT) with a fellow builder recently and we realized that some builders may not have a full understanding of how these instruments operate or how they should be installed. The principles involved could make installation of these devices chancy for the novice. The life of an engine and perhaps even your own is threatened by instruments which give grossly inaccurate readings.

First, some basics. Most EGT and CHT installations in aircraft utilize thermocouples (or the thermoelectric principle). That is, when two dissimilar metals (in thermocouple wire) are brought into intimate contact (a junction), a minute voltage is developed. The magnitude of this voltage depends on (1) the types of metals used (some combinations generate more voltage than others and (2) the temperature of the junction (more heat, like under a spark plug, means more voltage). If the free end of this thermocouple wire is connected to a milliammeter a current will flow and a reading will be obtained. This measured current will be nearly proportional to the temperature of the junction. Simple, right?

Here is where builders can go wrong:

First, each dissimilar metal connection in the thermocouple circuit is a voltage producing junction. The connections to the back of the meter or to a terminal block on the firewall affect the accuracy of the meter reading. Second, total circuit resistance, that is, the size and length of the thermocouple wires affects the accuracy of the meter reading. And third, various thermocouple alloys have been developed for different uses. Improper applications of these alloys or combinations of them can produce errors.

Factory matched probe, wire and meter assemblies installed in accordance with the manufacturer's instructions, seldom cause a problem. Trouble starts when a builder, armed with basic wiring skills, modifies a matched set-up or cobbles something together from parts. Perhaps he wants to provide a firewall disconnect, or lengthen the leads on the probe, or install a selector switch. Knowledge of basic wiring techniques is not sufficient to guarantee accuracy. These seemingly simple modifications can produce additional voltage producing junctions or disturb the calibrated circuit resistance. Significant instrument error can result.

Here are some guidelines for a good installation:

1. Avoid making auxiliary connections to the probes within the engine compartment unless they are made with devices specifically suited for the type of wire used. Running the EGT and CHT probes unbroken from the engine to the instrument panel is the best way to minimize error.

2. Avoid changing the length of factory set-ups. If the probe lead is too long, coil the excess behind the panel. If it is too short, reroute the wire or relocate the gauge.

3. If you are making your set-up from unmatched parts, your task is more difficult. The thermocouple, extension wire, and connectors (if used) must be compatible (Type J, T or K). The total circuit resistance must be adjusted (typically, the extension wire length or gauge) to produce the correct readings on the panel meter. Trial and error with accuracy checks may be the only way to determine the right combination.

4. Any installation must be checked to assure proper operation and, in the case of cylinder head instruments, verify accuracy prior to running the engine. A single point accuracy check should be sufficient. Verify that the instrument produces a reading of 212 $\pm$ 5 F degrees in boiling water, or better yet, a reading of 400 $\pm$ 10 F degrees in hot cooking oil. (Oil temperature can be verified with a candy thermometer.) Be careful! An EGT set-up can be verified by holding the probe(s) in a candle or lighter flame. The reading obtained is not particularly important, as long as it is upscale. What is important, however, is equal readings on multiple cylinder installations.

5. Be aware of the effects of cockpit temperature on your gauge reading. Most ready to install systems are calibrated at the factory at a specific temperature. Unless your system has automatic ambient compensation, your readings will be in error any time cockpit temperature differs from the calibration temperature.

I know this is a lot of technical information and it may be hard to digest but it is vitally important to the well-being of your engine that the principles and cautions described here be understood.

The following appeared in Steve Bennett's QUARTERLY:

CANOPY SAFETY LATCH

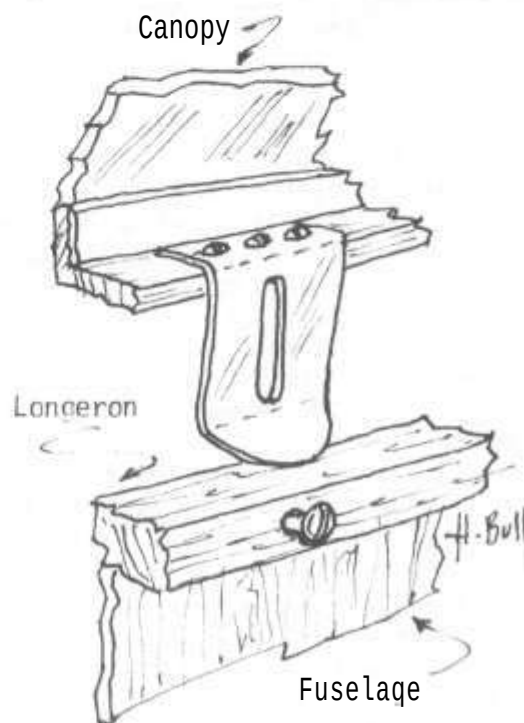
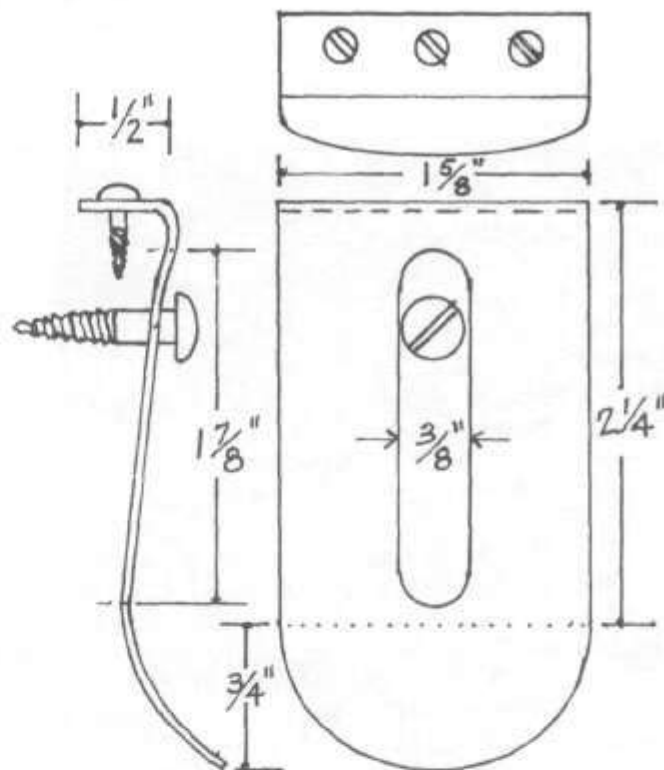
"Trouble", it seems like every time we expect to get our bird in the air, have a successful and beautiful flight, some dumb thing happens and we've got "trouble". I've had my share! But, I guess most of us can say the same thing... it goes with the job! However, here's one that didn't have to be.

I had finally finished repairing a dinged wing that resulted from a taxi light. (I took out on a fast taxi when a bolt on my left brake pedal broke and I ran off into the grass.) I've been working on my brakes while trying to get my slow, medium and fast taxis completed. My KR is a modified tri-gear and good differential braking is necessary for steering the casting nose wheel. The regular R.R./Azusa mechanicals just wouldn't do the job. So, I changed to the new Rand hydraulics. They seemed to be working very well, once I found how to bleed them properly for full hydraulic action. Very well, that is, until the bolt broke! To repair the wing, I trailered the plane home, spent a month trying to make it look like new, get a new FAA inspection and get it back to the airport to complete my "Airworthy Forty".

Looking back at the trailer on the way to the airport, the plane was riding well but something was wrong... my God, no canopy! My view of the upper part of the plane through the mirror was blocked by the wings being carried in the rear of the stationwagon. I had been checking our progress only by the side mirror which also didn't permit a good view of the upper portion of the plane. You all know that sickening feeling you get when some new "trouble" has struck! ... Sick!

Traveling on a main highway, we came to a cautious stop and assessed the damage.

The canopy had torn away at the hinge joint, but luckily had been held to the side of the plane by the mike, earphone and domelight cords. Except for a small nick in the right flap trailing edge and the tear along the hinge attach area of the canopy, there was no great damage. Pilot error! I had forgotten to lock the canopy closed. Seems also that I've heard quite a number of stories about KR canopies blowing off and causing all kinds of damage. Some that were very serious...



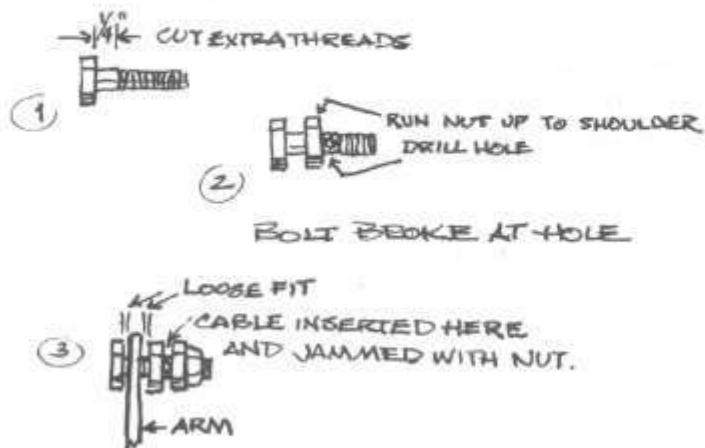
John Shaffers's accident is a good example. And a funny thing... I haven't heard anyone say anything about a canopy safety latch.

A Long EZ builder friend of mine was with me at the time my canopy blew off. First, he was appalled that I hadn't locked my canopy, since we had talked about the strong winds that were blowing. Second, he was astounded that I didn't have a safety latch. He said Burt Rutan had designed a simple safety catch into the Long EZ and he couldn't see any reason why it wouldn't work just as well in the KR. It does! I've got one now and it's so simple, everyone should have one. So take a look and install one at your earliest opportunity. The catch consists of one slotted piece of aluminum or thin spring steel and four screws.

And the bolt. The break (brake) bolt. How did it break? Well, I activate my master cylinders with a cable from my pedals to each cylinder. I attach my cables to the brake arms with bolts, ala Tony Bingelis (see illus). I now know if the bolt isn't of sufficient diameter to take a hole for the cable to pass through and you over torque the nut while attaching them, you've got potential "Trouble". Use a proper size bolt and torque carefully.

Herb Bull
1450 Northwoods Dr.
Deerfield, IL 60015

(Quarterly Editor's Note: As with most metal fittings, the minimum material on either side of a hole should equal that of the hole. Thus, a fitting that has an 1/8" hole in it should be minimum of 3/8" wide.)



HELP!!!!

I want to thank all of you for your words of encouragement and I need to ask for your help.

There are over 600 subscribers to this publication but only a few submit articles on a regular basis.

This is your Newsletter and your input is essential for it's survival. Please take the time to share your photos, ideas and experiences with all of us.

Thank you again and we look forward to hearing from you.

AIR VENT

Do you remember your first ride in a KR? Chances are you were so overwhelmed by sensory inputs that your brain retained only little bits and pieces of the experience. Score a couple more flights and you will definitely remember one thing... it gets hot under that canopy. Live anywhere that the word "ya'll" does not refer to some boat and it'll be uncomfortably warm even in the winter when temperatures drop into the sixties. (Small joke for those builder/pilots north of the Red River.)

Whatcha need is an air vent. Not some tacky, bulging scoop, or one of those plastic eyeballs gouged into the flexiglass, but a slick, submerged NACA inlet. You might entertain the idea of following the shop built inlet and do all the math calculations, fitting and fussin', and build a very complex mousetrap or you can break down and order a pair of the premolded plastic jobs... I did.

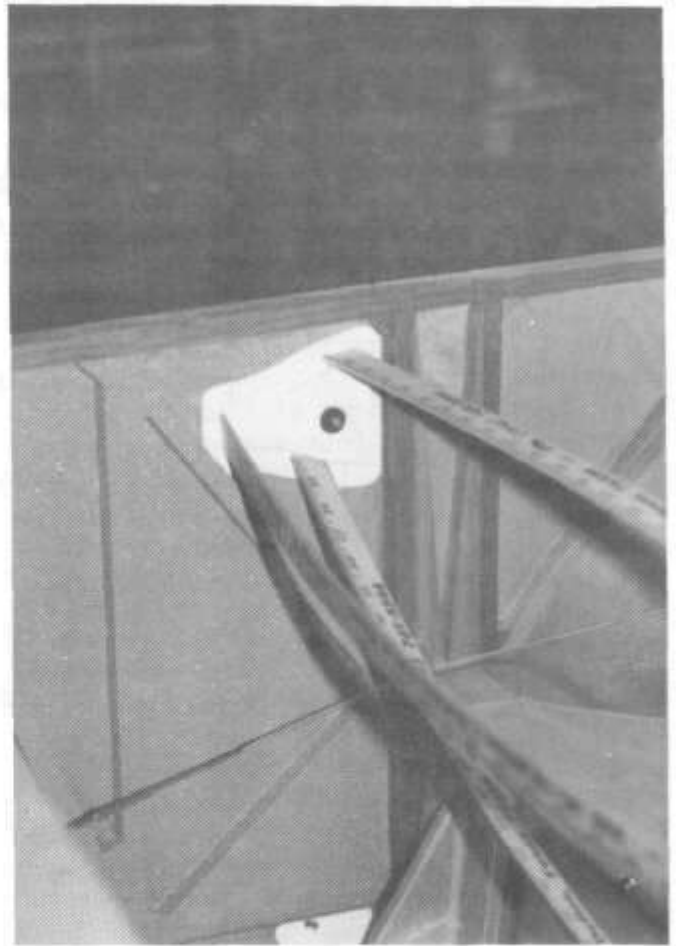
Installation is pretty simple, but a few tips won't hurt. The photo will answer most questions.

Throw away the supplied cut-out template and use the inlet to make your own accurate guide. Allow a bit of extra space as the scoop has some corner fillets. Scuff sand the mounting flange and bond in place using the high tech clamps shown in the photo.

After the epoxy cures, you'll notice that the inlet flange isn't quite flush with the slightly curved fuselage skin. Simple fix... crank open the vent door, slip in a trimmed-to-fit piece of waxed paper and slam shut. This will protect the vent door as you sand smooth the bondo. I can hear the screams already! Use the dynalite brand with microballoons and console yourself with the fact that most all will be sanded away along with just a bit of the plastic scoop that protrudes above the fuselage skin. That's it, boys and girls.

On the interior, consider adding a plywood ramp to redirect the airflow past a fuselage upright. Nothing exotic, 1/64" ply is fine and this addition will further quieten the airflow.

Now be cool in your KR, or crank it shut and warm up last night's pizza as you taxi to the active.



SAFETY NOTE: Be cautious of vent locations in the dash one series with stub exhaust plumbing. Drawing carbon monoxide into the cockpit could ruin your day.

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871 res. 387-5613 rec.

ENGINE TIPS

The following appeared in Steve Bennett's QUARTERLY publication.

VAPOR LOCK: Gene Darst wrote and said that he heard of builders having vapor lock problems using both 100LL avgas and regular. A simple solution to get rid of gas bubbles in the gascolator is to install an 1/8" line in the top port of the gascolator where the primer line goes. Vent this line to the top of the gas tank (inside the tank) so that the air bubbles can escape. It also can help to shroud the gascolator and direct a 1" O.D. tube of air to the gascolator to keep the gas cool.

SAFETY NOTE ON GASCOLATORS: Most gascolators have a large thumb screw on the bottom of them to keep tension on the bowl. Some gascolators do not have a small (1/16") hole drilled through the thumb screw so that it can be wired to the bowl bracket on the gascolator. If your gascolator is this type, make sure that your thumb is screw held in position with safety wire.

OIL TEMPERATURE: The only two means of cooling your engine other than lots of unburnt gasoline, are the effective uses of air and oil. The correct oil temperature is critical to the longevity of your engine. Almost any VW engine installation in a KR needs an oil cooler. Your engine oil temperature should run 180 to 190 degrees F. Your oil needs to run at this temperature so the unburnt gases and water in the oil can be dispersed of. Oddly enough, running too low of an oil temperature can actually harm your engine, just as running too high of an oil temperature can ruin your engine also. The function of oil is to lubricate and cool. It cannot do its job properly if it is not used within the constraints that it was designed to operate in. I heard a designer say that you should take the oil temperature from the coolest spot to be found on the engine case. I disagree with this statement. We are primarily interested in the high temperature number. For this reason, Great Plains recommends

that the oil temperature be taken from either the right or left side of the engine case, in the oil sump and as close to the rear as possible. You will note that there is a large circle on most engine cases on the side of the oil sump at the rear. Drill and tap this circle for 1/8" pipe thread. If your engine is already assembled, you can still put the oil temp sender in a good location. Most engine cases that are being used (Type I or III Universal) have a block off plate on the lower left hand corner on the front of the oil sump. This location is used to attach a dip stick to on VW busses

Remove the cover plate and drill and tap it for 1/8" pipe fitting or your sender size. Your oil temperature sender must be in a dead air space. Cool air blowing over it will result in a false reading. On Sonerais, you will notice that most of them take their oil temperature from the oil drain plate and that they are blowing cool air over it. Several Sonerai owners claimed to only be running oil temps of 160 to 180 degrees F and they were not running an oil cooler. Their temp sender is located on the bottom oil sump plate. To prove my point, we recently sold an engine to a Sonerai builder that had shelled an engine out. With the oil temp sender in the new location and oil cooler installed, the engine runs at 188 F. One can add approximately 60 to 80 degrees to the indicated oil temperature if they are taking it off the oil sump plate and have cool air blowing over it. You can readily see that if your oil temperature shows even 170 F, that your engine can be running at 230 to 250 degrees.

Bear in mind that for every 10 degree increase in temperature over 210 degrees, your oil life is cut in half. 220 F = 12.5 hours; 230 F = 6.25 hours; 240 F = 3.13 hours; 250 F = 1.57 hours. If you're still a doubter, I'll be happy to send you several bearings that came out of a less than 100 hour engine that operated at a presumed oil temp of 170 F... NOUGH SAID ABOUT OIL TEMPS!!!!



OVERSHOOT? BRAKES BAD? OVERGROSS?
 Td1-5 UTTL FPCKEP5IZE FUME
 DEPLOY SAVER AMP GREASE ON IN. ORDER NOW!
29⁹⁵ BIG EARL'S AERO 39⁹⁵
 MUNI AIRPORT. SHEEP

EDITOR'S NOTE: THIS AD WAS SUBMITTED ANONYMOUSLY BY SOMEONE WITH THE SAME ZIP CODE AS MONTE MILLER. I DON'T KNOW ABOUT YOU, BUT I COULD USE THE ECONOMY 1000' MODEL.

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$15.00 PER YEAR- U.S., \$20.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS.

NON-COMMERCIAL ADVERTISING FREE TO SUBSCRIBERS [INCLUDING PHOTO]. INCLUSION OF ADS SUBJECT TO AVAILABILITY OF SPACE. SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$75.00. INDIVIDUAL COPIES \$1.25 EACH.

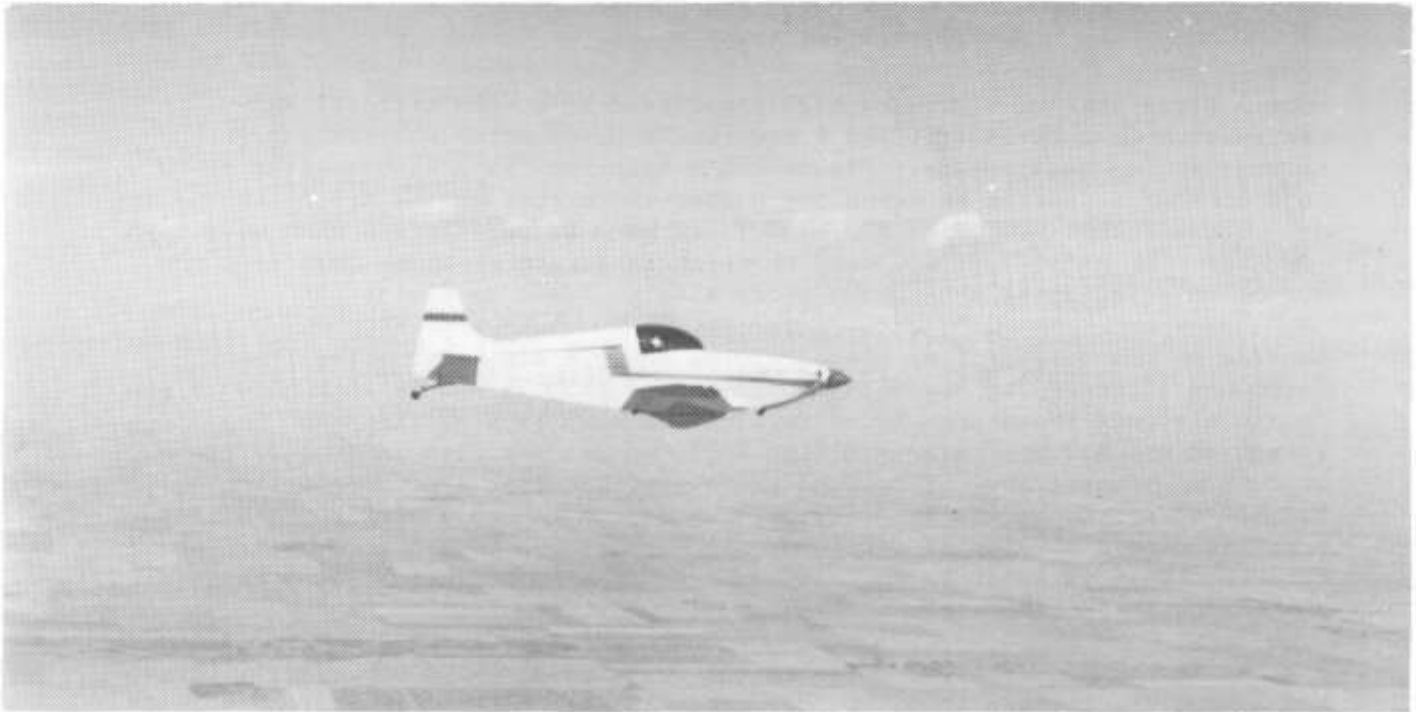
KR NEWSLETTER
 P.O. BOX 579
 LAKEVILLE, MINNESOTA 55044
 ISSUE NO. 149, OCTOBER, 1989

FIRST CLASS
 U.S. POSTAGE
 PAID
 LAKEVILLE
 PERMIT NO. 413





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



ROGER HANSEN'S KR-2, N200RH (PHOTOGRAPHED BEFORE MODIFICATIONS)

Here's the article I promised on Roger Hansen's modified KR-2.

When the above photo was taken in 1987, Roger's KR was powered by a VW. Since then, it has been extremely modified to accept a Continental 0-200.

A WORD OF CAUTION: RAND ROBINSON ENGINEERING CATEGORICALLY OPPOSES THE USE OF A CONTINENTAL 0-200 ENGINE IN STOCK KR-1 OR KR-2 AIRCRAFT. THEY HAVE STATED THAT STOCK KR-1 AND KR-2 AIRCRAFT ARE NOT DESIGNED TO HANDLE THE ADDITIONAL HORSEPOWER AND WEIGHT OF A CONTINENTAL 0-200 ENGINE.

Again, Roger's plane is not a stock KR-2. It has been extensively modified in order to handle the 0-200 and is officially listed by the FAA as a "modified" KR-2.

Okay, fasten your seatbelts... his story begins on page 2.

(Cont'd page 2)

Dear Earl,

Here is some information I promised you. I think it will be of interest to you readers and I trust they will receive some benefit from my experience. I have been very fortunate at the air shows I have attended and the judges have been kind to me. The award I am most proud of is the "Lindy" I received at Oshkosh 87. The award was for outstanding workmanship and to my knowledge, no other KR has received that top category of recognition. I guess what I am saying is that I do not like doing things second rate...probably why I have been working on mine for 10 years.

THE QUEST FOR HORSEPOWER
by Roger Hansen

When I first started flying my highly modified KR-2 (the official FAA designation is a KR-2M) in 1985 I new the VW based motor was not enough horsepower for my airplane. Please don't take this as a condemnation of VW's, it's more of a caution to watch the number and extent of the modifications you do. BECAUSE THEY COST TIME AND WEIGHT and more WEIGHT!!! The more weight you add, the more horsepower you need to maintain a rate of climb that does not border on stimulating a coronary every time you want to fly!

Because of the weight of my plane <830lbs empty - due to it being longer, wider and 3' more wing span) the turbocharged 1835 VW had to work hard to get to any altitude above sage brush level. Mow keep in mind that the VW I assembled was not your standard 60hp HAPI, it was modified internally to produce an honest 75hp. I twisted an "almost constant speed" propeller that had 52" of pitch and was 54" long. Throw 36" of manifold pressure and that prop would turn 3500rpm at altitude...it was getting to altitude that took forever. What my point is in this scenario is that you need copious amounts of horsepower to make a plane climb decent.

I won't bother you on why I selected the Continental O-200 but overall weight and dimensions entered into it. However, the real bottom line on why I chose the O-200 was I bought it CHEAP!

In my opinion most O-200 installations have a cowling that is not as aesthetically pleasing as would be possible with a few modifications to the engine (here we go with the changes again). The main problem with streamlining the O-200 is the location of the carburetor, oil tank and vacuum pump. I told myself these changes will be "a piece of cake". The major changes were to: 1. make a new oil tank 2. remove the wet vacuum pump and relocate it and at the same time drive it with a v-belt off the front of the crankshaft 3. move the carburetor to the intake side of the turbocharger...well I don't know about the piece of cake, but I finally did complete the changes. Besides those changes, I also added a remote mounted oil cooler; full flow oil filter; replaced the 20amp DC generator with a 45amp Nippondenso alternator (saving 3 pounds in the process); and fabricated a motor mount, intake and exhaust system. This whole process took about three months. And I thought I was on the down hill run toward completing the conversion...NOT EVEN CLOSE!

When I did the original cowling, I built it according to Rand's procedure. This worked ok, but it resulted in a very heavy cowling due to the amount of fill required to obtain that smooth molded finish. This time I decided to do it right, that is, make a plug first, pull a mold off the plug, then use the mold to make the actual part (a side benefit to this process is the ability to make additional parts). This process takes longer than Rand's "build it on

the airplane" routine, but it definitely is the way to go if you want to make more than one or save a lot of WEIGHT! Since I destroyed the lower half of the original cowling, (I was going to do a quick add on here and add on there deal) I can't tell you the actual amount of weight saved, but I do know that the new cowling, which is 6" longer, weighs less than just the top of the old cowling. Part of this weight savings is due to the use of Kevlar. This brilliant idea to make molds added 5+ months to the conversion process.

The delay was partially attributable to the destruction of the first plug when I didn't use enough hardener in the first layer of polyester laminating resin. Oh how much fun it is to lay on ones back sanding on the bottom of the cowl plug with bondo dust going everywhere. It's a wonder that my wife let me in the house to take a shower! Enough said about sanding bondo other than you hope that you never hear the word again!!!

During the shaping process, you want to complete one side exactly how you want the cowling to look. Then you make patterns or templates along with grid lines to enable you to duplicate the same shape on the other side. This is where patience and effort pays off, because this is a "WYSIWYG" (pronounced wizz-e-wig> system. A what??? Wysiyg...what you see is what you get!

After contouring the plug to the shape desired, I sprayed a catalyzed hard surface polyester resin manufactured by Ramanel. Sanded that some more (boy do I love sanding and if you believe that, I want to talk to you about purchasing my BD-5D production number)! This sanding process is done with finer and finer wet sand paper. The last grit I use is 600 followed by a generous buffing with machine compound. Since we're all done sanding at this time, we don't want the elbows and arms to grow flabby, so let's wax the plug about six times with mold release wax. You do this to help prevent the mold from gluing itself to the plug when you lay up the mold. In addition to the wax, you spray on a release agent known as PVA (poly vinyl alcohol). This stuff works great as resins do not affect it, however, it washes off with water.

Now if you thought the upside down bondo sanding was fun, wait till you start laying up fiberglass on the bottom side of the cowl! Resin runs down your arm, laminates you shirt to your armpit, and provides you with a permanent New Wave hairdo. Before you begin laminating the mold, it is necessary to build fences where you want the cowling to separate. These also provide a flange on the mold if you chose to vacuum bag the actual parts. Spray on gel coat and allow to set, otherwise you will make a big mess and wished you had waited until the damn stuff had cured. Doesn't that sound like the voice of experience? Next, cut your glass to fit the area you can effectively work with one hand full of sticky resin, the other with a sticky paint brush, your glued armpit...well I think you get the picture! After you have laminated about six layers of glass cloth and matt, clean yourself and the brush in acetone, then go in the house and have a beer...you've earned it!

Let the mold cure for a couple of days before you decide to remove it. Since polyester resins shrinks, you will want it to shrink to the shape you worked so hard to get in the first place, but more importantly, the final part will fit! Now your almost home free, pull the mold, clean it up, wax it, spray PVA and you are ready to make parts. Laying up the actual parts is almost anticlimactic after the trials and tribulations of the proceeding 5- months.

I still have a few more things to finish and hopefully the plane will be back in the air by March. By the way, that IS March 1989... enjoy the pictures, and I trust you now have an insight into modifying, IT REALLY IS A LOT OF WORK!



1. THE ENGINE AND WHAT NEEDS TO BE COWLED.

NOTE TURBO AND OIL COOLER.



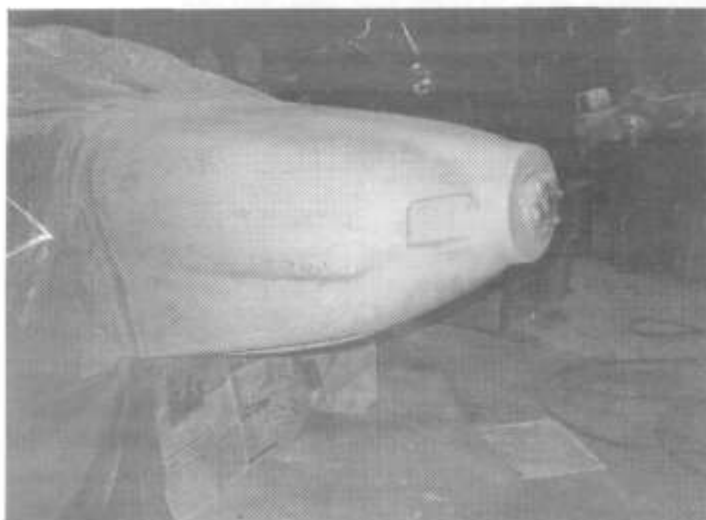
2. THE DISASTER! THIS IS WHAT WAS LEFT OF THE PLUG AFTER REMOVING THE IMPROPERLY CATALYZED RESIN AND GLASS.



3. ADDING BONDO TO BRING THE SURFACE UP TO CONTOUR.



4. AFTER COVERING THE ENTIRE PLUG IN BONDO, CHECK WITH TEMPLATES TO INSURE IDENTICAL RIGHT AND LEFT SIDES.



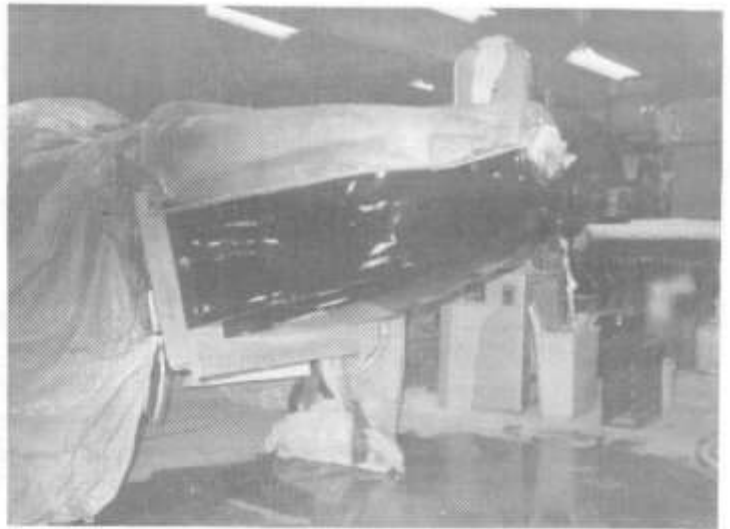
5. "FEATHER FILL" IS SPRAYED ON NEXT AND SANDED WITH 240 GRIT PAPER.



6. THE RAMANEL HARD SURFACE COATING AFTER SPRAYING.



7. AFTER WET SANDING AND MACHINE BUFFING, YOU WAX AND WAX AND WAX.



8. THE UPPER MOLD IS DONE AND IN PLACE TO LAY UP THE LOWER MOLD.



9. HERE ARE THE THREE STEPS IN MOLD MAKING. FROM LEFT TO RIGHT, THE PLUG, THE MOLD AND THE PART.



10. HERE IS THE FINAL PRODUCT TEMPORARILY TAPED TOGETHER



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD OSHKOSH WI 54903-3086
PHONE 414/426-4800

Well I thought that would be the end of the article as I originally wrote it for the Western KR Group. Most of us know what our strengths and weaknesses are....well, time estimation is certainly not my best to say the least!!! It is now the middle of April and the engine conversion is nearly completed, the only thing remaining is to finish welding the cabin heat muff and install the rubber baffling material along with painting.

However, along the way I made the decision to convert from retractable to fixed gear. The set up in my plane worked extremely well and is similar in concept to what Rex Taylor sells. (I can offer a few suggestions to "fix" Rex's plans since the inherent geometry in the landing process will cause his locking pins to bend. I'll bet Don Lott could have used this information. > Changing the gear became a necessity when I installed the Great American prop and found that I only had 1" of ground clearance when the plane was in a level attitude....just imagine if I bounced it in! Well, at \$535 a prop, I was not willing to gamble that I would always make perfect 3 point landings! That is another point I would like to mention for those of you who have not flown your KR with retractable gear...the maximum angle of attack you can achieve, without a tail wheel first landing, does not permit a full stall landing; therefore you are still "flying" the KR when you first land.

Back to subject of the latest modifications... My airplane, as you noted in your April KR Newsletter, is extensively modified in both dimensions and construction technique. I will attempt to give you a "brief" (that word doesn't seem to be part of my vocabulary) description as to the major changes in my aircraft, which, as you mentioned, is registered as a KR-2M since the wood portion of the airplane is the only part that is similar in construction than a standard KR. Here is a list of the changes:

- o Fuselage extended 11" aft of the rear spar and 10" forward of the firewall.
- o The fuselage is also 1" wider in the cockpit at the upper longerons.
- o The entire fuselage is covered in fiberglass.
- o Center section lower spar cap has additional 1/4" added to spar cap.
- o Elevator statically balanced.
- o Wings and turtle deck constructed of Clark foam (same as used in Glassair and Wheeler Express).
- o All fiberglass is Rutan type "Bid and Uni" and resin system is RAE (THIS IS NOT SAFETY POXY).
- o The forward deck fuel tank is made from Kledgecell foam which is a closed cell foam that is fuel proof and structural.
- o The wings have an additional 18" of span on each panel (total of 3'), due to the type of construction used, there is no spar on the outer 18".
- o Each wing panel carries approximately 12 gallons of fuel. Total capacity is 38 gallons. The longest flight to date has been 5 hrs and 45 min and I burned 26 gallons. (That flight was between Worthington, Minnesota and Ogden, Utah. Sure wished I had bottle on that flight).
- o The cowling is made of Kevlar. (Light, but not worth the hassle).
- o The aircraft has an IFR panel along with engine driven vacuum pump. This feature may be of interest to some of you as it is BELT driven.

There are many more "minor" changes which I can explain when I get a chance to meet with you all at a later date.

Roger Hansen
2517 Aranda Dr.
San Ramon, CA 94583
415-830-1842

WARNING ON USING EPOXY TO BOND POLYESTER!

The August issue of the KR Newsletter had an article describing the assembly of a Rand premolded polyester fuel tank. There were many good points but I would like to point out that using epoxy to bond polyester parts may not be a good idea. My concern is based on two articles published in Sport Aviation. Both were written by Mr. Peter Van Dine who operates a boat building company and has extensive experience in composites. In the March, 1980 issue he describes his composite amphibian design (the Merganser) and specifically warns against using epoxy in a bond to polyester. He repeated this warning almost word for word in his April, 1986 article on advanced composites. His main points are:

1. A joint using epoxy bonding to cured polyester will fail within a year even if the joint originally tested very well. The failure is a clean delamination often with little or no load.
2. Surprisingly enough, bonding polyester to epoxy does work well.
3. The best policy (and common sense) is to use a single resin or resin type throughout the whole structure. If this is not possible, there are things like urethanes which stick to just about anything.

Please read the articles yourself because I am not quoting Mr. Van Dine exactly or fully and there is a wealth of other information in them. I hope this little note will save someone from having a fuel leak down the line.

Melvin Levine
330 E. 79th St.
New York, NY 10021
212-288-9155

FOR SALE

Fixed landing gear for KR-2 and set of Goodyear 5.00-5" wheels and axles. The gear has no work or drilling done to it and the wheels have been cleaned and gone over. New clips, pucks, etc. A good combination and plenty of brakes. Price for both \$600 or sell separately.

Merrit Crabtree
184 Aladdin Rd.
Colville, WA 99114
509-684-5970

KR GATHERING 1989 VIDEO

See the KR's fly... hear the builders talk about flight testing, building tips, fixed gear, tri-gear, engines and more. Update from Rand Robinson. 120 minutes. \$19.95. 1988 video also available, \$19.95.

J. Koziarski
4920 Bales Rd.
Toledo, OH 43613

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
NON-COMMERCIAL ADVERTISING FREE TO
SUBSCRIBERS [INCLUDING PHOTO]. INCLUSION
OF ADS SUBJECT TO AVAILABILITY OF SPACE.
SET OF ALL AVAILABLE BACK ISSUES (OVER
100) FOR \$75.00.
INDIVIDUAL COPIES \$1.25 EACH.

FOR SALE KR-2 PARTS

J

Most parts Rand Robinson 1978-81. Built the boat to perfect specs, spars-rear and have wood cut to specs for forward spars for assembly. Horizontal stab is assembled. Have all spruce for completion and Diehl wing skins.

1835cc built and assembled by a professional Porsche shop. Except for a HAPI 69 crank 3 degree tapered and a used special heavy duty case - no line boring, everything is new. All accessories, new. 4216 mag, Diehl accessory case (no starter), HAPI performance exhaust system, HAPI super carb POSA with mixture control, Great Plains intake, HAPI carb heat and cabin heat, engine mount, Revmaster with Lord Shocks.

All Rand pulleys and cables, including pushrod stick control assembly. Do not have surface control assemblies. Have wing attach assemblies completed for all forward spars and rear spars except for rear bent attaches.

Rand fiberglass (have old Dynel), have Westech engine instruments and most flight instruments new in boxes. There are numerous other items new.

Will price substantially below current prices if sold whole, or at my cost by item (78-81 prices). I am compiling a list and will mail to builders who inquire with SASA.

Sky Stemporosky
24653 Hill
Warren, MI 48091
313-758-0125

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 150, NOVEMBER, 1989

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413



KR NEWSLETTER

ISSUE NO. 151
DECEMBER 1989



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



SPARKY SPARKS. ELDON RUMBAUGH, JEANNETTE RAND, HERB BULL, KEN COTTLE

1989 KR GATHERING, COVINGTON. TENNESSEE

The fifth annual KR Gathering was held in Covington, Tennessee on October 7, 8, 1989. This year's event hosted nine airplanes and approximately 130 KR enthusiasts. The activities included talks from the pilots who flew in, flying throughout the day, a workshop on Composite Construction and a much appreciated visit from Jeannette Rand.

The Gathering began Saturday morning with pilots making their way through a variety of good and bad weather. Participants registered and had the opportunity to purchase a souvenir T-Shirt. Dan Diehl had the T-Shirts with a KR logo and brought them to the Gathering. KR pilots who flew in received one free.

Wicks Aircraft sponsored the Composite Workshop conducted by Griff Pickett and Bud Meyers. Griff Pickett is a KR Builder and Bud Meyer is from Wicks Aircraft. Griff began with a short talk on the techniques of foam and fiberglass construction, then helped each of the participants construct a small wing by using many of the fiberglass techniques necessary to build a KR. A number of participants got their first experience working with fiberglass during this workshop. Everyone appreciated the time and expertise Griff and Bud added to the new and experienced builders skills.

The nine pilots who flew to the Gathering were Steve Alderman, Bill Berg, Herb Bull, Al Campbell, Ken Cottle, Dan Diehl, Martin Roberts, Eldon Rumbaugh and Sparky Sparks. Each spoke to the participants and answered questions about their planes. Many of the pilots gave rides to builders making this trip the highlight of their year. Steve Alderman once again showed us that the KR is capable of mild aerobatics with several demonstrations during the day.

Later Saturday afternoon, Bud Meyers spoke to the group about Wicks Aircraft Supply Company and their desire to help all of the builders with their building needs. Bud announced their new computer system which will allow for faster processing of orders and better tracking. He also announced his retirement earlier this year and the appointment of Jerome Hediger as the new manager. Bud stated, "Jerome wanted to continue and improve the great service that Wicks has consistently provided to the KR builders and pilots."

Perhaps one of the most exciting events of the weekend was the visit by Jeannette and Vicki Rand. They arrived Friday and provided many builders the first opportunity to meet Jeannette in person. Jeannette spoke to us about her new products such as the fixed gear, wheel pants, and of course the KR-100. It was truly an honor to have Jeannette join us for this weekend.

The afternoon concluded with a talk from Steve Bennett, Great Plains Aircraft. Steve talked about his new TOP BUG engine and the performance difference it would make in the KR aircraft. He also went over the installation of this engine using Dan Diehl's, N4DD. Dan has been flying this engine since late July and showed it previously at Oshkosh. Steve also answered many questions about engines, installations, octane and compression ratios. Once again he demonstrated why an engine from Great Plains Aircraft is so reliable.

Chuck Grammer did a great job with the facilities and arranging for a wonderful Awards Banquet. This year it was held at the Veranda with a family style buffet featuring southern cooking for approximately 70 attendees. After the banquet, Jeannette assisted in presenting the following awards. The recipients were given plaques.

Best KR-1	Ken Cottle, Columbia, MO
Best KR-2	Eldon Rumbaugh, Junction City, KS
Best Engine Installation.....	Herb Bull, Deerfield, IL
Longest Distance Flown.....	Sparky Sparks, Santee, CA

Bud Meyers also presented three attendance awards. Ken Cottle received a Altimeter Clock, Elmer Johnson received a Gift Certificate and Ralph Van Scoyk received a "Speed" Screwdriver. Congratulations to all of those receiving the plaques and attendance prizes.

Sunday brought more good weather, flying and discussions among builders and pilots. Unfortunately, every good thing comes to an end and as the day wore on, more and more pilots and builders had to leave.

In order to put on a quality event, it helps a great deal to have financial resources. Thanks to Earl Teporten for donating funds from video sales of last year's event. Thanks also, to Steve Bennett who forwarded funds from this year's Oshkosh KR Dinner. After the 1989 Gathering was concluded, a balance of \$134.25 was left to pass on to Keith James for the 1990 Gathering. I would like to thank everyone who has



KEN COTTLE WITH "BEST KR-1"



ELDON RUMBAUGH WITH "BEST KR-2"



SPARKY SPARKS "LONGEST DISTANCE FLOWN"



HERB BULL "BEST ENGINE INSTALLATION"

helped with the Gathering and wish Keith the best of luck in planning next year's event.

Keith James from Tulsa has volunteered to plan next year's KR Gathering. After talking to Keith in late October, I have found that he has located an excellent lake site in Kentucky with cottages and campsites available. In addition, it has a pool, a cruise boat that runs during the day, golf course and the lake with swimming, boating and fishing. This will be an event for the entire family, so you should make your arrangements immediately in order to ensure you will be able to stay at the site. Now that we have your interest, next year's Gathering will be held September 28, 29 and 30 at:

Rough River State Park
Falls of Rough, Kentucky
Coordinates: N37-36.6, W086-30.4
St. Louis Sectional
2500' x 75' Asphalt Runway
For Reservations call 1-800-325-1713

See you next year,

Jim Faughn
5615 Botanical
St. Louis, MO 63110
314-647-4012



DAN DIEHL



STEVE ALDERMAN'S KR-2



AL CAMPBELL



BILL BERG



MARTIN ROBERTS

KR GATHERING 1989 VIDEO

See the KR's fly... hear the builders talk about flight testing, building tips, fixed gear, tri-gear, engines and more. Update from Rand Robinson. 120 minutes. \$19.95. 1988 video also available, \$19.95.

J. Koziarski
4920 Bales Rd.
Toledo, OH 43613

WANTED

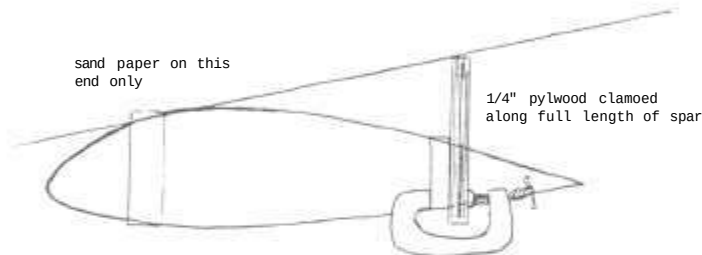
"Firewall forward" equipment, accessories- in particular a good 1835cc ML. Call: J. Woodward, 126 E. Drive, Hendersonville, TN 37075

SHAPING WING SPARS

I wanted my spars to be perfectly shaped at the point of contact with the wing skins. I came up with this system which is cheap, easy and very accurate.

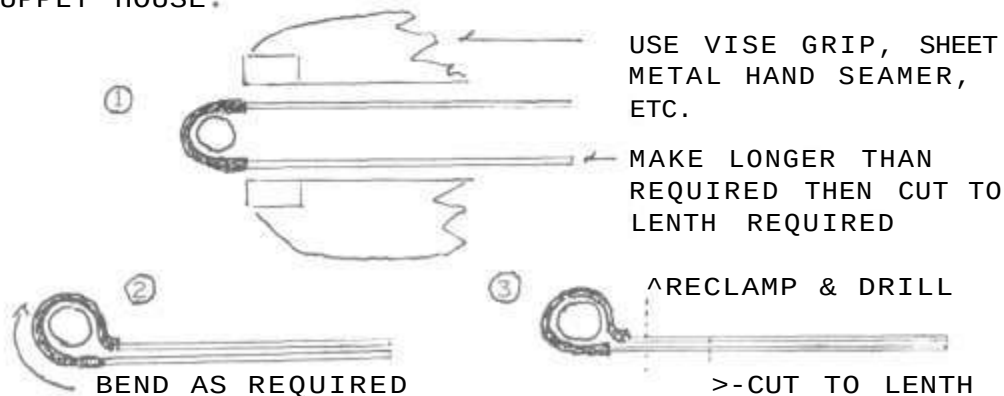
I took a straight board about 3" by 3' and put sandpaper on only one end. I aligned the sanding board with the inboard rib so that it was in position to form a tangent at the location of the main spar. I then clamped a straight piece of 3/4" plywood to the rear spar at the exact height to support my sanding board in the position to maintain a tangent at the spar. Then I moved to the outboard rib and again found the correct position for the sanding board to form a tangent with the rib at the main spar. Then support the opposite end of the sanding board by positioning the plywood at the proper height and clamping it to the rear spar. Since the wing being built is securely jugged in place including the proper twist for incidence, I could then sand the main spar using the sanding board at the perfect angle transitioning throughout the length of the wing. As the spar cap begins to take the proper shape, the sanding board will contact the full width of the spar touching the inner edge last. To keep track of progress and not to oversand below the desired shape, I sprayed a light coat of red paint on the spar cap. As I sanded, the paint was taken off. Just as the last of the paint disappears on the inside edge of the spar, you stop. If your spar was straight before starting, you will now have a perfectly shaped spar cap. Simply reverse the process for the rear spar.

Jack Messer
1104 S. Mitchell
Cadillac, MI 49601



CABLE/TUBING CLAMPS

I MADE MY OWN CLAMPS INSTEAD OF USING HEAVIER MS HARDWARE. CUT LENGTH OF HEAT SHRINK TUBING & SLIP TO CENTER OF STRIP & HEAT SHRINK. FORM A LOOP OVER DRILL BIT OR OTHER DESIRED SIZE AND THE REST IS SELF EXPLANATORY. I USED 3/8 & 1/2" TUBING & SCRAPS OF ALCLAD (.02) I USED BLACK TUBING FROM LOCAL ELECTRONIC SUPPLY HOUSE.



JAMES TAKEMOTO 4633 E. COLFAX AVE. DENVER, CO 80220

ENGINE MODIFICATIONS

My engine started out as a stock Revmaster 2100. I had completed firewall forward installation enough to permit some static operation of the engine. Also, I had read enough about this engine to be suspicious about the crankshaft. It was my intention to get the engine accessories (carb, starter, charging system, exhaust) all dialed in with some ground operation, then tear the engine down for a detailed inspection prior to flight testing.

During this early test period, I was fortunate enough to be invited to a local Dragonfly Club meeting. Their guest speaker was a local VW speed shop owner with a lifetime of experience on these engines. I was extremely impressed with his knowledge of the strength and weakness of this engine. I had decided that I would enlist his aid in overhauling my engine prior to first flight. The following describes the improvements/alterations made to my engine:

1. Cleaned up the inside of the intake manifold to remove weld splatter and provide a better match to the intake ports.
2. Cleaned up intake ports and enlarged exhaust ports for improved fuel flow.
3. Replaced cast iron crankshaft with forged SCAT crankshaft for obvious reasons.
4. Replaced all bearings. (The original bearings had been scored by crud in the oil galleries.)
5. Replaced pressed oil gallery plugs with threaded plugs.
6. Micro balanced connecting rods (+/- 0.5g) then stress relieved them (bead blast).
7. Machined pistons for matched deck height (and compression ratio equalization).
8. Micro balanced pistons (+/- 0.5g).
9. Installed Teflon wrist pin retainers.
10. Machined heads (combustion chambers) to reduce the compression ratio to 8:1.
11. Incorporated high volume oil pump, remote full filtration, and top mount oil cooler.
12. Strengthened engine case at top rear stud on cylinder #3. (This is a weak spot on large bore engines.)

Since I had ground run the engine prior to these modifications, I could evaluate the before and after performance on a limited bases. I noted the following:

1. Reduced compression allowed me to retain the small starter motor. (I had to hand prop the engine before.)
2. Reduced compression yielded lower head temperatures on certain cylinders. (I believe that the engine was detonating at even moderate power setting before compression was reduced and equalized.)
3. The engine runs noticeably smoother particularly at idle.
4. The horsepower lost from reduced compression was more than made up by induction and exhaust system clean-up and balancing. (Static full power run-up increased by 100 RPM.)

I am confident now that my engine will be a very reliable part of my airplane. The cost to have this work performed (\$900) was a small price to pay to get this feeling. I dealt with a firm which believes that my safety is paramount. No work was rushed; no corners were cut.

Anyone interested in further details is encouraged to contact either John Issacs at RaceKraft Engineering (602) 437-2382, or me.

Howard Kaiser (N39HK)
5205 W. Beryl Ave.
Glendale, AZ 85302
602-937-7556

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES (OVER
100) FOR \$75.00.
INDIVIDUAL COPIES \$1.25 EACH.



**EXPERIMENTAL
AIRCRAFT
ASSOCIATION**

WITTMAN AIRFIELD OSHKOSH WI 54901 J086
PHONE 414/426-4800

DICK DOUGAN'S KR-1 N186KR

Finally, after begging on bended knee, untold numbers of honey dos and fifteen hours of driving, I arrived at the Covington Airport at 7:30 a.m., Saturday, 10/7/89. I wasn't sure where to go until I spotted Dan Diehl's world famous N4DD "Old Blue". I finally got to see that one! It now has one of Steve Bennett's 2600cc engines and was running rings around everything there.

As I was walking around, I was joined by more KR people and soon was walking and talking KR. By the end of the gathering, I took away enough good information and feelings to last a year.

As I told you last year, it will fly this year...shows you how much I know. After an engine loss, long talks with Steve Bennett and a lot of hard work, I now have a stronger engine. The electrical system has been removed and the engine mounts lengthened by one inch. Weight is down to 240 lbs. empty and projected total gross is about 525 lbs.

The FAA inspectors say that my plane has deviated enough from the original specs that I will have to do a 4G load structure test on the wings. In other words, jack it up with supports at the wing tips and put a 1250 lbs. in the cockpit. The inspector pointed out that the standard KR length is 12'6" and mine is 14'7". The engine specifications for a KR-1 are 60 hp or less, mine is rated at 65 and according to them could go as high as 90 hp if I rev it up to 3200 rpm. Because of all the modifications, the title will list the plane as an "R. Dougan" KR-1, rather than a Rand Robinson.

As far as the CG figures, everything is running in the positive. The CG range is 62 to 70. The empty station is 63, pilot in aircraft 65.7, pilot in aircraft and fuel 64, empty 60.6. My gear falls at 58. In other words, if I don't put a weight in the cockpit after fueling the plane up and putting it in the hangar, I could come back the next day and find it on its nose.

I had an A/P mechanic over the other night and he informed me that I needed a water drain in my ASI line. He also told me that my aluminum tank cannot be "epoxied-in" due to the twisting and flexing of the fuselage. The epoxy does not flex and could crack if I pull a negative G during flight. This could

conceivably pop the tank right out of it's seat...and send it flying off into the wild blue yonder. Therefore, I'm installing mounting brackets for the tank.



CAUTION: By the way, I'd like to warn people about a situation that developed with my aluminum fuel tank. Do not use Randolph's 802 AV gas tank slosh sealer along with Permatex RTB, 26B or any of the other silicon sealers to do any sealing on an aluminum tank. Together they make a contaminate which may block the fuel system and it may not happen right away but over a period of time. I used that combination and my fuel tank is full of gunk.

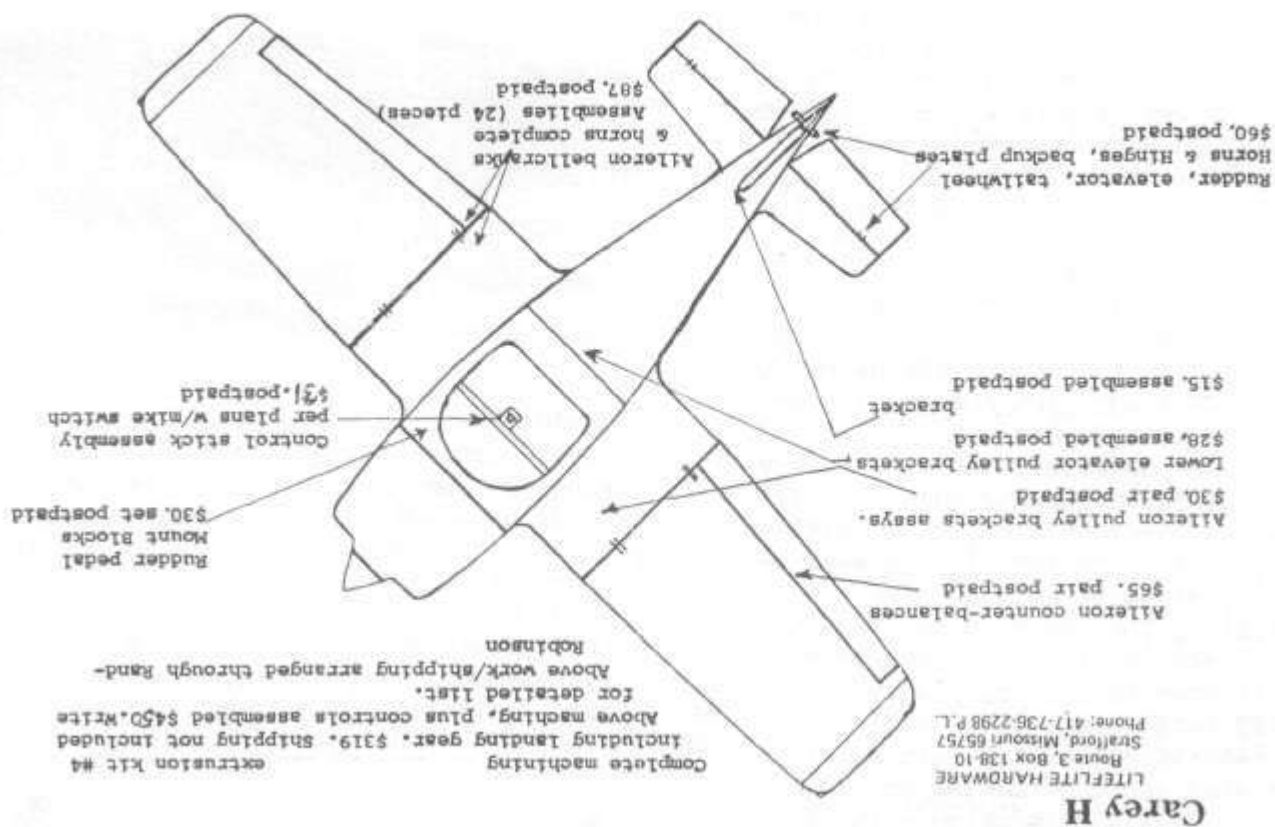
Dick Dougan
2317 Hedge
Pontiac, MI 48054

HAPPY HOLIDAYS!

A very special thanks to Jim Faughn, as well as, everyone who put together another fantastic gathering at Covington. The photos of the event were shot by Jim and J. Koziarski of Toledo, Ohio. I will be doing some features on the planes in up-coming issues.

Thanks to all of you for your support over the past year. To those of you who have taken the time and effort to share your ideas with all of us, a very special thank you.

Have a happy and safe holiday and wonderful New Year!



Carey H

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 151, DECEMBER, 1989

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413

*Season's
Greetings*



KR NEWSLETTER

ISSUE NO. 152

JANUARY 1990



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



STEVE HOWLETT'S KR-2, N7057V, FIRST FLIGHT REPORT

N7057V Built by Steve Hewlett, Riverton, UT, flown by Neil Bingham.

1835cc MAPI engine with hydraulic lifters (highly recommended), oil filter, oil cooler, POSA Supercarb, Warnke Almost Constant Speed Prop, MAPI mount.

Built to plans with flip-up wing tips. Retractable gear with Rex Taylor designed and built retract system (very positive), 540 pounds, weight and balance near perfect. Carries two very nicely at 170 MPH.

(Cont'd next page)

FIRST FLIGHT REPORT CONT'D

First flight June 19, 1989 by Neil Bingham. What follows is a letter that Neil sent to me after his first flight of my KR-2. His letter pretty well sums up his thinking and might be of interest to those who think Neil Bingham's views of the KR-2 in his article "Critical Analysis of the KR-2" (that appeared in the January, 1989 issue of the Newsletter) were a little harsh. He has respect for the KR-2 and he wants to fly mine everytime I see him. He always comes back with a twinkle in his eye and a large grin on his face... enough said.

Dear Steve,

I want to reiterate what I told you the other night, that you have created for yourself a very fine little flying machine. The flying characteristics are near perfect and you should take great pride in this fact, the first time out. Most builders don't come near that close. Some never make it because they didn't build accurately and with skill. You see these for sale in magazines with only three or four hours flying time or in a hangar collecting dust.

You have some little things to clean up, like the idle mixture, a little work on the brakes and some touches here and there that you are more aware of than I. But in net, you did a superb job.

I was particularly thrilled with three things: 1) The HAPI 1834 handles the aircraft extremely well, which proves that 60HP is adequate for a perfectly built KR. 2) The take-off and landing characteristics are very gentle and predictable. 3) The aircraft is so well behaved in the air that it will always be a genuine pleasure to fly. Everything else is ancillary to those three facts.

I've test flown other small homebuilts for builders and in at least one case do not wish to take the aircraft aloft again. The opposite is true of your KR, so I am offering to help you fly off the test program if you are interested. If not, I well understand. A man's homebuilt is a very private thing but the offer is there.

Thanks again for the privilege of sharing in your success. There are some great emotions in the world but none will ever match the emotion of taking one's creation up for the first time.

Neil Bingham



N7057V cost \$13,500 to build and with 60 hours on it now has proven to be a delightful flyer and problem free. The engine runs very cool (320 degrees) and the carb set-up (POSA) is near perfect. I own several planes and now that I have seen it through to completion, I am selling this beautiful plane for \$9,000.00. Call or write:

Steve Howlett
1734 W. 12600 South
Riverton, UT 84065
801-254-2784

STUB SECTION WING SKINS

I would like to make a contribution to our Newsletter by letting other builders out there know of a new product. It isn't advertised anywhere but it is available. Keith James, an employee of Dan Diehl (we all know Dan), is making wing "stub section" skins. The ones on my plane are the first ones produced but there have been three or four sets sold since.

They're made the same as Dan's wing skins (i.e. 6 oz. BID and 1/4" foam core, vacuum bag molded, etc.). The cost of a set of stub skins is \$300.00 plus shipping. Keith can be reached on any work day at Dan Diehl's composite shop (918) 299-4444 or 4445.

Oh, yeh! Just a thought... the heavier built upper skins, with a little bit of understructure, make great wing walks.

Mike Ladigo
6822 S. Toledo Ave.
Tulsa, OK 74136
918-495-3662

N49TW FLIGHT REPORT, BILL BERGE. BOW, KY

Early in July, I went to Bossier City, Louisiana to look at a mildly damaged KR-2, N49TW. I bought it and trucked it home here to Kentucky.



The landing gear had to be totally rebuilt. New castings, straightened the spring bar and installed all new bolts and modified the mechanical brakes to individual heel brakes. I had to install a new canopy, completely new instrument panel, all new wiring and repaired much skin damage at the wing center section and wing panels. The cowlings were also badly torn up and had to be rebuilt. The engine and crankshaft checked okay for run-out, and after I borrowed a prop and ran it up, it checked out ok.

Finally, I borrowed a big trailer and took it to the Tompkinsville, Kentucky Airport for taxi testing and flight.

Hey, slow taxi is easy! Onto the high-speed taxi with the tail up. Several runs later I'm happily tooling along with the tail-up (great visibility, huh?) and just automatically pick up a low left wing-pick up a wing on the ground? Hey, dummy! This thing is flying! Oh boy, decision time right now!

Since I had already let the plane get clean away from me, I decided I'd better set it down before I ran out of runway. It sat down like a feather and I'm congratulating myself and almost have it stopped when I see I'm at the edge of the runway so I got on my nice heel brakes and, OOPS!! My nice borrowed 52 inch propeller is a lot shorter and it feels a bit odd to be sitting there with the nose down, the tail way up in the air... ala Rutan.

The only damage was to the propeller, the lower cowlings and to my pride. The propeller owner is still speaking to me.

It was the cruise prop for his KR-2, Ralph Smith of Albany, Kentucky. He is a very tolerant feller.

I finished up my home brew prop and went at it again. After several more runs, I decided it couldn't be harder to fly it and land it than it was to tear around with the tail up and try to hold it on the ground. Okay, feed in the power gradually, ease it up and... WOW! This thing is in the air and climbing before I expect it. I was prepared for the twitchy pitch sensitivity and had no trouble at all... it is a real sweetheart in the air. Everything is fine except no airspeed indication at all... Great! Strange plane, first flight and no airspeed.

Oh well, go up and do some stalls, slow fly, feel it out a while and then go down and do a few approaches and see if you can feel your way down Bill! On the third pass everything felt right so I wheel-landed and eased the tail down and rolled out nicely. What a feeling! I didn't build the bird, but I put many many hours into the rebuilt and that first flight sure felt good.

My KR is rebuilt as a very comfortable, roomy single center seater. Now it has gobs of elbow room, lots of space for charts, thermos, headset and other gear and the visibility is wonderful. N49TW has a forward 19 gallon tank and no wing tanks so I'll have to really do something stupid to ever have a rear CG problem. Set up as it is for one person it's a dream to fly and more sensitive and responsive than I had expected.

I'm a self-taught tail-dragger pilot in spite of all I've read against this. I don't say it isn't good to get formal instruction if you can, but in my case it was a great distant factor (over 150 miles one way) plus the cost factor, so I elected to learn on my own. I didn't find the KR-2 as tough as I'd expected due to what I've heard about them, and I did do a lot of runway work. Personally, the actual landings and take-offs are easier for me than those high-speed taxi runs!

I'm planning to build a KR-1 1/2 and incorporate some of my own ideas and now I have a KR to fly and experiment with while I'm building one. It's like having my cake and eating it too!

Bill Berge
Shady Hollow Acres
703 Otter Creek Rd.
Bow, KY 42714

AIN'T SINGING DEM CANOPY BLUES NO MO!
BY MONTE MILLER, DENTON, TX

After hearing more than a few builders say that the canopy construction was the hardest part of their project, I had worked up a pretty good sized anxiety attack everytime I walked by that expensive chunk of plexiglas occupying space in my house. It had been sitting so long that it was getting dusted just like the furniture it was hiding behind. Well, lay your hands on the radio, brothers, cause the truth will set you to work.

Looking back, seems the fussy fellows all had non-stock canopies and frames. All had added complexity, cost, time and weight to their projects... not to mention a start on an ulcer. Deviate from the plans and you're asking for additional work.

Before the canopy frame goes on, the forward and aft decks must be complete as they determine final canopy frame trim cuts. Won't hurt to have the instrument panel blank in position along with anything else that might affect canopy function.

Trimming the canopy to fit the installed frame is pretty nerve wracking. Besides worrying about scratching and breaking, you have to trim to some pretty exact dimensions. Not enough and the plex won't lay in the frame joggle. Too much and you are in trouble. Hence, the anxiety, Fine, tell me something I don't already know, OK?

Well, the canopy can be trimmed, with less chance of error, prior to installing the frame onto the fuselage. Use string or duct tape to pull the bare canopy frame into the same width as it will be when installed. Doesn't have to be exact... for now, a one inch tolerance is close enough. Position the canopy bubble inside the frame and while holding it pressed against the frame, run a marker around the frame cutout. A trim cut can be marked parallel to the first mark and the excess cut away. When it's time to bond the canopy to the frame, you'll be hours ahead and you won't need the Roloids. Canopy sills can be neatly fabricated from the leftover spruce saved from cutting down the wing spars. It's 1/4 to 5/16 inches thick and just right. You do save that expensive lumber, don't you? Shape them to match the upper longerons less an amount equal to the thickness of the canopy frame. Also, bevel the outside edge of the sill to mate with the frame

for a better epoxy bond.

Fit and bolt the canopy hinge to the sill and longeron, checking for function. Position port sill and secure with small C-clamps. Add temporary weatherstripping to aft deck. This will help space canopy frame to proper finished position and avoiding damaging the completed assembly. Use epoxy-flox mixture to attach the frame to the sills. Don't forget to use waxed paper resists.

To save later hassles, complete the centering pin installation prior to blocking in the interior cockpit foam. This eliminates repairing your just-glassed rails and provides better drill access.

The interior foam and glass work goes smoothly and adds considerable rigidity to the frame although you'll develop a backache while stretching over the wing stub to complete this chore. The manual calls for an aft stiffener of one inch foam three inches deep. To save some headroom and eliminate this big "rainbow", shape the stiffener to the dimension of the turtleneck flange by two to three inches deep. Round the exposed edge and use the resin-flox technique on the corner adjacent the deck flange. This work must be done in two steps, per the manual, to insure proper curing of the frame in its final position.

Final detail work should be completed prior to bonding the canopy bubble. Latches, locks, supports, whatever... take care of these details now.

The previously trimmed canopy can now be fine-tuned for its fit within the frame joggle. As the resin will not adhere properly to the gelcoat surface, it's critical to thoroughly scuff sand these parts prior to glassing. Removing the thick gelcoat and exposing the fiberglass substrate insures a good bond and aids in fairing the bonding tapes into the airframe.

Attach the canopy with epoxy-flox, secure with lots of duct tape and allow to cure. Follow-up with the fiberglass tapes as per the manual. Details... use a minimum of three layers of 1/4" "fineline" tape (body shop stuff) attached one inch from the canopy edge... this distance is per plans. Do a good job aligning and securing. Scuff sand the canopy and adjacent deck areas. Apply the fiberglass tapes being sure to butt against, not overlap the fineline tape. After full cure, remove only two tape layers and use a mill file to carefully smooth any small surface zits. Removing the last tape

strip will reward you with a beautiful, consistent trim line. Final sanding, filling and smoothing is a matter of your own patience... it's a drag but has to be done.

The completed canopy frame assembly is quite rigid, much different than the floppy original components. Take your time in shaping and fitting all the various parts within the assembly and there'll be no urge to add unnecessary beefing-up.

KR Guru Dan Diehl once said that he felt canopies comprise 90% of the work on an aircraft. Get through it and you've got only 10% to go. True or not, it's a nice feeling.

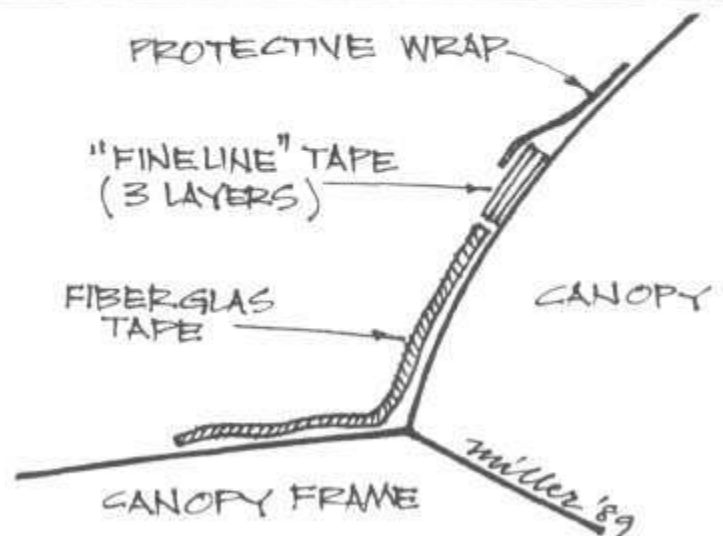
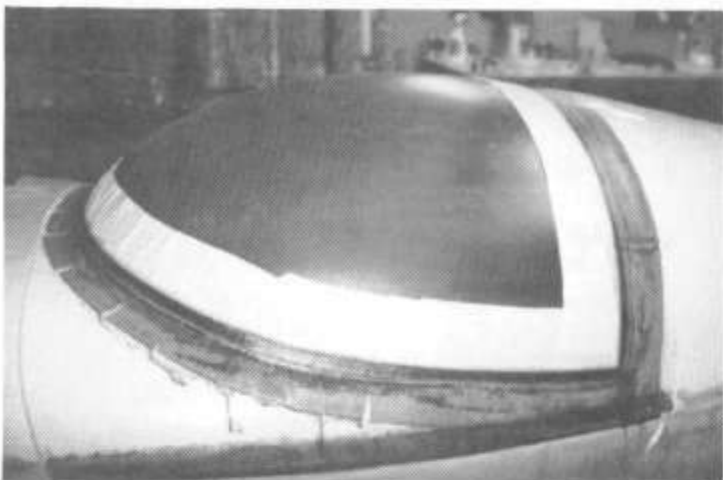
Somebody once asked the late Frank Lloyd Wright the secret of his architectural success. His response was the "God is in the details". Anyone can design a house, details separate the everyday from the great. So it goes with homebuilding.

Here's a detail touch for your project that costs only fifteen minutes of your time but will add to your enjoyment and life of your aircraft.

The cockpit canopy structure utilizes a cut-down 3/16" bolt as a centering pin. The pin mates to a hole drilled into the wooden longeron and aligns the canopy as it closes. This simple system works but the pin will soon pound dings in the longeron and this damage will contribute to the eventual enlargement of the locating hole. The beat-up hole will stare at you every time you open the canopy.

The fix is simple... do it before you damage the longeron. Use a dremel tool to cut a recess into which an AN960-10 washer will be epoxied. The washer should be flush with the longeron surface. Use a non-grease lubricant (similar to door-ease) on the centering pin to avoid locking down your canopy permanently as the epoxy cures.

Monte Miller
1900 Parkside
Denton, TX 76201



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN HIRSH 10 OSHKOSH WI 5490.) MS6
PHONE (414) 426-4800

**INQUIRING MINDS WANT TO KNOW!
PER MONTE MILLER**

Actual construction time spent on installation of premolded cockpit frame and canopy.

	HOURS
1. Trim & fit frame to fit between fwd deck and aft turtleneck	1.00
2. Fab. sill plates to fit frame & longeron contours	1.75
3. Install piano hinge & check operation	1.25
4. Bond canopy frame to sills & clamp for cure	.25
12 HOUR CURE	
5. Fab. & install canopy latch anchor plates	.75
6. Install centering pin & longeron protector	.50
7. Bond & shape foam for sills & aft stiffener	3.00
8. Fiberglass interior foam	1.00
24 HOUR CURE	
9. Remove frame, trim, flox & glass aft stiffener face	1.00
24 HOUR CURE	
10. Trim out & sand smooth	.50
11. Install canopy camloc latches & adjust	1.00
12. Prep work for canopy installation	1.00
13. Trim canopy to fit frame	3.00
14. Bond canopy to frame with epoxy-flox	.50
12 HOUR CURE	
15. Fiberglass tapes on exterior	1.00
24 HOUR CURE	
16. Smooth & complete interior bonds	1.25
24 HOUR CURE	
17. Contour & blend fiberglass tapes to fuselage	2.50
18. Time spent installing resists, cutting fiberglass fabric & mixing resins for project	1.75
TOTAL HOURS HANDS-ON CONSTRUCTION TIME	23.0
TOTAL CURE HOURS	120.0
TOTAL HOURS	143.0

P.S. Oust like advertiser's estimates on construction times, these times may not reflect "your" actual building times.

FROM DAVE SHIREY...

Thank you for the nice picture and mention in the October Newsletter. I feel very proud whenever my KR wins an award. It seems the KR's are passed over too often when awards are given out. I did feel justified in winning the award (at MERFI) two years in a row since in between I did extensive cockpit/instrument panel work.

Over the last winter, I brought my KR home and rebuilt the panel completely from side to side having to modify the gas tank to accomodate a new VAL 760 channel radio, a Narco 150 transponder, a Narco 850 encoder and an Apollo 604 TCA Loran.

After months of agonizing work trying to find an internal position for the antennas, I have finally given up and now have the antenna outside. I know that some builders have been able to make antennas work inside, and in fact my old home made welding rod antennas worked just fine inside, but these new broad band and Loran antennas would not work.

I hate the porcupine appearance, but all that equipment is no good if you can't send or receive signals. Installing the equipment was a lot of work but the real challenge for this non-computer type has been learning how to use the Loran. I will never be able to use all of it's talents but I must admit it is very handy. I removed the Omni completely and use the Loran exclusively and for the first time I feel I am flying straight line navigation. What I mean is the information the Loran supplies and the way it is presented automatically makes you follow a more precise course. Some friends had warned me that the ground speed readouts tend to make one humble and they were right.

Another interesting thing about my new panel... I removed a 90 channel tube radio with nav. head and antenna that weighted 11 1/2 pounds, all the new equipment with antenna weighed 12 pounds. Not a bad trade-off as far as weight. (Don't ask about time and money!)

I am sure everyone knows that the government lets us pursue this hobby because of self education and it is **very** educational. Recently I learned a new lesson. Unfortunately, it was another expensive and time consuming lesson. If anyone wondered why I didn't make Covington this year, it was because when I returned from MERFI and was putting the KR in the hangar, I was shocked to see oil pouring out of the cowling air inlet.



Upon removing the cowling, I saw that I had a crack in the right front side of the case about three or four inches long. It must have just happened as I was coming over downtown Detroit because there had been no indication at the time of landing at my base airport 20 miles north of Detroit. Needless to say, the plane is home again for the winter while I try to get a case reworked for a Revmaster 2100 set-up.

I have mentioned in the past that I was never thrilled with Revmaster, either with their workmanship or their service. This time I just don't know. Although a Q-2 pilot warned me that at 200 hours the case might crack and in fact my case went 190 hours, I still hesitate to blame anyone but myself and my general lack of respect for proper pre-heating, in flight cooling, over-revving and maybe not rechecking torque values properly.

I am curious though... has anyone ever had a 2100 case crack like this? The crack is on the right side front, below the distributor hole that we use to fill oil with. There is a threaded hole above the crack that my oil pressure line is fastened to.

I will let you know how all this turns out in the future. Thanks again!

Dave Shirey
8771 Springwood Way
Washington, MI 48094
313-781-8396

FOR SALE

KR-2 project approximately 75% done. On wheels with engine mount and rear deck installed including bungee elevator trim system. Premolded front deck, cowling, canopy, some instruments and aluminum fuel tank. Wings, ailerons and tail group ready for finish. Good workmanship. \$1,200.00. Revmaster 2100-D with oil cooler and rear mount alternator, never flown \$1,600.00. All for \$2,500.00 firm FOB Rimrock, Arizona. Call or write:

Al Ross
P.O. Box 474
Rimrock, AZ 86335
602-567-5527

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

**SET OF ALL AVAILABLE BACK ISSUES (OVER
100) FOR \$75.00.**
INDIVIDUAL COPIES \$1.25 EACH.

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 152, JANUARY, 1990

FOR SALE

KR-2 project, approximately 40-50% complete. Built 100% according to plans. On retract gear, brakes in, tail feathers complete, all aircraft hardware, stainless cable, rudder peddles, seat, outer spars done and lots of little things too numerous to list. Some supplies such as glue, resin, glass, foam, aluminum, etc. Plans, photographs of construction to-date, receipts, notes and Newsletters. Over three years of loving care and diligent work into this light airframe. I want to see this KR fly but loss of health and will to finish forces sale. I need the money for medical bills. I have just under \$2,000 into it, so any reasonable offer in this area and the promise to finish will get you this KR.

Andy Zigmantas
188 Copenhaver Ave. N.E.
Palm Bay, FL 32907
1-407-676-5058, morn, or late even.

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413



KR NEWSLETTER

ISSUE NO. 153
FEBRUARY 1990



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



ADRIAN CARTER AND HIS HOMEBUILT (Oh, in case you're wondering, his is the one in the foreground that's about to be swallowed by a Galaxy C2)

In 1974, I read in Mechanics Illustrated about a new homebuilt designed by Ken Rand. At that time I felt this was the aircraft I wanted to build, as having owned a VW bug, I was familiar with the engine. Then Jim Bede introduced the BD-5 which caused me to waiver as to the aircraft I really wanted to build. However, after a time, Bede was having problems acquiring and mating an appropriate engine and the price of his kits was increasing. My attention again turned to the KR, I liked the wood and composite construction. At the time I was flying the large factory spam cans around Canada, but I felt when I retired from flying, this would be an excellent project to keep my hand in aviation.

(Cont'd page 2)

In 1984, I started to build the engine. It was assembled according to Rex Taylor's book, "How To Build A Reliable Volks Aero Engine". Specifications and



ADRIAN'S KR-2, C-FAFY

suggestions were adamantly followed. The crankshaft, connecting rods and pistons were all balanced. The oil cooler adapter was milled down 1/2 inch to lower the cooler as I did not want to install it remotely. A HAPI prop hub was first installed, but because of the prop locking ring, it was replaced with a Great Plains hub. Since the HAPI hub has only a 1/8 inch locking ring, installation of a .090 spinner backplate leaves nothing to lock into the prop. The Great Plains hub from Steve Bennett has a 3/8 inch locking ring that locks into the prop nicely.

The engine has a single Slick magneto ignition and a Tillotson float bowl carburetor to a dual intake manifold. The left heat muff provides carb heat and the right muff cabin heat. A primer system is installed to the two rear cylinders.

Next came the fuselage in which all woodwork is glued with epoxy. The landing gear is a Charlie Wells modification, with positive pin locking on both sides. I find only a 3-4 mph decrease in speed with the gear extended. All composite parts are made from molds with vinylester resin. The fuselage is primed with sealer and painted with three coats of RM polyurethane, on the entire aircraft.

The elevator control is a pushrod to bellcrank mounted behind the aft wing spar with cable from the bellcrank to the elevators. Flaps are three position, extendable to 45 degrees. The vinylester resin fuel tank is made off a mold with baffles installed. Fuel capacity is 15.5 Imperial gallons of 100/130 fuel. All

aluminum and steel at the engine and in the fuselage is TIG welded.

The first prop I carved with 5 laminations of mahogany and birch, proved not to have enough pitch. The present prop is 12 laminations of eastern yellow birch (your yellow birch is very expensive in Alberta) in a Bernard Warnke almost constant speed configuration, with a greater blade chord and 52 inch diameter by 48 inch pitch.

Now comes the fun part, testing and flying. I ground tested the engine by running it at different rpm's to fine tune the carburetor. During three taxi runs with the wings off, it seemed like a real squirrely aircraft, however, after installing the wings, in two tail up taxi runs, it didn't seem too hard to handle.

On June 7, 1987, I contacted the control tower at the Calgary International Airport via telephone to advise them I was ready to fly my pride and joy on its maiden flight. My intention was to do a takeoff, an approach and overshoot if the temperatures and pressures were within limits. I taxied out and asked for takeoff clearance (no mag check because of single mag). The takeoff was as expected but the airspeed only showed 40 mph. The pitot and static systems had been checked the day before with a certified Pitot/Stat calibrator and checked out to specs.

Here I am, in a completely unfamiliar aircraft with no airspeed indication and only the tachometer to go by. I maintained 3000 rpm and completed the circuit. My approach and overshoot were at probably 100 mph. Temperatures and pressures were all in the green, and the engine was running perfectly. I widened the circuit to allow myself to settle down and get rid of the twitch that had developed in my legs, also giving me time to think about the airspeed problem. I came to the conclusion that since the pitot head was only 8 inches in front of the leading edge of the wing, the slipstream was separating ahead of it, "the pitot head was in dead air".

The flight had lasted for 45 minutes and now it was time to start thinking about getting on the ground. Our 16/34 runway is 12,600 feet long, somewhere along this runway I should be about to land my little dream. My airspeed over the threshold must have been 90-100 mph. I rounded out over the button of 34 and was still in ground effect as I passed the control tower, 6,000 feet from the button.

With a nervous chuckle as I passed the control tower, I knew I still had 6,000 feet of runway left; sooner or later my landing gear would make contact with the runway. When it did, things were a bit wild for a few short seconds, but settled into a good taxi speed. My first flight in my dream ship and a very hyper day were over.

Since then, I have relocated the pitot head to 4 inches under the wing with good results. The original industrial tires have been replaced with Lamb tires and tubes. A 3/8 inch wedge had been installed between the gear legs and the spring bar. The gear legs had a tendency to splay and made ground handling sometimes a little touchy.

There are now 150 hours on my KR-2 and I'm very happy with it. Negative reports of the KR-2 are unfounded and are probably due to high empty weight or poor C of G.

Primary radio is a STS7600VOR with a built-in antenna in the leading edge of the fin and an ATI50 transponder powered with a 4 amp motorcycle battery.

Building time was 1872 hours over a three year period, including 540 hours for the molds. I now have KR-2 composite parts for sale.

The registration C-FAFY is significant in that it is the same as my amateur radio call VE6AFY that I have had for 35 years.

Adrian Carter
305 - 6452 Travois Cres. N.W.
Calgary AB, CANADA

CANOPY SAFETY LATCH MOD

Kerry Vaughn, Ontario, Canada, submitted a good idea regarding Herb Bull's canopy latch that was highlighted in the October, 1989 issue of the Newsletter. Kerry suggested lengthening the latch and drilling a 3/8" diameter hole as shown in the sketch to the right. This modification will allow you to taxi with the canopy partially open. Thanks a lot for the tip, Kerry!



EXPERIMENTAL AIRCRAFT ASSOCIATION

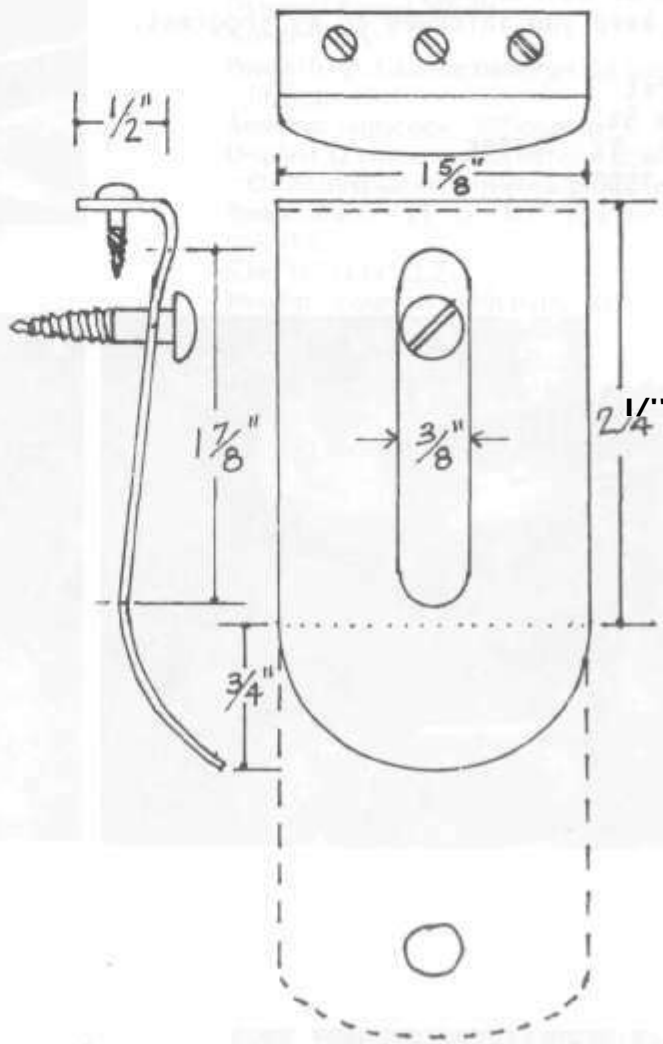
Vol. 1, No. 2, Staff: ii
... 3 3 4 ...

ADRIAN'S KR SPECS

Length	14ft. 6 ins.
Wing Span	22ft.
Wing area	80 sq.ft.
Wing loading	121bs./sq.ft.
Power loading	151bs./hp
Empty weight	530 lbs.
Gross weight	960 lbs.
Useful load	430 lbs.

Engine
VW 1835 cc
HP 50-55 (Calgary altitude)
Fuel Cap. 15.5 Imp. gals,
(100/130)
Fuel consumption 3.0 Imp.
gals./hr.

Performance	
Maximum Speed	150 mph
Cruise speed	140 mph
Range	700 miles
Rate of climb	900 fpm
Stall flaps and gear	46 mph
Approach speed	60 mph
Takeoff	350 ft.
Landing distance	500 ft. (full flap)



PROGRESS REPORT FROM GENE DARST

Here are some photos of my "bird" in the garage. All I'm lacking is the assembly of the parts and painting.

The painting is quite a job. To get a nice finish, I used epoxy slurry on the entire bird. Primed with one coat of Dupont 1315 Primer then sanded off (this filled any small scratches). Next, I used 115 grit Garnet sandpaper (dry). Another coat of primer and sand wet or dry with 320 grit paper, followed by 400 grit for the finish sanding.

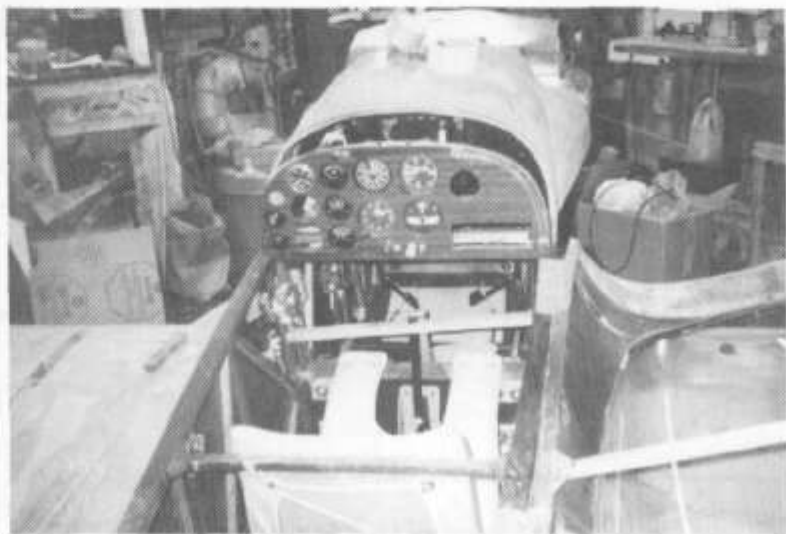
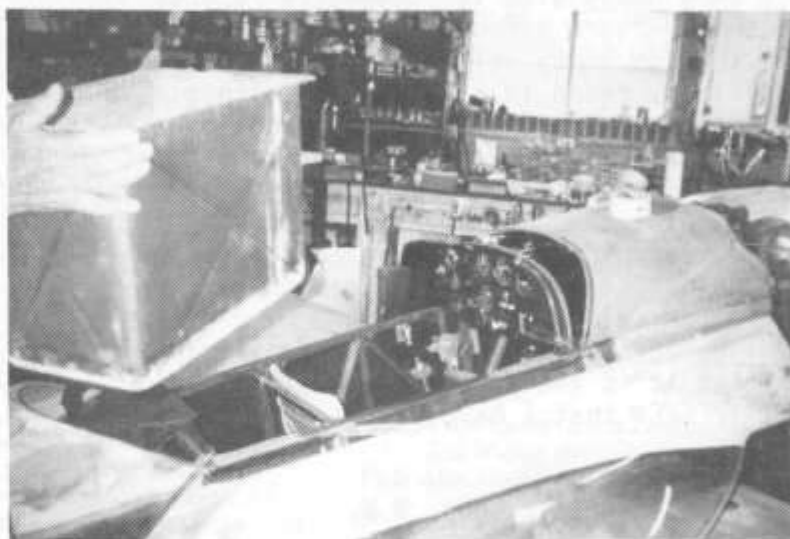
Doing it this way, I hope to have minimum weight and smooth finish.

For the testing of my fuel tank I hooked-up a clear plastic hose, filled the tank with fuel, then the stand pipe (mine was 6" which gives about 3 pounds pressure). Test for 24 hours, as you might get a seepage leak that may not be detectable immediately.

I use Velcro to secure wiring... seems to work much better than clamps. I also used Mercury outboard engine cables for throttle and mixture controls because of their stainless wire-teflon lined housing (no rust or maintenance).

Will keep you informed on my progress.

Gene Darst
585 Iowa St.
Beaumont, TX 77705
409-835-1990



FROM THE EDITOR...

A few people have asked me how they can tell when their subscription is up for renewal. All you have to do is look at your mailing label; the number in the upper right corner is the issue your subscription is due. If the number is 500, it means you have a complimentary subscription.

If you would like to advertise a neat product that you handle or one that we should know about, let me know, I'll run a free ad when space permits.

Speaking of neat products...

Louie Brochetti, 4150 Hillside Rd., Carlsbad, CA 92008 (619-729-6792), is a distributor for Voyager Lorans. This is an extremely versatile hand held unit that is being offered for only \$385.00 (see the ad on this page).

Dan Diehl informed me he has rewritten the instructions for installing his wing skins. Anyone who has purchased skins and has not yet installed them, contact him for a free copy of the new instructions 918-299-4444.

Roger Hansen of San Ramon, CA is organizing a flying excursion along the Baja Peninsula of Mexico. The group will leave the Calexico Airport, located near the South Central California border.

If you would like to join the group, your plane should have at least a 400 mile fuel range capability and be able to land on "QUALITY" dirt strips. If your plane does not have international sized I.D. numbers, Roger states you can use electrician tape as a temporary fix.

The excursion will be sometime between mid to late April. For info, contact: Roger Hansen, 2517 Aranda Dr., San Ramon, CA 94583 (415-830-1842).

HELP! I have received a number of requests for information on antenna installations, also any information in regard to insuring KRs. If you have any suggestions on these or any other subject, let me know!



VOYAGER.

SPORTNAV FEATURES:

- 4 100 Waypoints: Enter by Lat/Lon, IDs or Present Position
- 4 Lat/Lon to TD; TD to Lat/Lon; Lat/Lon Offsets
- 4 Automatic Functions: All receiver functions; GRI Selection; Secondary Selection; Magnetic Variation; ASF (landmass) Correction; Initial Position
- 4 Alerts: Battery; Waypoint Arrival; Cross-track Error; Anchor Watch; Border
- 4 Expected Accuracy Display
- 4 Signal-To-Noise Ratio
- 4 Range and Bearing: To Destination; Between Waypoints
- 4 Speed, Course Over the Ground
- 4 Velocity Made Good
- 4 Crosstrack Error: Numeric; Graphic
- 4 Course Error
- 4 Time and Time-To-Go
- 4 Estimated Time of Arrival (ETA)

SPECIFICATIONS

Sensitivity: 1 Microvolt

Dynamic Range: 105 db

Notch Filters: 5

Power: 6 AA Alkaline batteries (24 hour life typical)

Antenna: Telescopic, 20," built in

Display: 32 character Supertwist LCD (2x16) (displays complete alphabet)

Temperature: +23° to +122°F (-5° to +50°C)

Size: 9.6"x3.35"x2.25"

Weight: 28 ounces (with batteries)

Warranty: 1 year parts & labor

Construction: Impact resistant polycarbonate-polyester blend. Waterproof-1 foot submersion for 30 seconds. Will float.

ACCESSORIES

Extra Wall Mounting Bracket 4 Extra Battery Holder 4 Fabric Case 4 Horizontal Mount Tilt Stand 4 Wall Mount Tilt Stand 4 Spare Antenna

CAUTION FOR FUEL TANKS THAT USE SIGHT GAUGES

The following article was submitted by John Shaffer, 7101-C Laniuma Loop, Honolulu, HI 96818. The article appeared in the March, 1976 issue of SPORT AVIATION. John said, "I realize that the system referred to had a fuel pump drawing from the tank, but who is to say that it will never happen with a gravity feed system. I am going to be using an Ellison throttle body injector on my next airplane so will also be using an electric fuel pump, since the Ellison needs three to five PSI. I am not saying that you should change what you are flying if you have no problems but if you haven't yet built your fuel tank, consider using a separate hose connection at the bottom of the tank if you are using a sight gauge. Keep building, keep flying safe, until we meet again. John Shaffer."

I have had a problem with fuel flow on my Volkswagen powered racer that EAAers should be made aware of and warned against repeating themselves.

On the first five flights, the engine would operate normally for about two minutes only — just long enough to get opposite the "spot" on downwind. Needless to say, I was thankful for that.

First, I would get a barely perceptible surge, then a drop in rpm, and, finally, a complete cut-off. During the drop in rpm phase, carb heat produced an improvement. If the throttle were brought back and then advanced, rpm would follow the throttle, and then immediately fall off again.

Our first remedy was to put a blast tube on the mag . . . not because it made sense, but because someone suggested it could be the mag. I didn't believe it, but you can't afford to overlook anything and obviously it couldn't hurt as everything was bumping the redline.

Next we put a blast tube on the fuel pump, checked the fuel system throughout, overhauled the fuel pump . . . but found nothing significant.

Of course, we kept running the engine on the ground, but couldn't

get it to cut out. Next time we flew it — same thing again.

Then we relocated and improved the tank vent with a small scoop. The trouble actually got worse, if anything, and I think this was what finally put us on the right track.

We were using a piece of polypropylene transparent tubing for a sight gauge. Since we had topped off the tank with 10+- gallons, I didn't pay much attention to (V>e gaug-- in the air, but I did remember that when I had glanced at it I never did get a really clear picture of what the fuel level was. I made a mental note to change over to a more transparent type of tubing. And then the light came on! And you wonder how we could have been so dumb.

This sight gauge (used in so many homebuilts) is nothing but a manometer type thing connected from a hole in the top of the tank to a hole in the bottom. "Fuel will seek its own level" — everybody knows that.

I had installed a nipple in the top of the tank to let air into the line, but instead of bothering with another nipple in the bottom, I simply put a "T" at the outlet to the fuel pump. What difference does it make, I thought, how the fuel enters the line? Of course it worked perfectly . . . with the engine dead.

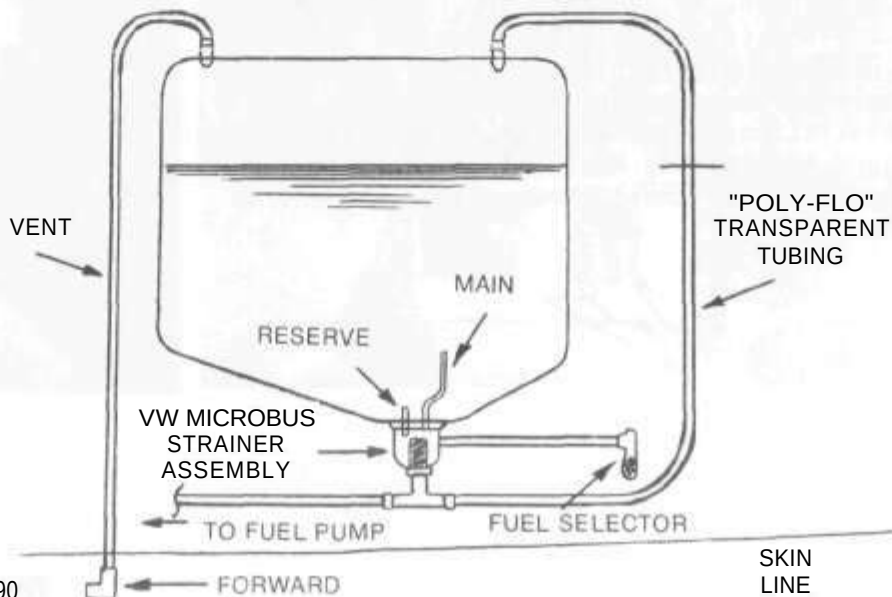
But pulling max power, the fuel pump evidently found it easier to pull air through the sight gauge than solid fuel from the bottom of the tank — and our "improved" vent helped it along.

Whooo, boy!

Now that we have a straight nipple at the bottom of the tank instead of the "T" and the sight gauge blocked off, everything is working beautifully.

By Ralph Korngold (EAA 2208)
385 Wilton Ave.
Palo Alto, California 94306

Fuel system that caused the problems. Instead of hooking the "poly-flo" transparent sight gauge tubing to the "T" at the bottom of the tank, it should have its own nipple as at the top of the tank.



ERRONEOUS AIR SPEEDS

One advantage to slow progress in building my KR-2, is that I have been able to read many newsletters! I have noticed that many of the flight tests report airspeeds that are physically impossible to attain with the propeller pitch and rpm given. This is not to say that the speeds reported were not indicated, but rather the indication is incorrect. If there is a pitot or instrument error, I see no real problem, but if the error is due to the static system, it may also cause an error in the altimeter reading (and, of course, the transponder encoder). Perhaps a prudent part of flight testing would be altitude comparison with another aircraft of known altimeter accuracy.

As a "rule of thumb" the maximum attainable airspeed (MPH) at 3000 RPM, is 2-1/2 times the prop pitch (in inches). At 2400 RPM (spam can cruise) the airspeed is double the pitch. The equation, which includes approximately 12% propeller slip, is:

$$S = \frac{P \times R}{12}$$
 where S=MPH, P=pitch inches,
and R=RPM (hundreds).

Thus, a prop of 48" pitch, at 3200 RPM would be $\frac{48 \times 32}{12} = \frac{1536}{12} = 128$ MPH

Bob Blackburn (Future KR pilot)
1215 Lancelot Lane
Ocean Springs, MS 39564
601-875-1183

KR-2 FOR SALE

KR-2 95% with Continental C-75 full electrics, in trailer. \$4,000, licensed pilots only.

Ted Medin
12010 Pomerado Rd.
Poway, CA 92064
619-278-2718

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$15.00 PER YEAR- U.S., \$20.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$75.00.
INDIVIDUAL COPIES \$1.25 EACH.

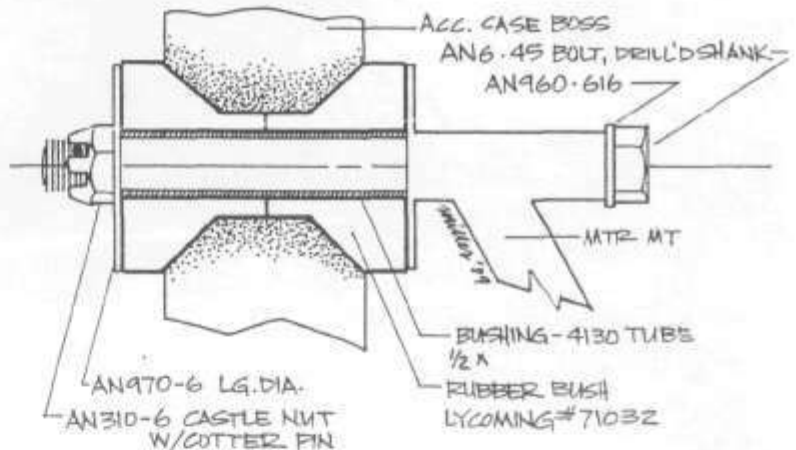
MOTOR MOUNT CHECK-OUT

Discovering you're short a part just as you're hoisting the engine could be frustrating... especially if you've rented the hoist.

A hardware call-out is helpful and a couple of tips will make the job easier.

Check bolt clearance through the motor mount tubing... welding usually means you'll need to ream the tubing so those AN-SIXES will pass. Mounts vary so confirm your bolt length requirement. The Lycoming rubber bushings are number 71032. The good guys at Wag-Aero put them on sale at about twenty bucks at set. Call 'em at 1-800-558-6868. Ask for their neat free catalog, too. Nice folks.

You'll need to fabricate the 4130 bushings to fit the rubber parts. The motor mount bolts torque to 40 in/lbs. The bushing length should allow for a slight compressing of the rubber parts. Make the tube bushings all the same length or you'll dial in some odd thrustline settings.



AN 970-6 washers, placed between the motor mount and the rubber components, can be used for slight thrust and/or C.6. adjustments.

Some folks say motor mount bolts should be installed with heads aft. I see lots going the other way. Getting a torque wrench on the nut probably explains the issue. Just don't forget the cotter pin!

Monte Miller
1900 Parkside
Denton, TX 96201
817-566-5871

★ AIRBORNE ★ COLOR RADAR

PRICE BUSTER *POW!* 
ONLY **\$249⁰⁰** CASH
includes...

- RABBIT EARS • HOOK UP TO CABLE TV COMPANY •
- 5000 YDS COAX CABLE • TV GUIDE SUBSCRIPT •

ORDER NOW... *Operators Standing By!*

► **BIG EARL'S AERO** ◀

MUNICIPAL AIRPORT • SHEEP DIP, MONTANA

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 153, FEBRUARY, 1990

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



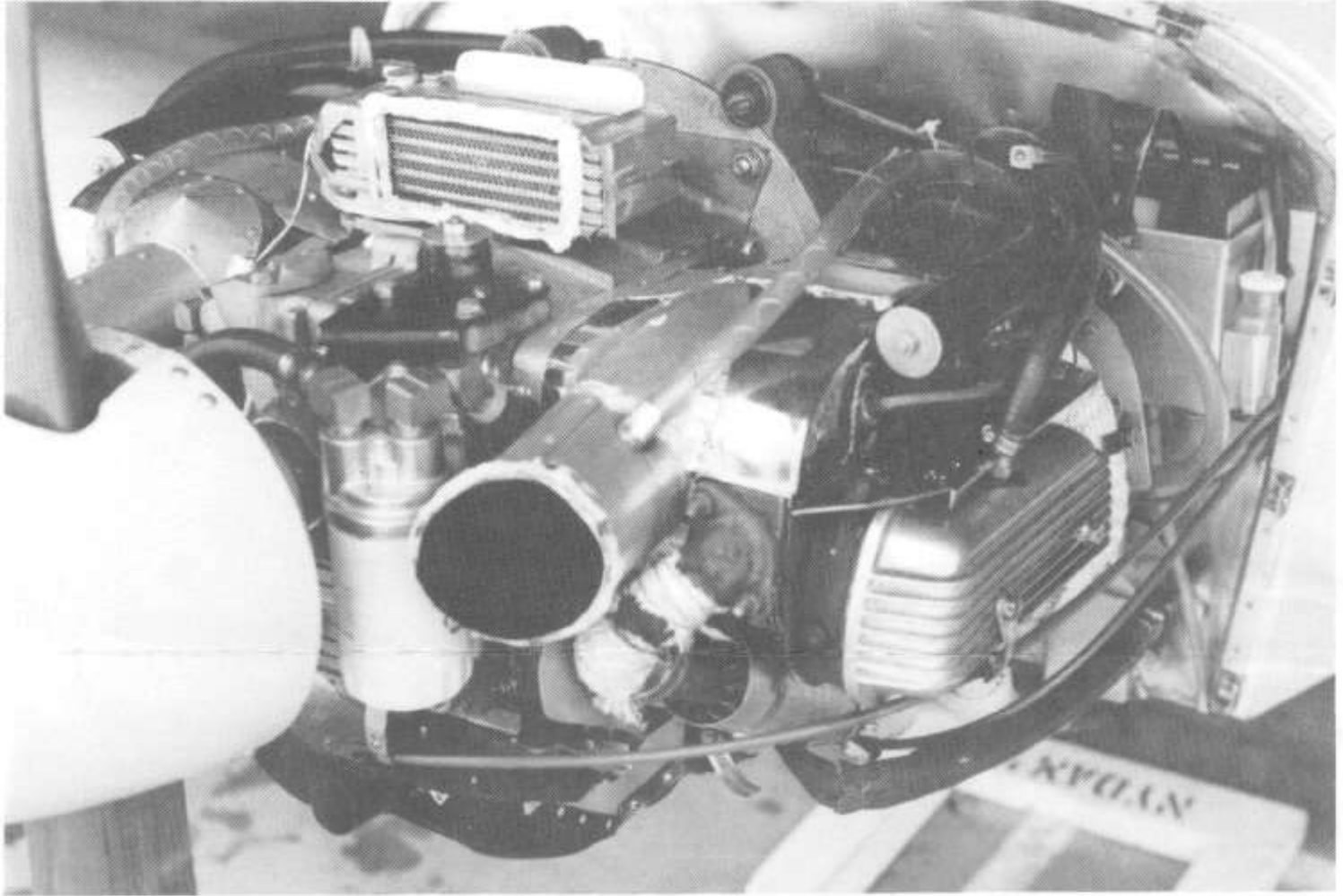
VIEW OF DAVE FEIGER'S "COOL" KR-2 N39426

"KEEP IT COOL"

Finally getting my cooling system write-up to you. Have 546 hours on my bird to-date and have tried a lot of "improvements", some worked, some didn't. This one does. Have a MAPI 1835cc engine with dual port heads driving a homebuilt 51 x 46 prop. Most of my flying is in eastern Oregon where summer temps often exceed 90 degrees F; couple this with a field elevation of 3700' and with most flights at 5000-7000' and you can appreciate the need for good engine/oil cooling.

(Cont'd Page 2)

Cooling was always marginal, the kicker came a couple years ago while leaving the Redmond, OR Airshow with surface air temp at 103 degrees F. Shortly after take-off OT exceeded 225 degrees F and OP dropped from 60 to 30 psi; had a most worrisome flight back to John Day. First fix was to remove all engine to cowl baffling. Then formed Alum sheet baffling around cylinders and heads with ram tubes to cowl air inlets (KR Newsletter 1135). This helped but cooling was still borderline during extended climbouts during hot weather. Last winter I purchased a set of Type 3 Volks upper cooling tin and spent late winter-early summer rigging this in and reshaping the front of the cowl.



Modifications included closing off the original cooling tower slots in the cooling tin and cutting holes in the front ends of the cooling tin to accept 3-1/2" diameter inlet ram tubes. Also had to patch in upper cool tin to the bottom cool tin. Early into my flying/development I had added a 3" prop extension and had also installed an alum collar to close the cowl to spinner gap this created. This improved prop efficiency but was not esthetically pleasing, so I took this opportunity to change the front of the cowl. Did this by cutting off all the offending blunt portions of the cowl front, gluing on urethane foam, shaping it and then glassing it using polyester resin (two layers of glass). When this was cured, I dug out all of the urethane foam from the inside and added one layer of glass to the inside. The ram tubes were made by wrapping alum sheet over a shipping tube, pop-riveting these and then pop-riveting them to the cooling tin. The ram tubes "float" just behind the air inlet holes in the cowl and have a bead of silicon rubber around them to provide a light seal with the cowl.

Other changes: Modified the oil pump and installed a new cover and full flow oil filter (from Great Plains Aircraft, used NAPA filter ele. #1516). Oil now comes out of the oil pump cover, goes to the filter, then to an oil cooler element under the front of the engine (JC Whitney Part #38-1481X), then up to the front engine oil gallery (have to drill, tap and install fitting per GPA instructions). At this point the excess oil is dumped back into the crankcase while the rest not dumped by the pressure relief valve goes through the stock cooler on top and then on to the bearings.

Complicated huh! The top cowl scoop extends back to the top oil cooler, the bottom duct provides air to the bottom cooler and carb ram air. The only engine-to-cowl flex bating occurs at the lower cowl air duct.

With this arrangement most of the engine block heat is ejected through the oil hence the need for two oil coolers. Does it work? First trials were last fall with air temps in the mid 70's. Full power climbouts CHT 350-400 degrees F, cruise CHT cools to 300-325 F. OT 190 degrees during extended full power climbs, cools to 170-180 - during cruise. Rate of climb and cruise speed noticeably up, due I believe to reduced cooling drag and improved front cowl streamlining. Winter conditions (20-40 F) had to install covers to block off 1/2 of openings to cylinder ram tubes, and cover



all but the carb ram air on the lower cowl duct to maintain above CHTs and to obtain 150-160 degrees F OT.

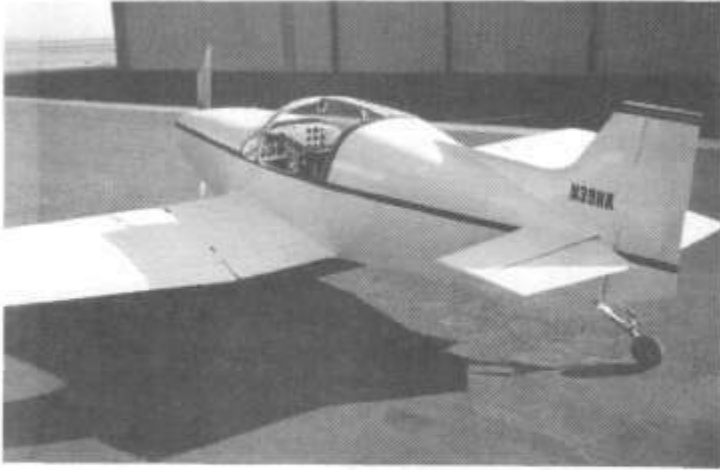
Size of openings: Top duct= 9 sq. in., engine cooling= 9.5 sq. in. each, bottom duct= 7 sq. in., for a total of 35 sq. in. total inlet openings. Exits: Three on top of cowl to keep cowl from bulging up during power-off descents and landing flare= 10 sq. in., and bottom-rear cowl= 44 sq. in. with cowl flap closed (64 sq. in. with cowl flap fully open). Rarely need to use the cowl flap now, however it does add drag and spoils lift during short final and landing. Speed? Won't know for sure till I get another chance to fly with G. L. (Jerry) Robinson this spring, but cruise now appears to be in the 140-150 MPH true range without pushing it too hard, with top around 160. Am it bad for an overweight (640# net) 1835cc Volks powered KR-2.

the above I found to be necessary to achieve the degree of engine/oil cooling I thought necessary, however my advice to you is if your bird gets by okay with conventional engine-cowl baffling, then leave it alone-if it ain't broke, don't fix it.

David Feiger N39426
P. O. Box 581
John Day, OR 97845
503-575-0766

CANOPY MODIFICATION

Here's a letter C. O. Morehead of Campbell, CA, received from Howard Kaiser regarding Howard's canopy modification.



I do not have plans drawn up for my canopy modification. The design just evolved from a basic need for more head and shoulder room. (I'm 6'2", 190 lbs.)

I had acquired all of the Rand Robinson premoulded parts: Engine cowls, forward deck, canopy frame, plexiglass bubble and turtledeck. With this investment in parts, I tried very hard to make them work for me but I just was not satisfied with the headroom and aft visibility. It was clear that for the comfort of two people, the canopy would have to be made slightly higher and more broad in cross section near the shoulders. I preferred the look of a fixed windshield with gull-wing doors over the stock side-hinged canopy. Unfortunately, this also meant that I would have to scratch build a canopy and maybe a rear deck. Just how to make it was the big question. I wanted something that would not be difficult to build; preferably with a wood frame rather than metal or fiberglass.

The scheme I had in mind required a laminated wood frame or bow in front for the windshield, a laminated wood frame for the rear deck and frames for the doors. The construction of the door and windshield frames was really not difficult once their shape had been decided. I chose to make them from laminated spruce to be strong yet light.

The first step was to optimize the seating. (I disliked the stock sling seat concept from the standpoint of comfort and crash resistance.) I made moulded seats from rigid urethane foam covered with two BID. They contoured my butt, supported my thighs and were low in the fuselage. Once padded, this was much more comfortable and crash worthy. I also increased the

seatback angle. These changes allowed me to keep the overall cockpit height almost the same as stock.

The next step was to make cardboard templates for the front and rear frames. With these, I could evaluate the head and shoulder room. What I wound up with was more squared than circular in cross

section. The shapes of the templates came out slightly different; the front one was shaped to allow the use of the stock plexiglass bubble (modified) for use as a windshield and the rear one was sized for head and shoulder clearance.

The stock bubble worked fine as a windshield. I turned it around so that the original aft edge when properly cut, would fit over the front deck. The nose of the bubble when cut back, fit over the front frame template. The bubble shape produced a nice streamlined fit from the windshield to the doors. (There was much trial and error fitting before the bubble was cut.) The windshield bow wound up several inches behind the instrument panel. This was nice for visibility and appearance.

I placed the rear deck bow at the back edge of the package shelf to maximize rearward visibility and to make for easier entry and exit from the cockpit. This made the doors about 28" wide.

So much for the planning.

I made forms for each bow out of 3/4" particleboard. The forms were cut using the templates as a guide so that I had a female half shaped like the bow and a male "plug" cut exactly 1" smaller than the bow.

I cut about a dozen 1/4" by 1" spruce strips of various lengths from leftover spar scraps. The spruce strips were soaked overnight in water to make them pliable. Four wet strips were carefully bent into each of the forms, one behind the other to make a 1" stack. (The first and last strips in the stack were continuous. The middle two strips were pieced.) The male plug was inserted and firmly clamped to compress the stack and maintain the shape until the strips were completely dry. (It took two days.) After drying, the strips were epoxied and placed back in the forms until cured. The cured bows were then trimmed and sanded.

The bows were mounted onto the top longerons with epoxy, screws and gusset blocks without cutting through the longerons. (This would seriously weaken the airframe.) A laminated center spline of nearly straight spruce joined the front and rear bows at midpoint and became the stationary mount for the door hinges.

This completed the "cage".

Each door frame consisted of four separate laminated components epoxied together. All components were made from 1/4" by 3/4" spruce strips (three thicknesses). The front arches were formed in the windshield mold with a fourth strip as a temporary filler. The rear arches were formed in the rear frame mold in a similar manner. The door top rail was formed over the center spline. The side rail was formed against the longerons. The spruce strips of each component was carefully trimmed before epoxying the stack so that each of the four component parts of the door could be joined afterwards at the corners in a tongue and groove fashion. Also, the finished door frame should fit into the space between the front and rear bows with a 1/8" to 1/4" clearance (gap) front and rear. The door frame attaches to the cage with a piano hinge at the top and a suitcase latch at each of the lower corners.

The windshield bubble can be screwed or epoxied into place to suit the builder. (The front edge of the windshield bow will need to be bevelled for a close fit to the windshield.) Each bow shares duty with the doors. That is, the windshield is trimmed to occupy the first 1/2" of the front bow and the door glass occupies the back 1/4". (The door glass overhangs the door frame about 3/4".) The rear bow is similarly shared by the rear deck and door glass.

The glass for each door is flat 1/8" acrylic glazing material. The window panels were flat wrapped over the door frames and held in place with screws. The glass must then be stress relieved or it will crack at the slightest provocation. I stress relieved the glass while on the door frame by wrapping the whole affair in black plastic and placed it in the sun for an entire afternoon. (The idea being to raise the plex temperature to about 170 degrees for several hours.) This produced a glass sheet perfectly formed to the frame and ready to trim. I cut the plex flush to the frame on the top and side but left about 3/4" overlap on the front and rear. This overlap allows a flush, well sealed fit to the windshield in the front and rear deck. I lightly screwed and epoxied the glass to the frame. (When the edges of the glass were masked and painted, the frame and glue lines disappear.

The rear bow becomes the start for the revised rear deck. I scratch built a new rear deck but in retrospect could probably have used the premoulded part after some trimming and skirting.

Painting of the windshield bow to match the airframe and installation of the weatherstripping foam completed the job. I ventilated the cabin by mounting clear plastic snap vents in the front corner of each door. These are effective but noisy. Submerged NACA vents in the fuselage would probably be better.

I hope this detailed account can help you on your project. I don't maintain that my approach is the right one _____ only different.

Howard Kaiser
5205 W. Beryl Ave.
Glendale, AZ 85302
602-937-7556

FROM THE EDITOR:

Congratulations to Richard Kunc, Winter Park, FL for his wonderful article featuring his KR-1 in the February, 1990 issue of Sport Aviation. Thanks also to our friends at Sport Aviation for printing this very positive article.

There is a correction to the article by Gene Darst in last month's Newsletter, Issue #143. In reference to the height of the stand pipe used in testing the KR's fuel tank, it should have read 6" instead of 6".

Regarding the request for info on insurance... no response. Regarding antenna information... one person responded and hope to have an article soon. Thanks to all those who take the time to share their ideas with the rest of us.



THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES (OVER
100) FOR \$75.00.
INDIVIDUAL COPIES \$1.25 EACH.

EDITOR'S NOTE: Sometime ago Jeannette Rand gave me Stuart Robinson's address. I contacted Stuart to find out about the early days of Rand Robinson Engineering. I think it's an interesting subject and I will be publishing his comments in future issues. Thank you for the info, Stuart!

KEN AND I

Here's a story you might be able to use in your fine newsletter. It brings back some nice memories of my time with Rand Robinson and Ken. I'll have some more stories I'll send you and you can use any of them you want.

Actually there were two KR-1's in the beginning. Ken's and mine. After we decided what to build, there came the problem of how big or small it was going to be. I am 6'2" tall. Ken was somewhat less. The result was a KR-1 that didn't fit either of us. Ken compensated with a quick opening chute and a few pillows. I had to content myself with a thin "T" shirt. With my somewhat conservative attitude toward enjoying the blue sky (brown in L.A.) Ken did most of the flying. Besides it was his airplane that found it's wings first. My airplane didn't fly until many years later.

Not to say that I am slow, but sometimes things can distract even the most serious builder. Ken was a married man with 2-1/2 fine children. I was single with nothing more to worry about than DC-8's, 9's and 10's at work and a homebuilt under my small garage apartment. Life was smooth and I steadily pulled ahead of Ken's project and it looked as though the bachelors would win again. But one day my dear neighbor dropped by the garage and suggested that I get my head out of my airplane and meet a beautiful young lady she had in toe. Well, love comes in many forms and the homebuilt was forgotten for more than a few months as I explored the stars and such.

Ken just looked on philosophically, smiled and continued to make steady progress in his garage. He also decided to change companies about that time and we did not see each other too often.

Eventually, I rediscovered the homebuilt and got back to work but it was not the same. Progress lagged and I had lost the catalyst of competition. The idea of forming a company and actually selling plans was on the fuzzy horizon so I contented myself with slowly drawing the plans whenever there was a dead spot at Douglas.

Meanwhile, Ken was contenting himself with building his airplane and pushing it through the hardest part of any project... the last 10%.

Rand Robinson was hatched on the first day of the KR-1. Ken had called a reporter from a large magazine (I forget which one) and he showed up early that Saturday morning at Chino Airport. While we were unloading the airplane from the trailer, he started asking a bunch of questions and generally making a pest of himself. Ken, who loved to talk, started off on a long discourse about wing loadings, construction methods, and such, and pretty soon the two of them wandered off to sit under a tree. Not really knowing what to do with myself, I wandered back and forth between the airplane and the tree wishing we could get on with it.

Sometime later, while passing by the tree, I heard the reporter ask if there were going to be any plans for sale. Since I had been working on the plans off and on for the last year and they were mostly finished I said, "I guess we have a set of plans". The reporter gave me a— who are you—look and asked how much they were. That's about the only time I have seen Ken without a ready answer. We both had not talked seriously about going into business much less about the cost of a set of plans. After some "well, I dunno's" we settled on \$15.00 and the interview went on.

First flights have always attracted a lot of people. Pilots, who want to see how well the bird flies and non-pilots who want to see if the pilot lives. By the time the KR-1 was put together and cranked up, there were a lot of people. Ken put on a show that pleased the pilots and disappointed the non-pilots. The flight was beautiful. The KR-1 was stable, faster than we had expected and a joy to fly. And by golly, we were in business.

Stuart Robinson
22352 Longeway Rd.
Sonora, CA 95370

I think that I have read every article that has ever been printed on this neat little airplane... most good and a few bad. The bad news, it seems, stems from builders who tried to make this airplane more than it was intended to be or from pilots whose flying skills were not up to those required for this design.

It's debatable I suppose, whether the sensitive handling of this airplane is good news or bad news. It's good news if you enjoy a machine responsive to your wishes and you are sensible and on top of it when you fly. It's bad news if you get behind this machine and things start happening faster than you can figure them out.

This is where consideration of cockpit workload becomes important. If you can design and build a machine that will minimize the fiddling required during normal operations, you have a better chance of managing the airplane and saving your butt during a crisis. Simplicity of operation should be as important a consideration in aircraft design as are cost and weight. In most cases simplicity follows with low cost or low weight designs but not always. I've seen some pretty complicated electrical systems (just to name a few) built from cheap, lightweight parts. I've also wondered what those pilots would do in the event of a system failure or other circumstance which would require quick correction or operation of these systems.

It's happened to me more than once in rented aircraft where a limited knowledge of emergency procedures or even basic aircraft systems has put me "behind" the airplane. But in these cases a fairly docile aircraft could be trimmed for hands-off or flying duties momentarily ignored while corrective action is taken in the cockpit on fairly simple auxiliary systems.

This is not the case with most KR-2's! This airplane requires your undivided attention during normal flying to keep it straight and level and flying duties increase with payload and naturally takeoffs and landings. It would be a highly disciplined pilot who could manage an electrical, fuel system, or landing system failure in a KR-2 on final approach.

Don't make life any more difficult than it already is. More (in the way of gadgets) is not better. In retrospect, the perfect KR-2 would be single place with fixed gear, no flaps, one gravity fuel tank, and no electrics! Light! Fast! Simple! FUN!

If you need more than this, you should consider building a different airplane.

Howard Kaiser N39HK
5205 W. Beryl Ave.
Glendale, AZ 85302
602-937-7556

**"SPARKY" SPARKS FLIGHT REPORT
AWARDED "LONGEST FLIGHT", COVINGTON 1989**

I had a wonderful trip to the KR fly-in. Left San Diego and flew to Demming, NM then north to Dalhart, TX then, east to Lake of the Ozark in MO to see a friend of mine. From there to Ohio and spent three days at my brothers. Then to eastern Kentucky and spent three days at my mothers. From Kentucky, flew to Tennessee to the KR Gathering. I spent three days there and met some of the nicest people and had a wonderful time. Left Tennessee and took southern route back to San Diego.

Throughout the entire trip I never flew over 7,500' or landed at a field with a control tower. Burned 3.8 gallons per hour and ran around 150/160 MPH with my little 1835 VW.

I have almost 400 hours on my KR-2 now and the more I fly it, the more I like it. About 150 hours ago, I took the POSA Carb off and put on a Stromburg from an old 65 HP Cont. and I sure am happy with it. All the cylinders run even mixture and I don't have to turn the fuel off each time I shut it down.

There are about a half dozen KR's around the San Diego area but Louie Brochetti and I are about the only ones that fly regularly.

Well, I'll sign off now and I'm looking forward to the next KR fly-in.

M. T. "Sparky" Sparks
10232 Kit Carson Place
Santee, CA 92071
619-448-4945

FOR SALE

KR-2 project, Wickes wood kit. Foam, glass, epoxy and pump. Carey Anderson's hardware kits, including center control stick. Plans, construction photos, receipts, newsletters, many misc. extras. Project is in boat stage. All spars built, fuselage woodwork complete, horizontal stabilizer and elevator built and glassed. Excellent workmanship. Built 100% to plans. \$1,800 plus invested...asking \$1,000. Must make room for new baby.

Kenny Haden
1224 Radmoor Dr.
Chattanooga, TN 37421
615-499-0640

FOR SALE

One KR-2 canopy (clear) and premolded Rand canopy frame -neither have been touched. \$130.00 plus shipping for both.

Ed Janssen
601 Heinze Dr.
Rock Falls, IL 61071
815-625-4898

FOR SALE

KR-2 project 70% complete. Fuselage on fixed gear with axles. 5.5 gallon tanks in stub wings. Control system complete. 1835 Conversion with 0 time. MAPI accessory case, starter, alternator, Great Plains prop hub and intake manifold. Most instruments and turtle deck also. Excellent workmanship. \$4,500 OBO.

Phil Hogan
189 W. Highland Ave.
Sierra Madre, CA 91024
818-355-0646

WANTED

California KR-2 project. Prefer boat stage on fixed gear. Must be to the plans and light w/good workmanship. I've got the cash, let's see your project, builder's log and inspection record. Call or write.

Ryan Young
1247 1/2 Broadway
Alameda, CA 94501
415-521-1406 (leave message)

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 154, MARCH, 1990

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



**DAN DIEHL IN TRI-GEARED KR, BUILT BY BOB PASSMORE
(FUTURE KR DRIVERS NEXT TO DAN ARE HIS SONS, ALEX AND ADAM)**

Editor's Note: At last year's Covington event, Dan Diehl mentioned he was experimenting with a fixed tri-gear for the KR. What follows are Dan's comments regarding the new design...

Well, what we've been working on is a fixed gear that completely eliminates the aluminum gear bar and all the stuff needed for a retract system. The fixed gear simply has a casting on each side outboard of the fuselage, so it totally frees up the space inside the cockpit. There isn't a bar that runs across the bottom of the fuselage, so there is no need for fancy fairing work.

The castings for each main gear just bolt on to the spar. The fiberglass nose gear angles down at about a 45 degree angle with an aluminum casting at the bottom that the axle bolts to, very much like the Grumman Tiger and Yankee Series. The fiberglass material for the nose gear is 3M Scotchply. It comes in big sheets 3/4" thick and we then cut it into strips for the gear legs.

The whole main gear assembly weighs only 15 pounds.

If you want to have a tail dragger, you mount the assembly on the front of the main spar. If you want to have a tri-gear, you mount it on the back of the main spar which is behind the C.G. at the axle.

The nose gear is a simple socket affair that bolts to the couple of supports that go up and catch each one of the lower engine mount bolts out on the engine mount itself.

As far as the ground clearance, the gear will raise the aircraft 4" higher than the stock retract gear.

As far as weight, the stock retract weighs 29 pounds (not including the bolts). This design weighs 15 pounds, including all the bolts, so it's cutting the gear weight exactly in half.

The gear is currently undergoing preliminary field tests... will keep you updated on any future developments.

Dan Diehl
1855 North Elm
Jenks, OK 74037
918-299-4444

Roger Hansen is organizing a KR Gathering in Sun River, Oregon over the four day Memorial Day weekend. So far nine KRers will be attending.

The airport is the Sun River Airport located about 26 miles southwest of Bend, Oregon and has a more than adequate length paved runway.

The area is a beautiful resort area noted for it's many bicycle paths that can be traveled with rented bicycles.

For more info, contact:

Roger Hansen
2517 Aranda Dr.
San Ramon, CA 94583
415-830-1842

H E L P ! ! !

I need to again ask for you to contribute info to this Newsletter. This is **YOUR** Newsletter and your participation is vital to it's survival.

Please take the time to send your photos, flight reports, progress reports, questions, special events, etc. or just drop a line on how you are doing.

Thanks!



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD. OSHKOSH. WI 54903-3086
PHONE. 414/426-4800

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES (OVER
100) FOR \$75.00.
INDIVIDUAL COPIES \$1.25 EACH.

BUILDING UP-DATE FROM GENE DARST, BEAUMONT, TEXAS

A special note on tachometers... I purchased Westach Gauges EGT, CHT voltmeter, a Stewart Warner oil temp and an oil pressure gauge (from an auto parts house). Both are mechanical type.

I have had problems with the Westach Tachometer... it would only go to 2500 RPM then back to 2000 RPM. I talked to Westach and they suggested I check the points on my Slick mag and I did. I then talked to the Slick Factory and they said to set points as specified in the overhaul manual (.008" to .010") and it didn't help the tach.

I sent the tach to the factory and they installed a new unit. Cost \$4.00 freight to send it to the factory plus a \$15.00 overhaul charge and \$7.25 return freight charge, and it still doesn't work (it still drops back to 2000 RPM.)

I also know a Q2 builder that has a 2-1/4" Westach unit and a 3-1/8" tach-hour meter combo that uses a dual bendix mag and both Westach units have the same problem.

I ordered a Braal Digital tach unit and it's sending unit is an optical system, recommended by Burt Rutan. It may seem expensive, costing \$165.00 to \$190.00, however I've wasted \$56.00 plus \$26.25 overhaul cost on a unit that still doesn't work.

I checked the engine RPM with a unit that reads prop RPM and it's a steady 2800 static RPM reading.

As far as other progress, I have all electrical wiring completed: Radio, Loran, transponder, etc. Complete except for P.T.T. switch on stick. Also installed a water drain (low point) in the fuel line for the wing tanks.

All in all, I think I'm finally over the hump! I have the prop spinner finally the way I want it—running true.

The alternator system, a MAPI product, was a real pain to get the voltage down to 14.5 volts. The regulator unit that was furnished only goes to 16 volts - too much for a battery or radio, actually nothing is designed for that voltage.

The stator unit (the windings on the bell housing) is unusual as it has four wire coils, one to ground and three leads coming out to the rectifier-regulator unit.

Finally, after \$70.00 on various parts, we disassembled another engine and luckily it had the manufacturer and part number on the stator.

The system is used on a Wisconsin engine so I contacted my friend's dealership in Wisconsin. He gave me a complete brochure (3 pages) on the system that details everything. Wisconsin uses a rectifier unit and a separate voltage module.

I installed it and "low and behold", 14.5 max with full RPM.

HAPI says their alternator is 20 to 25 AMPS but they're wrong... it's not over 17 AMPS at 3600 RPM.

Anyhow, I kept plugging and scratching as overvoltage can ruin a radio, boil water from the battery, burn out lights, etc.

I am very near painting now, only need to build a paint booth. I've decided on Dupont Acrylic Enamel, no hardeners, as Imeron used as a hardener in acrylic, gives off a highly toxic vapor and can kill you! At 64 years, I'm too old to gamble on it... my life is worth more than \$100.00 worth of paint.

Today I'm going to install the outboard wings, adjust the aileron connecting linkages and safety-wire all the turn buckles.

Hope to be at the airport in a couple weeks!

Gene Darst
585 Iowa St.
Beaumont, TX 77705
409-835-1990

The following articles are from Technical Councilor News. If you'd like any additional information about this excellent publication, contact: EAA Technical Councilor News, Wittman Airfield, Oshkosh, WI 54903

VAPOR LOCK Author Unknown

Vapor lock occurs fairly frequently in cars, because the fuel lines and carburetor are exposed to engine heat, and when idling, the fuel can get hot enough to boil and fill the lines with vapor. The fuel pump can't pump enough vapor to keep the engine running, so it stops.

Vapor lock is less common in aircraft, particularly those with up-draft cooling, where the fuel pump, lines and carburetor are in the cold air stream.

There is a situation, however, where you can experience vapor lock. If you run one tank dry before switching tanks, the fuel line from the selector valve to the engine will be filled with air and fuel vapors. Then when you switch tanks, the fuel pump will have to exhaust the air and vapors from the line before fuel flow is reestablished and you get an engine restart. Fuel pumps do not pump air vapors efficiently, so it will take a period of time. You can get some idea by measuring how long it takes your booster pump to get fuel to the engine the first time you fill your tanks. My experience is that it takes several minutes. Auto fuel is much worse, because it has twice the vapor pressure of aviation fuels and fills the lines with more vapors. The moral is that you shouldn't run a tank dry unless you have plenty of altitude, and then check to see if you are within gliding distance of an airport. It is also suggested that you exercise similar precautions when switching tanks.

A SUGGESTION FOR AN IGNITION SWITCH

By Art Bianconi, 983 Madison Ave.,
Plainfield, NJ 07060

Back when you and I were a little younger (?), cars didn't have alternators just DC generators and the six volt battery. Solid state devices hadn't reached car radios yet. There was a need to provide alternating current to drive the radio circuits. The way Bill Lear solved the problem was by providing a

vibrator within the radio. The vibrator oscillated some contacts thereby creating a pulsating DC current. To radio, this looks just like alternating current. Viola Benny Goodman while you drive!

However, when you cranked the starter with the radio on, it tended to weld the vibrator contacts thereby ruining the vibrator. You soon learned that you'd better turn off the radio **before** engaging the starter. Habits die hard however and since car drivers don't use check lists, something needed to be devised to prevent the inevitable destruction of all those vibrators. The way Rober Bosche solved it (Bosche is the Delco Remy of Germany) was to provide a separate accessory lug on the starter switch which automatically interrupts the current to the radio each time the starter is engaged. Volkswagen likes the idea so much, they even wired the headlights the same way. Now, on all VW products, not only does the radio juice get squelched, so does the juice to the heavy consumers; the headlights. Thus more current is made available to the starter when it needs it and deep cycling of the battery is minimized. The starter switch does this all automatically and there's the additional bonus that the high wattage consumers automatically get turned off when the key is removed from the panel. Presto! No more dead batteries from forgetting to turn out the lights!

The point of all this is that there's no need to use any fancy avionics relays or complex wiring (and the added weight) to prevent transients from spiking your radios and you need never again worry about whether or not you remembered to kill your master and avionics switches when you last parked your bird.

Most any ignition switch from a Volkswagen will work and the wiring diagrams can be easily had from any Chilton manual or from the dealer himself. While there are probably ignition switches from older Porches, Mercedes-Benz's, BMW's, etc. that will do the job. I don't recommend using these more expensive types. They cost many times more, are often the exact same part but with different part numbers and you get to pay two or three times more for no better performance. Bear in mind, however, that if you do elect to go this route, you will have to provide separate magneto switches for grounding out the mags.

FIBERGLASS FUEL TANKS

The problem with fiberglass fuel tanks made with polyester resin has interested me, particularly since I recently lost the plastic tip from the float needle on my car due to use of fuel with Methanol. The float needle tip just disintegrated. I had planned to build wing tanks from Kevlar similar to Darryl Capps. I am using West Epoxy, which works very well with either Kevlar or fiberglass. I wrote to the Gougeon Brothers and asked for words of wisdom about using the West Epoxy and Kevlar for tanks. I will quote from the February 19, 1986 letter from Jan Gougeon. "In general, gasoline by itself shouldn't be a problem either. A 100% Toulene test showed a reduction in strength in WEST SYSTEM Epoxy, but the small amount in gasoline shouldn't be a problem."

"The bad news is when Methanol is added to gasoline. Although it doesn't appear that anything is emitted from WEST SYSTEM Epoxy into gasoline containing Methanol, the epoxy loses a significant amount of strength. I don't know if FAA will allow this to happen to aviation fuel, but our chemist thinks Methanol will be used more as time goes on. We have used our products for fuel tanks in our boats for many years with good success.

From the above, it still looks like the additives, particularly Methanol, could be a problem. Since the Gougeon brothers (WEST), have extensive experience in the boat business and with epoxy, I have the utmost faith in their products and their engineering skills. They have always been most helpful in helping with problems and answering questions. NOTE: Methanol is **wood alcohol**. Ethanol or grain alcohol does not cause as severe a problem, as far as EAA knows now.

SILICONE AIRCRAFT FINISH ADHESION

Most of us are aware of any product containing silicone should not be used any place where you want epoxy, glue or paint to adhere. Silicone will just stop most subjects from adhering, and there is no way to clean it off.

I checked with Joe Perez, President of USATCO (U.S. Air Tool Company, Inc.) in Long Island, New York, telephone 1-800-645-8180. Their company makes quite

a few air tools for aircraft use and his comments are that lubricating oils don't have silicone added, that there is no point to this and it is an unnecessary expense. He says that some greases might have it, but he feels that most of them that do have it are going to claim "silicone added" as silicone is an expensive item to add. He suggests that you use Marvel Mystery Oil or Three-In-One Oil for your tools. Any oil is better than no oil as the lack of lubrication adversely affects rotating and moving parts and the lack of lubrication also lets moisture get at the metal to deteriorate it. His comment - "look on the outside of the container as practically every manufacturer using silicone will put this on the label due to the high expense of adding it."

CLEANING PLEXIGLASS WINDSHIELDS

From an unidentified newsletter source, they found that Pledge Furniture Polish (not lemon) will clean plexiglass and has no apparent effect on it. It apparently has a better effect than the commercial plexiglass sheet cleaners.

MAG-DRIVE INSPECTION-VW ENGINE

From the "Sonera Newsletter"

It's that time of year to get back to some serious flying in this part of the country. Which should mean taking a good look at a few parts of the Sonera that were too cold to look at during the winter. May I highly recommend pulling your magneto off to see how the magneto drive is holding up. It is the sort of part that doesn't get looked at on a preflight, but is absolutely critical to you and your airplanes well being. If you have an aluminum drive and see metal powder below the alternator area there is a good chance it is quite worn and possibly cracked. A phenolic drive will not tend to show this material since it will just be blown away. Yes, I know this means you will have to retune the mag but you needed the practice anyway. If not once a year, then how about every 50 hours of flying time. From my experience, the engine will not quit even if the drive is broken, but that moves it off center and can also change the timing which has proved to be so critical in the past. Phenolic drives are available at this time.

KEN AND I

There is one interesting bit of information that very few people know about Rand Robinson Engineering. After we had been in business for about one year and had several good magazine articles (thanks to Ken) we received a "buy-out" offer from Popular Mechanics and it was a real shock to us. We were both engineers at Douglas at the time that plans and kits for the KR-1 were selling fast. Ken was handling the selling of the plans, writing letters, advertising and public relations work from his home. I was ordering and chasing down parts to keep the kits in stock, packaging and shipping them off by truck, UPS and Greyhound bus... all out of my garage. Ken showed me the letter at work and we thought about it for a day or so but in the end we said, "no thanks". (P.M. never did any articles on our KR's as I remember.)

About that time, we started getting questions about a two-place KR-1. The design was not too hard to come up with. A tandem had too many C.G. problems so the side by side was selected. We also wanted to stay with the 10 lbs/sq ft wing loading that worked so well on the KR-1. The tail feathers remained the same after stretching the fuselage. The spars in the KR-1 were so over designed that a span increase of 4' 6" was easy with minor modifications (for example, the steel wing attach joint on the KR-1 is good for 24Gs. The same joint is used on the KR-2 and is good for 17Gs). The engine attach points and the gear were beefed-up but many things remained the same. We had the normal tug-of-war over how big or small it was going to be. In no time, we were building again and had become Rand Robinson Engineering, Inc.

The first flights on the KR-2 proved that we had another delightful airplane to fly. The difference between the KR-1 and KR-2 in the air are small. The KR-2 has a slightly higher stall speed but was more stable in a deep stall. Also, the adverse yaw was slightly greater (which means we could actually feel some).

The hours were flown off with a minimum of problems and the plans were finished and ready. Ken and I were still holding

down full time jobs at that time so we hired a pilot to fly off the hours. Just about every day he would slip into the chute, put on his glasses, head phones, tune into the local rock station and fly up and down the coast from Meadowlark Airport in Huntington Beach, CA.

He seemed to like the job.

Stuart Robinson
22352 Longeway Rd.
Sonora, CA 95370

INSURANCE INFORMATION

If you are a low time private pilot you cannot purchase insurance for the first ten hours of flight time. This was from Vemco. I called USAA and they seemed a little better. If you have 50 hours of taildragger and 200 hours total time, you would only have to fly your KR two hours before they would insure you. Both insurance companies stated instruction time in type and model of two to five hours they would insure you. You can only buy liability insurance. Hull and medical insurance was so expensive or not available.

I have made three or four calls to different individuals who did not understand or realize it is difficult to buy insurance. People who did have the time requirements refused to buy insurance because the insurance company would not insure them in the beginning.

I did ask about obtaining instruction in KR-2 for a KR-1. This was not acceptable according to Vemco and I don't know about USAA. USAA has another company writing their aviation insurance and I do not know who this company is.

This insurance information is based on the retract gear version KR-1. It would be nice if a trainer were available or agreement be made with the insurance companies for instruction in a KR-2 be adequate for KR-1 pilots.

Patrick Murphy
1309 Juniper Lane
Benbrook, TX 76126
817-249-4794

UNIFORM SCARF JOINTS

While trying to make some of the many scarf joints that are required of the four foot pieces of plywood for the fuselage and the strips for the spar webs I've resolved there must be a better way. In trying to find a way to make perfectly uniform scarf cuts, I have found that an adjustable dido blade put on the table saw set to 5/8" width and at an angle such that the beginning of the cut is flush with the table and the other end of the cut is equal to the thickness of the plywood. By running a straight board on top of the plywood as you cut will insure a straight and uniform cut. It sure beats trying to sand all of these joints and it is always better to glue a cut surface than a sanded one.

Dan Wilson
7301 Grand Meadow Dr.
Claremore, OK 74017
918-342-2508

FOR SALE

KR-2, never started.
-- KR200-001 sprucewood kit
-- KR200-003 mahogany plywood kit
 (8 sheets)
-- 6MM x 4'x 4 birch plywood
 A/C grade
-- KR200-039 alum extrusion kit
 (box never opened)
-- Many newsletters
-- 3 ring binders w/used plans
Paid over \$1,000.00, make offer.

Dick Bufkin
14605 Wacousta
Grand Ledge, MI 48837
517-626-2292

WANTED

Flying, problem free KR-2 on fixed gear.

David Westpahl
16711 4th St.
Lakeland, MN 55043
612-436-8022

HELPFUL TIPS

Whendrilling, tapping, machining aluminum material, I use a common candle for lubricant instead of commercial fluid type. Have found equal results with less mess to clean up.

Have you tried this stuff called SIMPLE GREEN for cleaning soot/oil stains off of bottom of your bird? Works like a charm! Water soluble and safe. Can be purchased in auto supply, drug supply, K Marts, etc.

James Takemoto
4633 E. Colfax Ave.
Denver, CO 80220
303-388-0407

DRILLING WING FITTING HOLES

I have enclosed a picture of an idea I had while shaping wing fittings for my KR.

I built a fairly sturdy box of the exact dimensions to contain eight pieces at one time. By doing this, I could drill all the holes at one time (hopefully accurately).

Lonny Luepke
1023 Mulberry St.
Mankato, MN 56001
507-388-4194



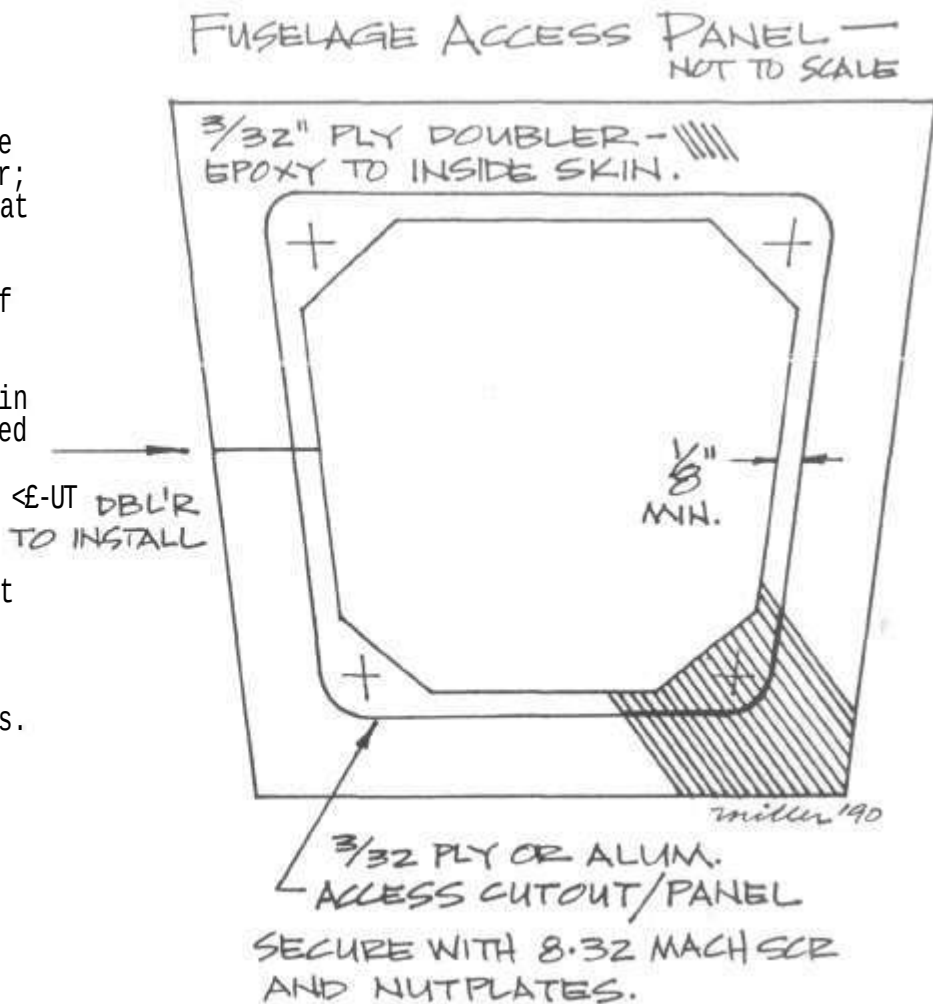
FUSELAGE ACCESS PANEL

I've long felt that the KR needed some sort of access to the tail group interior; if for no other reason than to assure that the end of my elevator cable is still snugged up by the nicopress sleeve. However, after seemingly endless hours of smoothing, filling and shaping the tail feathers and aft fuselage juncture, I couldn't bring myself to whittle a hole in the side of the fuselage. So... I chopped one in the bottom and now only the armadillos and I know it's there.

An opening approximately 4 x 6 (a trapezoid, actually) positioned in front of the interior tailwheel block and a bit aft of the last fuselage upright will permit a hand and flashlight entry.

Refer to the sketch and be aware of longerons, crossmembers and other widgets. Ultimate size and location is at builder's discretion.

Monte Miller
1900 Parkside
Denton, TX 96201
817-566-5871



KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MINNESOTA 55044
ISSUE NO. 155, APRIL, 1990

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413



KR NEWSLETTER

ISSUE NO. 156

MAY 1990



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



GEORGE TOTH, THE WOODLANDS, TX. N28GT, KR-2

Since I was ten years old, I have dreamed of building my own airplane. I began by building numerous model airplanes and after gaining confidence, was able to tackle a "full size" airplane.

About six years ago, I met a fellow aviator who was displaying a very interesting airplane at an air show I was attending. He said the plane was a KR-2 and asked me if I'd like to have a ride... I fell in love with the plane and ordered the spruce kit in January, 1987.

(cont'd page 2)

The airplane was completed and passed inspection this past March. First high speed taxi test was begun in April during which I accidentally found myself 50 feet above the runway. From then on I would do the same, full power, become airborne 40-50 feet above the runway, then power off and land straight ahead. (Editor's Note: Although George makes no mention of runway length, I wouldn't try this on any runway less than 6,000 feet.) I did this several times before I took it around the pattern for the first time on April 21.



In the pattern at 2500 RPM, gear down, cowl flaps open the airplane indicated 100-105 knots. Climb was 1000-1200 FPM at 70 knots. It floats over the runway at 40 knots indicated during flare. So far, I haven't tried full power cruise, the max speed I have reached is 120 KIAS with gear up and cowl flap open at 2700 RPM. I feel the KR will do approximately 140-145 KIAS at 3000-3200 RPM level cruise.

I used Diehl wings skins and tail feathers, that saved me about six months of work and the finish is remarkable. Other than that, it is built to the original plans without any modifications. The engine is a Revmaster 2100-D normally aspirated, 75 HP at 3200 RPM. Radios: Single Nav/Com, ADF, transponder with mode C, full gyro panel (although I don't plan on flying 1FR). Propeller is a Great American 52 x 49. I use an aluminum fuel tank (13 gal.) I purchased from Carl Eldridge, Wharton, TX.

George Toth
3451 Tangle Bush Dr. #612
The Woodlands, TX 77380

ACCIDENT REPORT FROM LOUIE BROCHETTI
CARLSBAD, CA

Ted Monto, a very close friend of mine and I were flying our KR-2s to the Copper State Fly-In held in Arizona last October. The flight over to the fly-in was beautiful. As we approached CASA GRANDE Airport, where the fly-in was held I knew the winds were kicking up but didn't know how bad it was on the ground until I called the tower.

They said the runway was closed, a plane had flipped over on landing and they had a 30 knot 90 degree crosswind. I asked where the closest alternate airport was and they said the Eloy Airport. So we decided to go there, a decision that would prove to be a tragic mistake.

I didn't know it at the time but the Eloy Airport was experiencing wind gusts of over 40 knots at a 90 degree direct crosswind. This situation would be bad for any airplane, let alone a KR.

I was the lead plane, I went downwind turned base and the wind was just blasting. I made an attempt to put it down, bouncing it a couple times and almost stalled it. I thought, what am I doing, put power to it, pulled out and called Ted and said, "DON'T LAND!"

He never responded. I don't know if he was too busy handling the situation or if he had already stalled and went in. I turned and as I got mid field, I saw the wreckage of his plane and a person running towards it. I just lost control and knew I had to get to him. I just flew the airplane onto the runway hot and as I jumped out of the plane, the guy that I had seen run to Ted's plane met me and said it was too late, he's dead.

If we had been given a second chance, we would have gotten altitude, regrouped, looked at the chart and either found a more favorable airport or if nothing else, landed in the desert, into the wind.

Ted wasn't given a second chance, I was. You kind of get complacent sometimes but you have to stay on top of things. You just have a three hour flight and you fly the airplane all the time, you can handle it well and you just want to get down and get to the fly-in. We were upset that we had to divert to another airport and thinking of a number of things except our safety.

Upon inspecting the condition of Ted's KR after the accident, I am convinced he would have survived the crash if he had

been wearing a shoulder harness. There was no fire and the cockpit was essentially intact. I believe Ted died as a result of head injuries resulting from contact with the instrument panel.

I urge anyone who does not yet have shoulder harnesses, to install them before their next flight.

I only hope that each of us will learn from this experience so that a tragedy like this will not be repeated.

Louie Brochetti
7040 Avenida Encinas #104-117
Carlsbad, CA 92009
619-931-8527

WITH GREAT SADNESS...

As many of you know, Carey Anderson, owner of Liteflite Hardware of Strafford, Missouri, has been producing parts for KRers almost as long as there have been KRers. Sometime ago, when I ran one of his ads I received a note from his wife requesting that I not run any more of his ads due to his poor health. With great sadness, I received the following note:

Dear Friends,

I am sad to report that my husband, Carey Anderson died on April 11, 1990. Since there may be KR builders out there with old newsletters containing his ad, I'd appreciate an announcement in your next Newsletter.

There are many KRers that contain Carey's parts. He enjoyed the work and the thought that he was helping builders get their KRers in the air.

To all of you in the KR family, thank you for your many years of friendship and support.

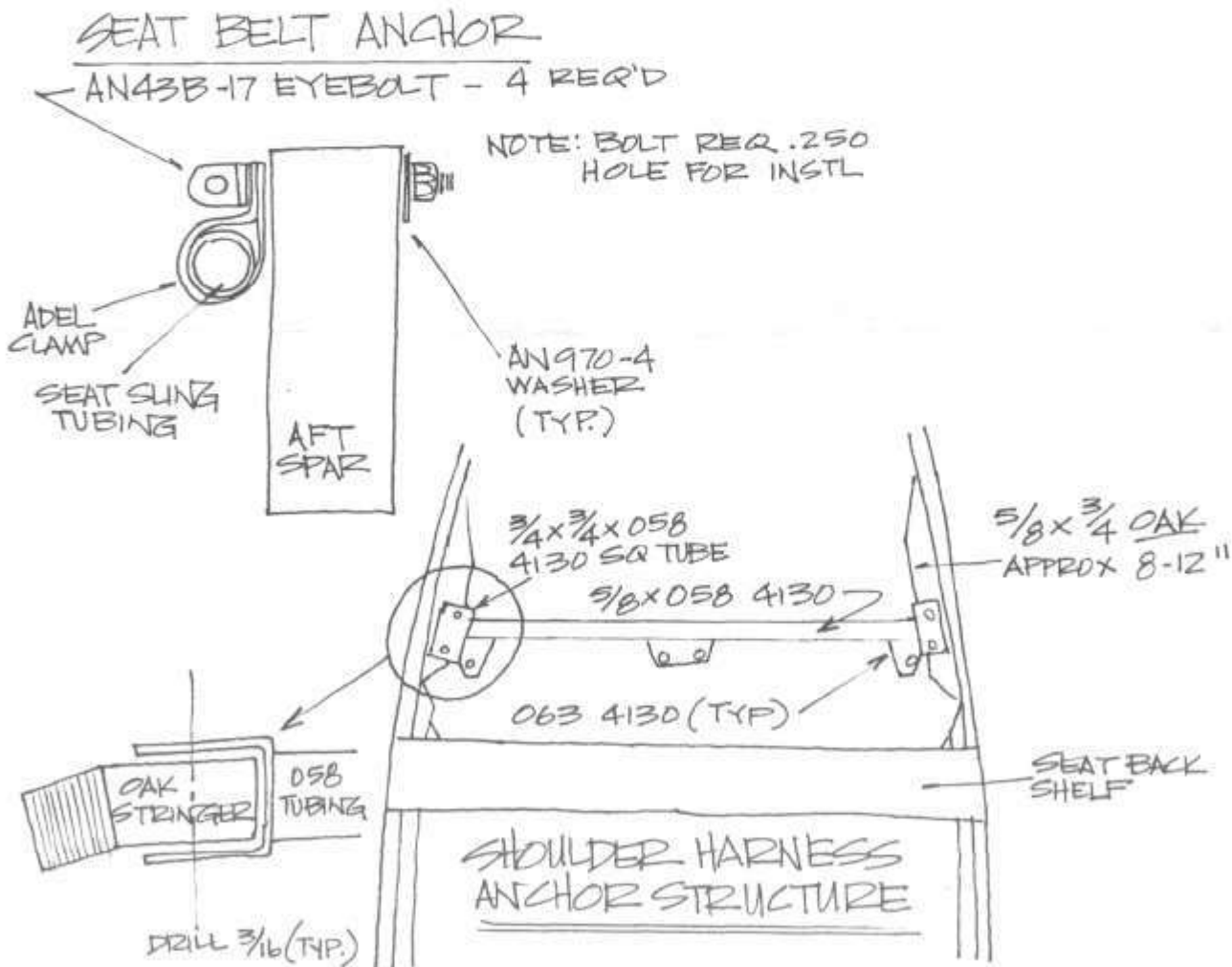
Sincerely,
Anita Anderson
Rt. 3, Box 138-10
Strafford, MO 65757

SHOULDER HARNESS ATTACH POINTS By Monte Miller

I've been struggling with ideas for installing seat and shoulder belts... each solution more complex and heavier than the last.

On page 45 of the Builders Manual, is a cross section of the seat sling installation. By replacing the called for AN-3 bolts at each end and the center with AN43B-17 eyebolts, you'll be able to not only secure the seat sling tubing with an Adel clamp, but provide an anchor point for the seat belt. The center seat belt bolts will capture the tubing Adel clamps as well as the lower elevator pulley bracket. Again check out the sketch and refer to page 72 of the manual.

A shoulder harness anchor should be located, ideally, on the same level as the shoulders or at a point above. Any point that pulls the body downward should be avoided. Remembering the KISS principle, an anchor location about 4-6" aft of the seatback shelf and fabricated as shown in the sketch will provide an adequate and secure anchor point. Remember, adding weight aft of the CG will only cause you grief.



LOWEST PRICES



LORAN SPECIALS VOYAGER LORAN

Portable Handheld
Made in U.S.A.
by Micrologic

\$325

- 100 Waypoints
- ETA/Range
- Mag. bearing to waypoint
- Course and speed
- Alert to waypoint
- Cross-track error

ROSS LCA 200 Loran-C Aviator

\$585.00



2 1/2" x 6 1/4"
Comae w/antenna coupler for use w/taoting com. antenna & AC adapter for use in home.

ASA Air Pro II

• Digital Display - 4 - Band Recetrar \$JT"7 OC
• Area Weather -AM/FM O / 570



Michel Avionics
Retrofit NavComs for
Cessna & King radios

- MX 300 1275.00
- MX 170B 1275.00

OTHER HANDHELD RADIOS

- Narco HT-870 **365.00**
- Portable Power Amplifier **168.50**
boosts any handheld to 10 watts

TERRA RADIOS

BLIND ENCODERS

- ACK A-3D 189.53
- Na~oAP.-85C133.5C

FLIGHTCOM Headsets & Intercoms

4D Headset **\$88.50**

- 2,4D Headsets
- 1, IIGX Intercom.....245.00
- 501 Intercom Headset. 159.50



FLIGHTCOM III

Portable Clearance
Recorder & Stereo Intercom
***118.50** 2 place

FLIGHTCOM Hid ***209.50**
2 place add \$20 for 4 place



Soft Com Headsets & Intercom Specials

Other Headsets

- Sigtronics S-40.....135.50
- Peltor7003.....195.00
- PA-11-40.....114.95

Dave Clark/Telex available

PIT switch with Headset 10.95



Electronics International

Smart Scanner

- 8 Channel.....825.00
- 6 Channel.....725.00

Ultimate Scanner US-8

- 12 Channel. . . .single '1325/twin '1525
- 16 Channel. . . .single '1475/twin M775

Complete Line of Electronics
international' instruments

AERIAL IMAGES

CARLSBAD, CALIFORNIA

(619) 931-8527

EDITOR'S NOTE: THE ABOVE AD IS FOR LOUIE BROCHETTI'S NEW AIRCRAFT SUPPLY COMPANY, AERIAL IMAGES. THROUGHOUT THE YEARS, LOUIE HAS HELPED COUNTLESS KR BUILDERS WITH THEIR PROJECTS. LOUIE HAS ALSO ASSISTED RAND ROBINSON ENGINEERING IN THE DESIGN OF THE FIXED GEAR OPTION FOR KR AIRCRAFT.

I HOPE IF YOU ARE IN NEED OF INSTRUMENTATION OR EQUIPMENT, YOU WILL CONTACT LOUIE AT THE ADDRESS BELOW.

LOUIE BROCHETTI
AERIAL IMAGES
7040 AVENIDA ENCINAS #104-117
CARLSBAD, CA 92009
619-931-8527

Just thought I'd drop you a note to bring you up-to-date. I'm enjoying reading the Newsletters especially the articles by Stu Robinson. Most people don't know the beginnings of the KRs.

This last year has been pretty hectic; got married in June (we were married by Tom Endicott, who is a KR builder and pastor in Washington). N1004K has about 500 hours on it now and is still a great flyer. Most of my flying lately has been practicing aerobatics and putting on little shows for the local airports. Keep up the good work!

Kevin Kelly
22039 Fallview Lane
Sonora, CA 95370
209-532-4326

BUILDING UP-DATE

I am working on a KR-2 project that is about 65% finished. I'm using a 1835 Revmaster engine. Several interesting problems have emerged which might test the wits of our fellow workers.

First: Has anyone come up with a good way to add oil to these engines? Mine has a plate over the hole with bolts on it - most unhandy, I might say.

Second: I got a fancy \$270 tuned exhaust system- chrome and everything and I can't use it because the motor mount is in the way.

Third: How does one use the tail wheel that is currently being sold for the KR-2? The one I got is no way like that shown in the plans.

Wayne Stringer
Rt. 3, Box 95
Ft. Scott, KS 11701
316-223-5995

The following time period has been reserved for Rand Robinson:

Monday, July 30, 1990
Tent No. 3
11:30-12:45 p.m.

For more information, contact:

Rand Robinson Engineering
15641 Product Lane
Suite A-5
Huntington Beach, CA 92649
714-898-3811

HELP!

I have been a KR fan for sometime now. I've ordered the info kit from Rand Robinson, subscribed to the KR Newsletter and have been reading through a set of back issues. There is only one thing that I would like to do before beginning construction and that is have a ride in KR-2.

If there is anyone within a 400 mile radius of Bismark, ND that would be willing to take a passenger for an intro flight, I would gladly fly over to meet them.

Tim Klawon
806 S. Woodland Dr.
Mandan, ND 58554
701-663-2352

KR-2 FOR SALE

KR-2 95% with Continental C-75 full electrics, in trailer. \$4,000, licensed pilots only.

Ted Medin
12010 Pomerado Rd.
Poway, CA 92064
619-586-0350



FOR SALE

1989 KR-2 -• TTA&E 75 hrs *A11 equipment listed is new! No used or surplus items were installed. New 2180cc Great Plains engine with shielded magneto ignition, NASA vent oil cooler, electric start. Chrome, tuned MAPI exhaust system, Ellision throttle body carburetor, Sterba prop 52 x 52. All new instruments, "true" airspeed ind., rate of climb, directional gyro, certified altimeter, certified static system, cyl hd temp, oil temp oil pressure, magnetic compass, just installed new hydraulic brakes, wheels and tires, radio, new, 720 nav/com with intercom and mode "C" transponder, electric trim, electric flap, auxilliary wing fuel tanks. Total fuel 19.5 gals, tinted canopy, rear side windows, baggage compartment, blue velour interior, cabin heat, 2 halogen flashing beacons, Diehl molded wings with super tips, adjustable NASA vents for cockpit. "Brand new 3 color polyurethane paint", just a month old, Miami white, royal and light blue trim. Always hangared. Cruise 3.9 ghr @ 150+, stalls at 42 mph. Cost to build, over \$14,500 just for factory new parts, not counting four years labor. Aircraft is !! Super Sharp!! Sacrifice at \$10,500. Will trade airplane + cash for fast four place, (Bonanza, 210, Commanche).

Bob Fabian
Rt. 4, Box 451
Mountain Home, AR 72653
501-492-5759

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00.
INDIVIDUAL COPIES \$1.25 EACH.

FOR SALE

KING KX-145 Nav Comm. 720 channels. Includes KI-205 GDI and tray. Factory reconditioned in 1988. See SPORT AVIATION, February 1990, page 23. Unit was removed to make room for Loran. Works perfectly. Seen at \$800+ in Trade-A-Plane. Asking \$725 with instructions.

Richard Kunc
3477 Fairway Lane
Orlando, FL 32804
407-627-0062 (w) 407-290-1104 (h)
407-629-0450

FOR SALE

KR-2 fuselage with rudder pedal assembly, spars and fittings complete, woodwork 95% complete, foam kit, wood kit, fixed landing gear with wheels and brakes, plans and drawings, extras, \$975.00, no time to build.

Dave Henderson
P. O. Box 614
Knights Landing, CA 95645
916-735-6172 mornings

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 156, MAY, 1990



FOR SALE

Award winning KR-2, fixed gear, 2100 engine (highlighted in Issue No. 139, December, 1988). Dual controls, custom paint and interior. Loran, intercom, transponder, encoder, VC compass, strobes, 4 cylinder monitoring on CHT and EGT, electric trim, new Sterba prop. 600 lbs. empty, 150 mph ind. cruise, 178 mph top speed sea level, 1200' FPM solo climb... much more.

Louie Brochetti
7040 Avenida Encinas #104-117
Carlsbad, CA 92009
619-931-8527

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO 413





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



**DAN DIEHL'S "PRIDE AND JOY" WITH
PAUL MILLET'S "PRIDE AND JOY"**

I wanted to let you know what we've been doing on the tri-gear. My wife and I just completed an 1800 mile trip in the KR-2 built by Kerry Vaughn of Ontario (see picture). As many of you know, this airplane has won several awards and is truly a nice KR-2. It was built and flown by Kerry for about 185 hours as a stock retractable-gear airplane. Kerry sold the aircraft to Paul Millet of Montreal. A landing mishap destroyed the retract gear hinges and locks. Paul trucked the KR to Jenks, Oklahoma and we installed the tri-gear (fixed) with Rand's new wheel pants.

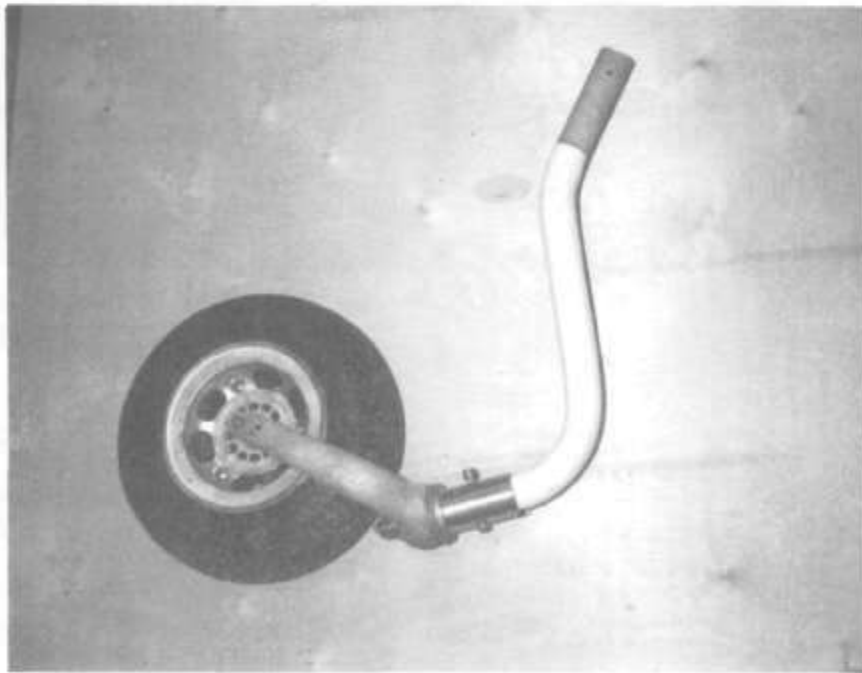
Alicia and I flew the KR back to Montreal via two stops to Dayton, Ohio the first day and a tour of the Air Force museum, one stop and then Niagara Falls the second day for a terrific evening at the Falls. Then one stop in Montreal for a nice dinner and overnight stay. We then rented a car and spent the next five days touring Maine, the coast, New Hampshire, Vermont and upstate New York.

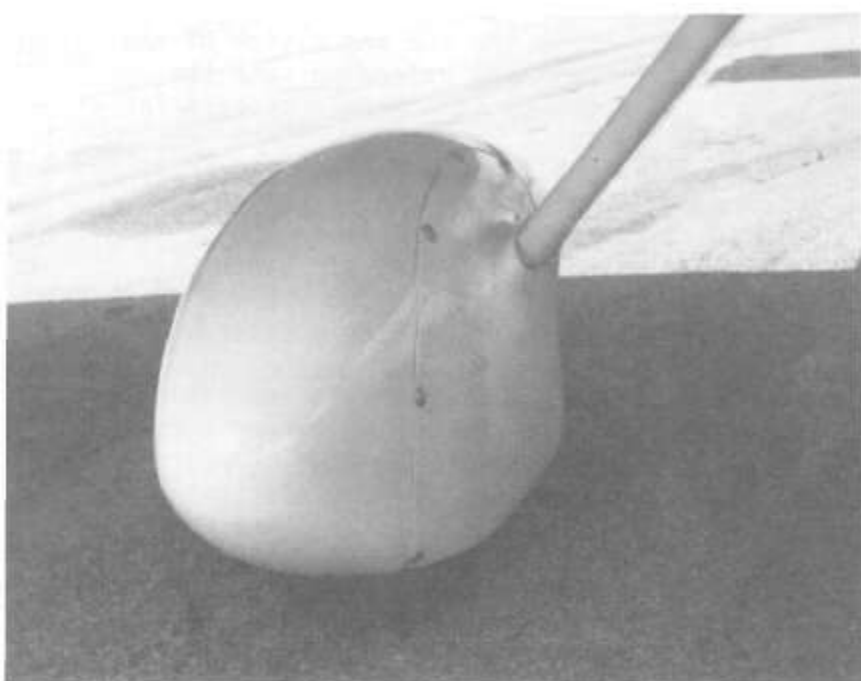
All in all, we had a terrific time. Returned to Montreal and American Airlines brought us home.

In remembering the trip and I've made several notes about the KR. The stock Rand Robinson fuel tank had been modified somewhat for radio clearance, thus yielding a 13 gallon capacity. The 80 HP(?) Limbach burned 4.3 gallons per hour over the trip. This gave us about a 2.5 hour range. My first thought was that this would prove to be a detriment. As it turned out, 2.5 hours was about all we could stand to be in the airplane.

Kerry Vaughn built this KR to fit him. It used the stock canopy and turtledeck. Kerry is about 5'7". I'm 5'11" and found that to get me in this KR, I had to remove all the seat and cushion and mail it to Canada. I sat on the belly of the airplane and put in some foam rubber for Alicia. Also, my knees were jammed against the bottom of the panel. The panel in this KR extends down 3.5" below the top of the top longeron (too low for me). I'm sure it fit Kerry fine. Flying in Canada, one would expect that cool ventilation would not be needed much. Well, on this trip we flew in record setting 80-85 degree temps all the way to Canada. We about fried until the first stop and we ripped out all the canopy bubble seal to let in some air. The new gear completely closes off the holes around the gear so no air comes into the cockpit from below. One should consider cabin vents when building.

Another interesting observation; the stock fuel tank has the radio clearance slot on the right side of the panel. This would work fine with dual control sticks but with the center mounted stock stick (which I still prefer). The pilot must reach across the panel with his left hand to operate the radio... most difficult especially in rough air. We found that Alicia could do the radio frequency changes better than I. I still like my radios on the left side of the panel. This KR has a Limbach Engine. It's 80 HP rating does not translate to 80 of our HP. The engine ran flawlessly during the entire trip... always started on the second or third piston, never missed one time and didn't leak or burn one drop of oil. I feel one must get back to engine displacement and not HP ratings when planning the performance of the KR.





The (roughly) 1950cc Limbach performance is about the same or a tad better than any 1835 VW powered KR I've flown. It doesn't have near the power of a 2100 or 2200cc and, of course, can't compare with the 2600cc. In other words, fancy heads, valves, carbs, exhaust, cams, etc. don't have nearly the power as cubic inches and compression ratios.

The KR averaged 152 MPH over the 1800 miles and flew 11.5 hours. We made 8 landings on the trip and carried enough clothes for two for an 8 day trip with two people aboard. Some people say the KR is not a cross country airplane for two!

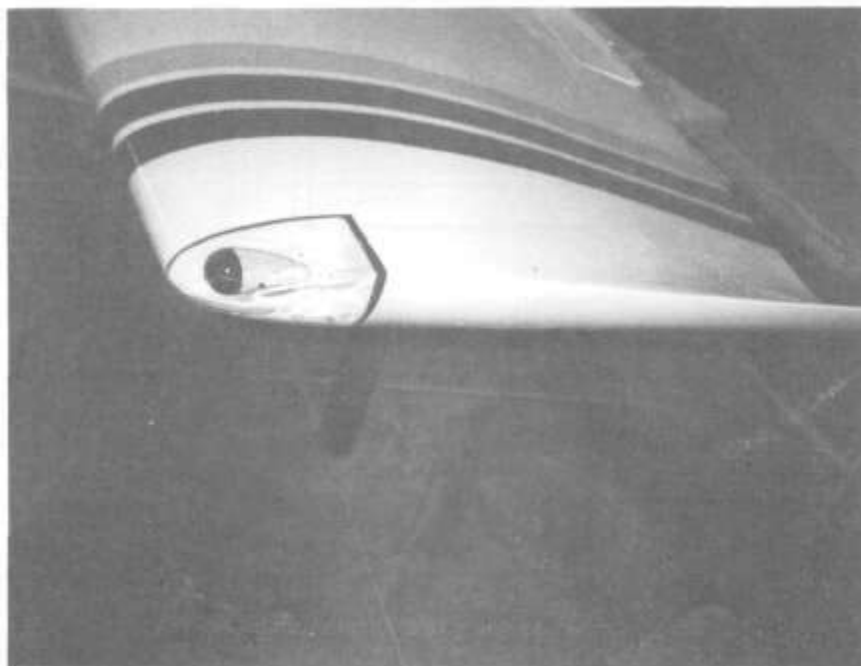
Another interesting thing happened the day we took off from Jenks. Between thunderstorms, the Loran quit working and failed to operate the whole trip. With Mode C and transponder installed, we flew with "flight following" the entire trip with controllers handing us from one to the next giving us headings, altitudes, ground speeds and traffic all along the route. I now have a new attitude towards the system, controllers and Mode C. It's neat and was most comforting having them "along for the ride". This KR has no VOR or ADF, so navigation without the Loran was by the charts only.

I've included some pictures of the airplane with the fixed tri-gear. We now have two tri-gears flying and two fixed taildraggers flying. If anything, the fixed taildragger will add speed over the retract, due to the much cleaner under wing area. The tri will cost you about 5-7 MPH. Rand Robinson and I will handle the gears for \$420.00 for the mains and \$420.00 for the nose. The mains weigh 15 lbs, compared to about 30 for the retract. The nose gear weighs 9 lbs. complete with wheel and tire. In other words, this fixed tri weighs 6 lbs. less than the stock retract taildragger gear.

Another item of interest are the wing tip light lenses. We made molds and are having these made to fit the Diehl wings only. They are \$60.00 per pair and come in clear only.

To close, Alicia and I thank Ken Rand for such a neat little airplane that made this honeymoon trip possible.

Dan Diehl
1855 N. Elm St.
Jenks, OK 74037
918-299-4445



REMOVABLE SEAT BACK

It has been nearly three years since I started construction on my KR-2. All building time has been on the weekends since my profession takes me out of state. Every stage of construction has been according to plans with no deviations.

One minor problem that I did encounter in the beginning was with the fuselage width between the top longerons. After the belly plywood is installed, the guides on the work table are removed and the "boat" is turned right side up. Though a brace is temporarily placed between the top longerons to retain the desired cockpit contour, I still lost an inch of width because of the bowing tendencies of the fuselage sides. Losing an inch in this compact design is similar to losing 2 or 3 inches in a C-172. The loss certainly is not a major setback because the premoulded turtledeck and canopy frame are flexible enough to conform to the longeron shape. If you are using foam and glass the technique is still the same. To return the fuselage back out to it's specified width would take a tremendous amount of force and would put excessive pressure on the 5/8" spruce cross members and weaken the epoxy joints. So, I didn't fuss and I left it as is. A possible solution to this situation would be for future builders to allow an extra 1/2 inch in width when laying out the guide blocks. When the "boat" is then removed, the bowing that will occur should fall closer to desire specifications.

My seat modification is simple enough... I have set the 1/4 plywood seat back in a slat that runs across the top of the aft spar. The slats are made from leftover 5/8 spruce. Cut the spruce lengthwise on a handsaw so as to form 45 degree sectional cross cut of the piece. In essence, you are dividing it into two equal triangular halves. Use as many pieces as necessary (buted together) to run the entire length of the spar. Bond the slats to the top of the spar using epoxy (your choice) mixed with a little cotton flox. I've been using Hughes Glue - FPL 16A epoxy on the recommendation of Jim Staib (a fellow KR'er) and on the confirmation of a Sport Aviation article. It is a good strong wood penetrating adhesive.

Be sure to place the slats evenly and wide enough apart to set the 1/4 seat back in between them. Next, modify the seat back web brace by putting a second web across the bottom of the 5/8 spruce cross members. The adherent strength of the two webs on the top and bottom of the seat back shelf and extending onto the longeron doublers is adequate support for any KR pilot.

The slats eliminate the need for permanently mounted verticle supports. Also, I cut out some lightening holes in the 1/4 plywood. The five-ply birch plywood is plenty strong and you won't even know the holes are there after you upholster.

That's it., you now have a removable seat back that gives you quick and easy access for inspection, storage, repairs and if you disconnect the elevator cable and lay the seat back flat off the rear edge of the aft spar, you can take a snooze.

The toughest part of the modification was drawing detailed sketches to better illustrate this change. I never really appreciated the time that contributors of the Newsletter give until now.

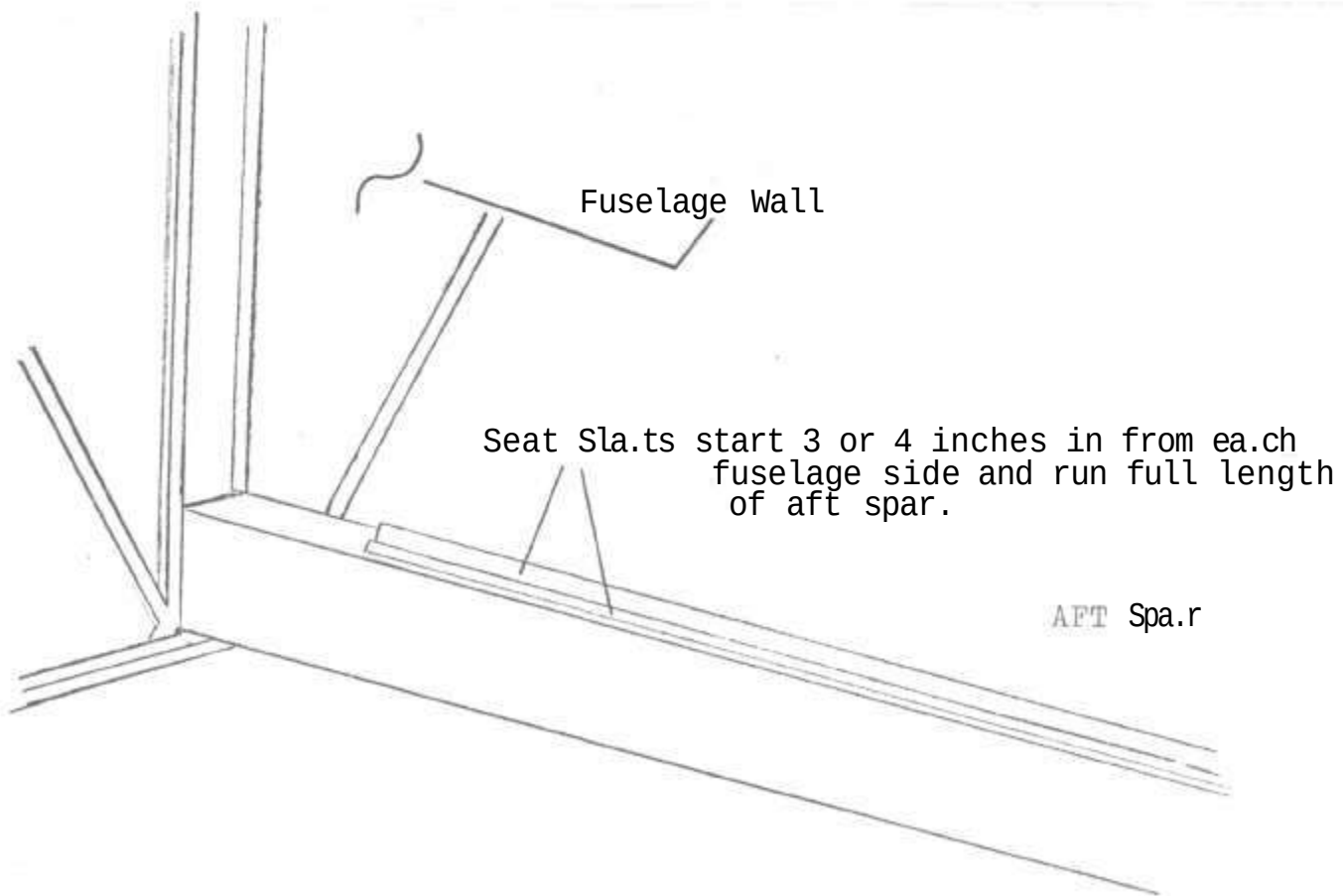
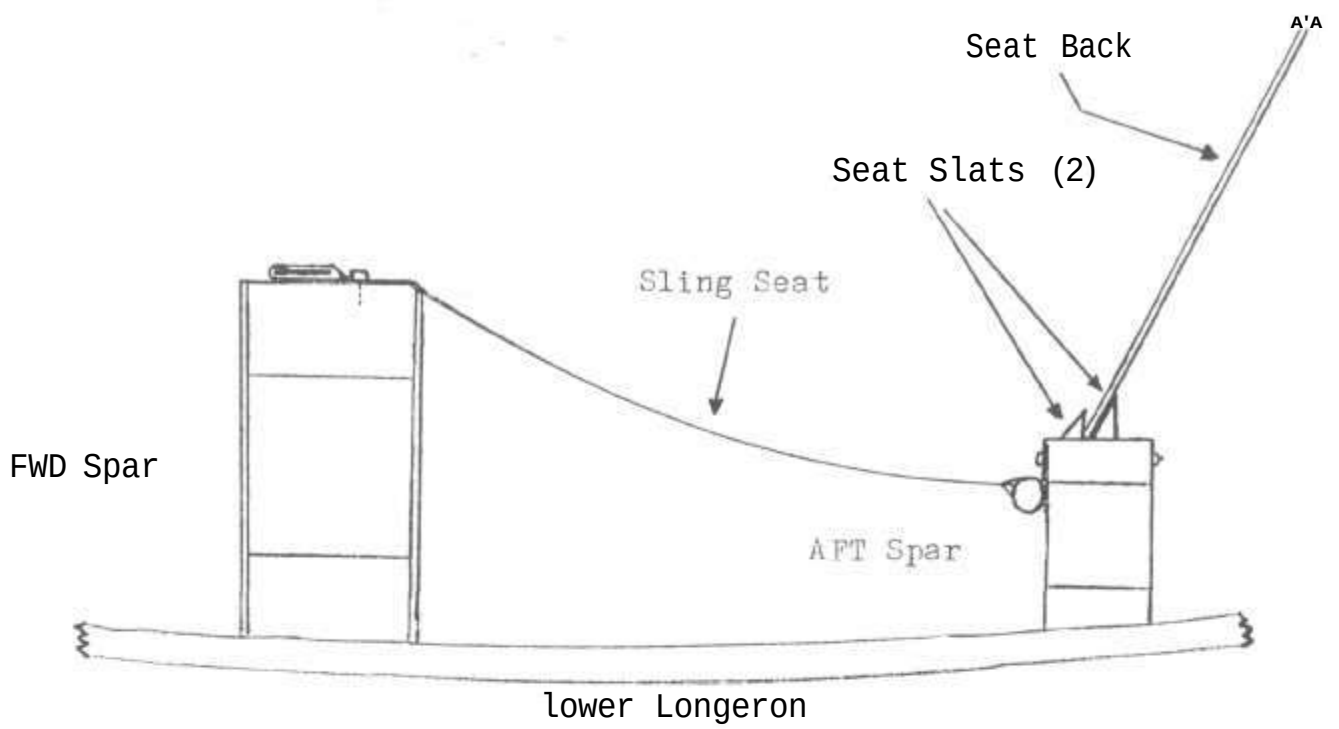
Our Newsletter is probably one of the best in the homebuilding realm. Thanks goes to everyone who contributes.

Gerald Heffner
R. R. #1, Box 429
Humboldt, PA 18201
717-455-9138

KR-2 KIT FOR SALE

All woodwork done, fuselage is one bay (14") longer than standard. Components include: Dan Diehl's wing and tail skins, fixed gear kit with disc brakes, hardware kit. All controls and linkages built by Carey Anderson of Liteflite Hardware, much more. \$3,000/offer.

Tim Rowin
2637 Van Buren St.
Carson, CA 90810
213-518-3086



INSTRUMENT PANEL CONSTRUCTION

The KR builder's manual is pretty sparse when it addresses the instrument panel and its installation. Come to think of it, sparse might be too kind a word as you're really on your own.

My stone axe simple KR utilizes the Rand premolded parts so the position and upper profile of the panel is pretty well fixed. The only question being how to fabricate a removable panel and keep it as simple and light as possible. The final result meets all requirements, however, its design evolution began long before the actual installation. As instrument panels are as personal as your choice of spouse, you'll need to remind yourself that this is only one of many solutions.

Modify the premolded forward deck, before bonding it to the fuselage boat, by trimming away the attached panel face. Leave at least a one inch deep flange around the upper edge. This flange will hold four 8-32 nylock nut plates. Space the nutplates equally along the upper portion of the deck flange. Use pop rivets and epoxy flox to secure them to the back side of the deck flange. Note the cross section drawing. For now, avoid the urge to attach the deck to the airframe.

Make two panel attach brackets, left and right. These will bolt beneath the upper longerons and will carry the majority of the panel's weight. The sketch should be self explanatory. Position and install with bolt heads on top of the longeron so the bracket could be removed, if needed. Flox over the bolt heads. The forward deck may now be permanently attached, as long as it fits within your construction schedule.

Aluminum produces a fine panel. Either 2024 or 6061 x .063 is ok. The 2024 costs a bunch compared to the more economical and easily located 6061. If you live in a fairly good size metropolitan area, check the phone book for companies that produce traffic signage. Most of the material utilized by these outfits is .063-6061. I was able to buy a KR panel for half the cost of mail order stock.

Pick up a large sheet of heavy cardboard from an art supply shop and use this to produce a pattern for your

instrument panel. Avoid the shirt box variety cardboard as it's too floppy for the double-wire KR. Begin by trimming the cardboard to fit over the longerons and to match the upper deck profile. Test fit the pattern and check for stick, knuckle and knee clearance. Keep carving cardboard off the bottom edge until you can get into the cockpit and over the spar without difficulty. There's really no need for a deep panel on a daylight, VFR KR-2.

Trace the pattern outline onto the aluminum. Don't cut any instrument holes just yet. Trim the aluminum to shape but slightly oversize. Fine tune the panel so that it will fit over the longerons but do not develop the final upper deck shape at this time. Radius the inside corners and chances are nil that a stress crack will ever develop there.

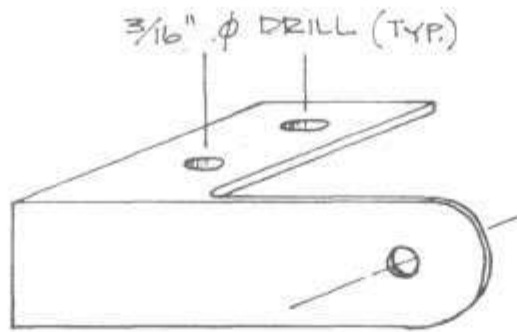
Mark a drill position at the bottom corners of the panel that will capture the previously installed attach brackets. Drill both the panel and bracket at the same time. A single 3/16" bolt at each side is more than adequate.

Locating and drilling the panel's upper installation screw holes so that they match the previously installed nut plates could be a nightmare unless you use a trick granddaddy taught me.

Cut the heads off of four 8-32 machine screws and grind a point on the end of each. Overall length should be about 5/16". Hand thread into the anchor nut, allowing the point to extend just above the surface. Temporarily bolt the panel blank to the attach brackets. Using a plastic mallet, tap the panel at each screw location. The screw points will prick the aluminum at the exact drill location. Don't let your ham-fisted brother-in-law help you as he's apt to knock the anchor nuts off the back side of the deck.

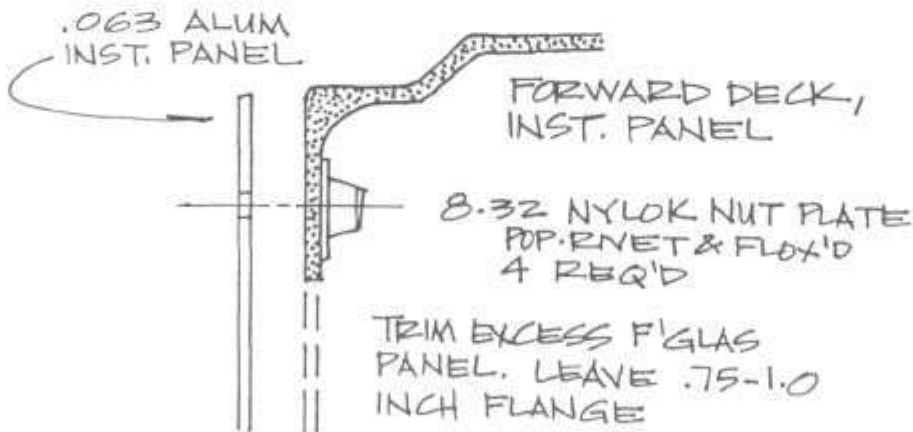
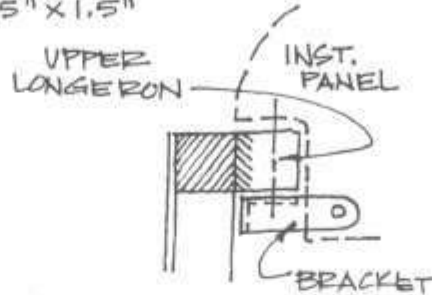
With the aluminum panel blank snugged down, it's a simple matter to use a file and bring the panel to its final outline.

Monte Miller
1900 Parkside
Denton, TX 96201
817-566-5871



INST. PANEL BRACKET
 .125 ALUM ANGLE
 APPROX 1.5" X 1.5"

FABRICATE FROM
 LEFTOVERS OF
 METALS KIT.
 2 REQ'D - LEFT/RT.



THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
 P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
 612-435-7275 - EVENINGS AND WEEKENDS.
 EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
 ARE \$15.00 PER YEAR- U.S., \$20.00 PER
 YEAR- CANADA AND \$30.00 PER YEAR-
 OVERSEAS.
 SET OF ALL AVAILABLE BACK ISSUES
 (OVER 100) FOR \$75.00.
 INDIVIDUAL COPIES \$1.25 EACH.

ACTION PACKED VIDEOS
KR VIDEO TAPES

TAKE A RIDE IN A KR - TAPE 1

Tips on flying a KR, inside the cockpit flying scenes, tips on a tail dragger, instruments, rudder pedals, joystick handling and more. \$29.95 VHS or Beta

DAN DIEHL'S WING SKINS - TAPE 2

Step-by-step instructional video tape. Dan Diehl shows you how to put KR wing skins on. \$29.95 VHS or Beta

KR'S IN FLIGHT - TAPE 3

1985 KR Flyin. Aerial video photography of KRs flying in formation. Pit talk session with Dan Diehl and other builders about tips on building and flying KR's. \$29.95 VHS or Beta

1986 KR FORUM - TAPE 4

Steve Bennett speaks on engines for KRs. Al Campbell "Rainbow Rider" speaks on first flight, turbos and KR insurance. Dan Diehl speaks on pre-molded parts,,gas tanks, and much more. Share their experience and save time building your KR, \$29.95 VHS or Beta

TO ORDER, MAIL CHECK OR MONEY ORDER TO:

ACTION PACKED VIDEOS
13303 EAST 39TH STREET
TULSA, OK 74134

NAME _____
ADDRESS _____

QUESTIONS: 918/665-3735

(Circle One) TAPE # 1 !4 VHS or Beta

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 157, JUNE, 1990

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO 413



KR NEWSLETTER

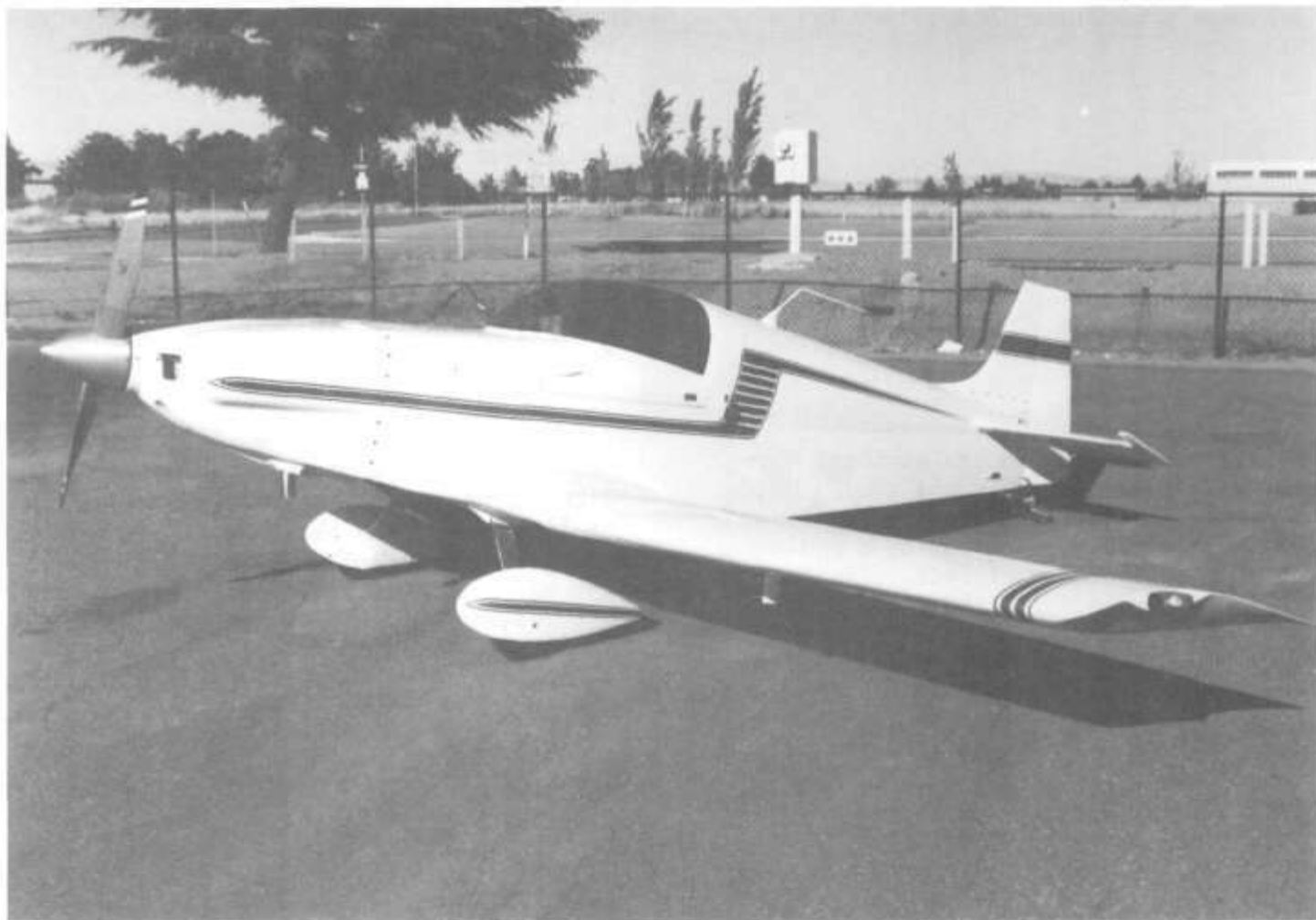
ISSUE NO. 158

JULY 1990



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



ROGER HANSEN'S KR-2M (MODIFIED) N200RH

It has been nearly nine months now that I have had the turbocharged Continental 0-200 flying in my KR-2M; and what a difference an engine makes! While I had a few minor teething problems initially, the aircraft has basically turned into a "turn key" airplane (turn the key and go). I could not say that when it was powered with a VW since it required a lot of maintenance.

Everyone wants to know the performance figures since it has approximately 120 horsepower. First of all, you must keep in mind that the aircraft weighs 910 lbs. empty. This alone has a dramatic effect on climb and, interestingly enough, a substantial effect on cruise performance of my KR.

(Cont'd page 2)

N200RH has been flown at approximately 1460 lbs. on a recent trip down to Baja. At that weight and without wheel pants, (wheel pants contribute approximately 7 knots) we averaged 125 kts (145 mph) for the 940 mile one way trip. On the return trip, we fueled up at Loreto, Baja California Sur with 35 gallons of fuel, two adults on board, 98 degree temperature (sea level airport), some baggage and climbed out at 500 ft/min NOTE: This as well as all take offs are at 40" of manifold pressure in order to produce the horsepower to twist my 59 x 70 Great American propeller.



The only major concern at these high ambient temperatures is oil temp. Under these conditions, oil temperature can climb past 250 degrees during a prolonged climb. As a matter of fact, climbing out of Calexico, CA where the temperature was 109 degrees, the oil temp went to 260 degrees as we climbed from sea level to 6500 ft to avoid a sand storm blowing off the desert. Because of the occasional high oil temperatures and the fact that I am running a turbo, I run nothing but Mobil AV-1 synthetic in my engine. Having worked for an engine manufacturer who produced turbocharged diesel engines, we conducted substantial testing on synthetic oils and while there are quite a few varieties out there, (each has specific characteristics it is designed for) it can be generally stated that synthetics out perform petroleum based oils in nearly all categories except price... they are more expensive!

On the other end of the weight spectrum, 12 gallons of fuel, wheel pants installed and pilot only, the aircraft climbs at 1500+ ft/min (my VSI does not have individual markings beyond 1500 ft/min and stops at 2000 ft/min) and

cruises comfortably at 150 kts (173 mph). Top speed is 157 kts (181 mph) which was verified by Loran C on two way, opposite direction runs, at 5500 and 6500 ft. This same run was made a couple of days later with the 31 gallons of fuel (114 lbs more weight) and the max speed dropped to 149 kts... again, a rather dramatic difference in speed. This tends to prove the need for more wing area at higher gross weights to maintain speed.

Slow flight is another area that my KR shines. I can maintain level flight at 44 kts (50 mph) and stall occurs somewhere below that figure (airspeed indicator becomes inaccurate below 50 mph). Final is flown at 52 kts at lighter weights and 60 kts at heavier weights (that's 60 and 70 mph respectively). Best rate of climb is between 70 and 80 kts (80 and 92 mph) depending on weight. A comfortable cruise climb is 95 to 100 kts (110 to 115 mph). Total fuel capacity is 39 gallons which provides, at cruise speed, 5.9 hours duration with no reserves, or 1000+ statute miles. A lot longer than I care to sit!

Haven't had time to take any aerial photos, too busy flying places. However, I have included several ground shots so you can see what the plane currently looks like. In the meantime, work hard, the fun of flying is worth it. I hope to see many of you at Oshkosh this summer. My plans are to arrive on Wednesday or Thursday, before the first weekend and leave on Monday or Tuesday. Oh, by the way, Steve Bennett, please save me a reservation at the KR dinner on Sunday night. If you're looking for a program that night, I'll be glad to show slides of my Baja trip... an interesting adventure! Give me a call if you want me to bring the slides.

Roger Hansen N200RH
2517 Aranda Dr.
San Ramon, CA 94583
415-830-1842

EDITOR'S NOTE: ROGER'S PLANE IS NOT A STOCK KR-2. IT HAS BEEN EXTENSIVELY MODIFIED IN ORDER TO HANDLE THE O-200 AND IS OFFICIALLY LISTED BY THE FAA AS A "MODIFIED" KR-2.

RAND ROBINSON ENGINEERING CATEGORICALLY OPPOSES THE USE OF A CONTINENTAL O-200 ENGINE IN STOCK KR-1 OR KR-2 AIRCRAFT. THEY HAVE STATED THAT STOCK KR-1 AND KR-2 AIRCRAFT ARE NOT DESIGNED TO HANDLE THE ADDITIONAL HORSEPOWER AND WEIGHT OF A CONTINENTAL O-200 ENGINE.

(NEARLY) FLUSH ANTENNA SYSTEMS

It never seemed right to me to build a sleek, efficient composite airplane like a KR and then slow it down with draggy antennas. So I looked around for some flush-mounted stuff. I wasn't the only one either. Just look at the commercial 747, MDIO's, Starships, B1, B2, etc.—none of them have much of anything sticking out in the slipstream, except wings and control surfaces.

Well, I found this EAA antenna and electronics guru, Jim Weir, who runs Radio Systems Technology, 13281 Grass Valley Ave., Grass Valley, CA 95945, 916-272-2203. He's quite a guy and comes up with things like digital OAT for \$25.00 and PTT switches for \$5.00 and flush mount antennas. RST makes avionic radio kits (like NAV-COM'S) and has a neat catalog, even if just for browsing through. Anybody interested in antenna installation should order his "Plastic Plane Antenna Anthology" for \$5.00. The minimum order is \$10.00 though, so order a bag of toroids for another \$5.00... you'll use them on any NAV-COMM antenna you build with these plans.

Basically, he described a type of antenna called a dipole (as opposed to a whip) which can be flush-mounted under the glass skin of the wings. In fact, this antenna, properly designed and built can perform better than a whip. This is because you can "point" it to get optimum reception/xmission in a certain direction. For instance, a glide slope needs to point forward of the nose and down and a LORAN needs to point towards the Earth and so does the DME, ADF. NAV and COM'S, though need to address air-to-air as well as air-to-ground communications so he explains how to do that.

The antennas themselves are pretty simple. All you need is coaxial cable, copper tape (from a stained glass supply store) and those toroids to tune the antenna. Then you trim the copper tape into strips, depending on the frequencies that particular avionic operates at and point the strips in the right direction and solder the ends to the coaxial cable. The tape is adhered to the lower wing surface and finally, the whole "shebang" covered with a layer of fiberglass. This can be done after a plane is built but it's easier to install during construction.

The placement and orientation of the antennas is the tough part. One thing this Anthology makes clear, is that you don't want the ends of any dipole antenna too close to anything conductive. Conductives will shadow another radio from getting your signal or keep you from properly receiving another signal. Point in case: Say you've got a whip antenna mounted above the turtleneck and you're talking to an airport on the ground. To get to the tower that radio signal has to pass through two very large conductors. The engine/mount/accessories/firewalls and the pilot. Ever wonder why many high wing span cans were so lousy in reception when you were on the ground? That's why! Conversely, that same aircraft probably comes through 5x5 when airborne and talking to another plane because the transmitted waves aren't going through these "iron curtains". We KR jockeys have it easy though—our plastic and wood wings don't stop much of the NAV waves, so mounting these antennas on the underside of them gives you **really** good reception of VOR's.

LORAN antennas is where the KR flops. Being so non-conductive, the KR doesn't have the large ground plane surface like a sailboat (the ocean) or a spam can (it's aluminum skin). So, to increase the reception of the three Loran chain signals, we actually need to add metal (carefully) to get the best reception. The papers from RST discusses all this.

Now, I'm really not being paid by this guy in Grass Valley, it's just that his ideas WORK WELL. He did all of the Voyager's antenna and the Starship and EZ, etc. To boot... he's cheap! Several companies sell NAV or COM prepared dipole antennas for \$50-\$80, which can be made with copper tape for \$5.00, if one just knows how and follows a few basics on selection of location.

Griff Pickett
404 N. Jackson
Raymore, MO 64083
816-331-9388



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD, OSHKOSH, WI 54903-3086
PHONE: 414/426-4800

ADJUSTABLE CUTOFF JIGS

I built a set of adjustable jigs to allow me to cut accurate angles for the framework and gussets of my KR-2. Each jig consists of a plywood base which slides on the table of a table saw. This base has a runner which rides in the miter gauge slot and holds the whole thing aligned with the blade. On the top of the plywood base is an adjustable fence, pivoting as close to the blade edge as possible, and locked in place at it's opposite end by a piece of hardware called a "drop leaf door support". The real secret to this whole thing is, you cut the blade edge of the base after the guide runner is installed on the bottom. Thus, you can see where the blade will cut, because it rides right along the edge of the jig. Hopefully the photos will illustrate the concept.

The range of angles the jig will comfortably cut depends on where you anchor the drop leaf door support. I made three jigs. One for angles around 45 degrees, (photo 1) the other for steeper angles and a third for fixed 90 and 45 degree cutoffs (photo 2). The latter being **excellent** for the upper gussets in the aft fuselage!) The edge of my saw table is machined to be parallel with the blade, so I installed the guide runner to slide on the side of the table (photo 3).

My procedure for cutting diagonals in the fuselage framing is as follows:

1. Place vertical pieces in place and secure with a few nails (photo 4).
2. Use a short scrap of 5/8 square material to show position of upper longeron (photo 5).
3. Measure from inside corner to inside corner and cut a piece of 5/8" square spruce to this length. Don't try to cut the angles yet and **cut the diagonal a shade long**, then gradually "sneak up" on the right length by trimming just a hair off and checking it, repeating this process until the square ends of the stick will just touch each inside corner of the bay you are filling.
4. Position the diagonal ON the verticals in the position it will occupy when it is done. Using a protractor, measure the angle it makes with the vertical (photo 6). If your



PHOTO 1

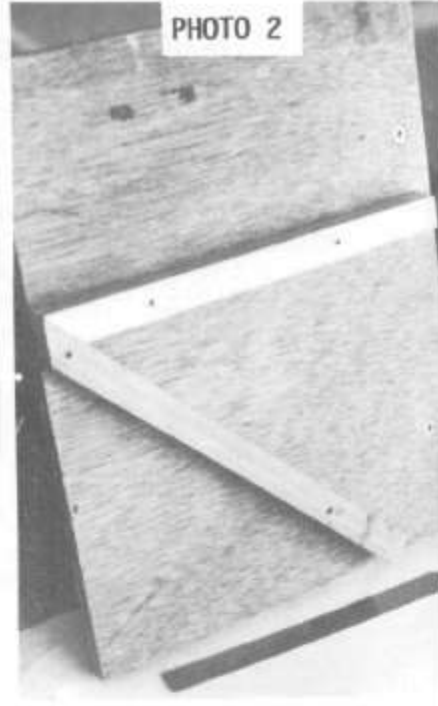


PHOTO 2

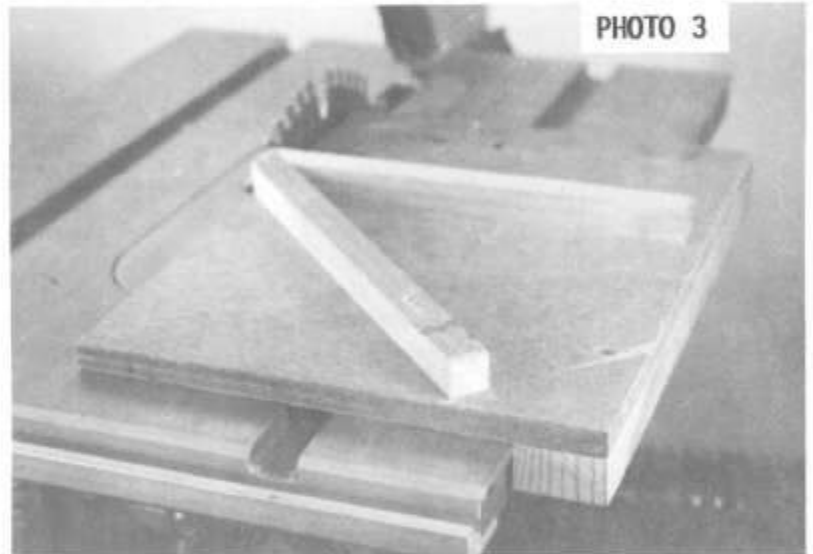


PHOTO 3



PHOTO 4

PHOTO 5

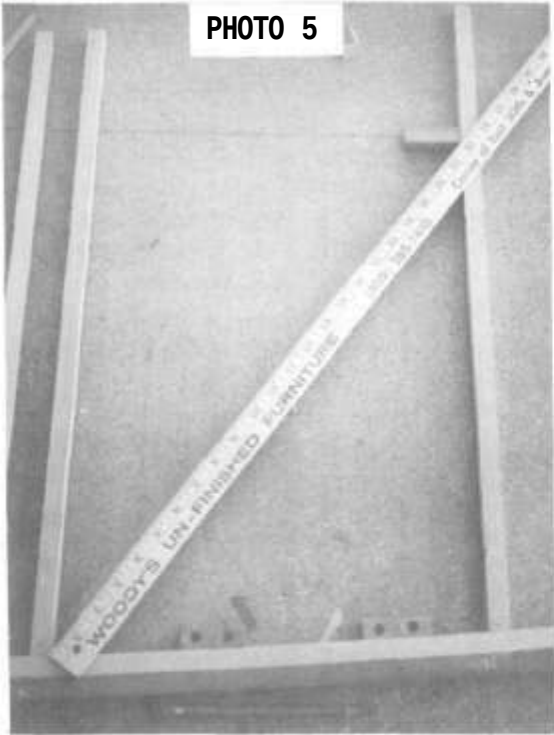


PHOTO 6

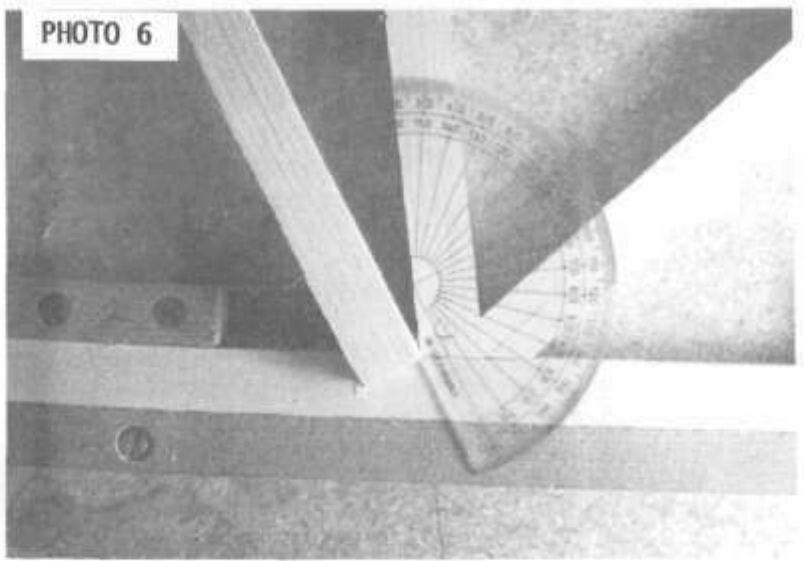


PHOTO 8



PHOTO 7

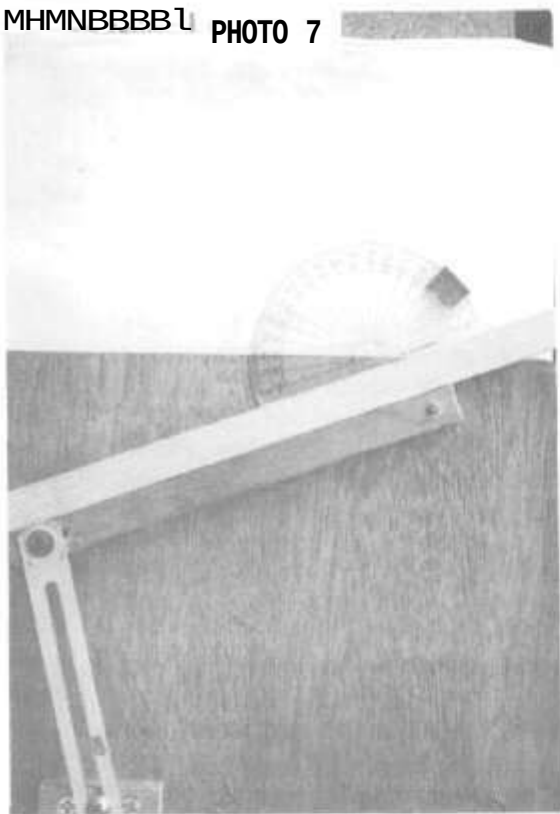
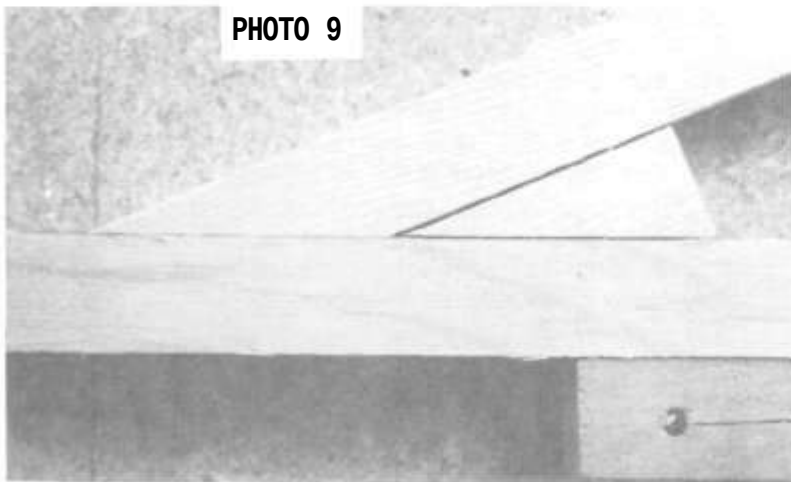


PHOTO 9



verticals are parallel and square to the top longeron, this angle will be the same on each end of the diagonal. 5. Transfer this angle to the fence of the cutoff jig (photo 7) and trim this angle into each end of the diagonal. Use a back-up stick behind the good stock to prevent splintering as the blade goes thru the back. Take small cuts and "sneak up" on the final length (photo 8). 6. While you have the angle set on the jig, cut two gussets from 5/8" square material and the fit should be excellent (photo 9).

A note about the photos. I raised the blade guard so the photos would better illustrate how the jig fits and functions. **PLEASE USE YOUR BLADE GUARD WHEN MAKING ANY CUTS!!!**

Ed Gossert
2111 Penny Lane
Rosamond, CA 93560
805-256-7030

"HIT ANYTHING ON THE GROUND LATELY WITH
YOUR KR? OR

"GEE, I GET DIZZY WHEN I TAXI..."

My first flight in a KR was a wonderful experience. It flew like an airplane should and is an absolute pleasure to handle....but when you get on the ground, (unless you have trike gear)... you would think you're in the cockpit of a Gee-Bee Racer or F4-U Corsair! All you can see forward is the nose and lots and lots of sky! After many landings and making so many "S" turns down the taxiways, I almost became afflicted with the little known and rare sickness (discovered by NASA in early studies of stock car demolition races) called "Mai De Taxi" which is somewhat akin to seasickness. This differs, however, insofar as seasickness is from up, down and all around, Mai De Tax is only from being shifted back and forth sideways from "S" turning on taxiing at air yards with 11,000' runways like Chicago's O'Hare, Kennedy International and such. It is usually not as fatal as not making the "S" turns and running into a object on the ground, such as the "follow me" guy in the scooter or a small unobstrusive DC-3 that has been parked there since the end of WWII.

Then a bright light appeared and a vision that spoke of being able to actually see in front of this machine with the proboscis akin to Jimmy Durante. Being an exsubmarine sailor, I thought, why not install a periscope? Boy,, would that draw a crowd at the airshows!! But you would have to holler "up-scope" on landing and "down-scope" on take off. Too much bother with that long thing anyway.. but alas, a trip to the local auto junk haven revealed two car rear view mirrors, had for a few dollars, that seemed to solve the over the nose lookie-see problem.

The first one is mounted top center of the instrument panel, and the other mounted inside to the upper approximate center of the canopy. Now by tilting the mirrors so I can look at the one on the panel, which is focused to the one on top of the canopy that faces forward, which in turn is focused forward over the nose and on to the ground about 50 feet or so in front of the plane's nose. Now I have a full view of what is out there! I can seee___jeepers I can even see the far end of the runwayyy... and the junk DC-3 I've hit so often___



The only problem at first was to find an adhesive that would bond the small metal plate to the canopy plexiglass, that which is normally glued to the car windshield. The rear view mirror is then attached to it with a small set screw. The mounting plate can be drilled and a small machine screw can be used to hold it there but I had found some wonderful stuff called "Kreem" from Kreem Products, P. O. Box 751, Somis, CA 93066. I bought mine at the local Suzuki bike shop. It is used for sloshing gas tanks... \$10.00 per pint. Used it as an adhesive and boy it grabs and stays grabbed when it dries.. excellent for fuel tanks too!

There you are boys and girls, now you don't have to look out the scope or even have to put your cap on backwards like in all those submarine movies... but it does take some of the fun out of it... fire tubes 1 and 3.. take her down to 150 feet! Rig for depth charge!

Bob Fabian
Rt. 4, Box 451
Mountain Home, AR 72653
501-492-5759

BUILDING TIPS

I now have about 290 hours on my KR-2, N47AR, and have a few ideas that may be of interest to other builders and flyers.

First is a method of adding oil without removing the cowl or having a special little door. A pump type oil can with a few inches of 1/4 inch OD Tygon flexible plastic tubing on the spout will do the trick. Insert the tubing into the dip stick tube and pump the oil in. I find that the flow rate on my oil can is about one ounce per ten pumps, so a half pint will require about 80 squeezes. This goes faster than it might sound and is a lot better than removing the cowl, especially at a distant airport.

But how do you check the oil without that little door in the cowl? A flexible dip stick, of course! Go to the auto salvage yard and select a dip stick with a tubular handle and a skirt that fits over the dip stick tube with space for a rubber seal. Insert a length of 1/8 inch diameter aircraft (stainless steel) control cable through the handle and braze in place at the outer end. DO NOT braze the cable in such a way that the brazed portion goes into the dip stick tube. Brazing will destroy the temper of the steel and when flexed it will break. Steel cable inside an engine makes a real mess! Cut the cable to match the length of the original dip stick, put a dab of braze on the end to prevent unraveling, and dip the end in epoxy paint for easier reading. The flexible dip stick can be removed and replaced easily through the cowl inlet.

There have been many articles written about engine cooling and I tried various cowl modifications unsuccessfully for three years attempting to solve a chronic high cylinder head temp problem before coming up with a satisfactory solution on my Revmaster 2100D. The first viable change was to lower the compression ratio from the factory 9.3 to 7.5:1. Less power? Perhaps, but not a noticeable amount. Most of what I had been losing to detonation (on 100 LL) now produces power, not heat. Engine life is increased, and on 88 regular to boot. This change produced an acceptable temp at cruise but at 80 MPH full power climb the cylinder heads would continue to heat past 450 F.

It occurred to me that at low airspeed, propeller action is more effective in pushing air into the cowl than ram air. If that is true, then an inlet shape that captures the air as the prop pushes it around is needed. The result of my experiment is shown in the photo. An "eyelid" covers half of the original inlet on the right hand side of the cowl, slanted downward to capture air being pushed upward by the prop. On the left hand side, the prop blade is pushing the air downward, so a nearly sharp edge with a curved shelf to direct the air upward and into the cowl was installed. Check the cowl on Steve Whitman's "0 and 0 Special" on the 1990 EAA Calendar. Not too symmetrical, but then asymmetry has a beauty of its own. Now my cylinder head temp never goes over 400 F even in prolonged 80 MPH full power climb and sits about 350 F at cruise. In all tests cowl flaps were used as appropriate. Note that the inlet area has been reduced by approximately 50% with improved performance and, I assume, less cooling drag.

Al Ross
P. O. Box 474
Rimrock, AZ 86335
602-567-5527

OSHKOSH KR FORUM AND DINNER

The KR Forum at Oshkosh will be held on Monday, July 30, from 11:30-12:45 p.m. in tent no. 3. The KR dinner will be on Sunday night, July 29 at Butche's Anchor Inn, Lower Deck. Format will be a family style dinner with cocktails at 6:00 p.m. and dinner at 7:00 p.m. Cost is in the \$10.00 range for adults and about \$6.00 for children.

Sign-up at the Great Plains Aircraft Booth. You must pre-pay for this dinner. We need to have a head count no later than 12:00 p.m. on Sunday, July 29... for more info, contact:

Great Plains Aircraft Supply Co.
P. O. Box 1481
Palatine, IL 60078
312-359-6558

FOR SALE

KING KX-145 Nav Comm. 720 channels.
Includes KI-205 GDI and tray. Factory
reconditioned in 1988. See SPORT
AVIATION, February, 1990, page 23. Unit
was removed to make room for Loran. Works
perfectly. Seen at \$800+ in Trade-A-
Plane. Asking \$725.00 with instructions.

Richard Kunc
3477 Fairway Lane
Orlando, FL 32804
Office 407-898-5880
Fax 407-896-0141
Home 407-290-1104

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00.
INDIVIDUAL COPIES \$1.25 EACH.

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 158, JULY, 1990

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO: 413



KR NEWSLETTER

ISSUE NO. 159

AUGUST 1990



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



JAMES TAKEMOTO'S KR-2 N3LL, WITH RETRACTABLE TRI-GEAR

First flight around the patch was smooth with no problems. Hydraulics by Dan Croy. Nose gear by Bill DeFreeze. My own retract system (mechanical). Dive brakes instead of flaps (work great). Empty weight 635 lbs. Currently flying with test prop on a Revmaster 2100DT. Have IVO PROP for future installation. No performance figures available at this time.

James Takemoto
4633 E. Colfax Ave.
Denver, CO 80220-1201
303-388-0407

INSTRUMENT PANEL CUTOUTS

That large, empty sheet of aluminum instrument panel can be pretty intimidating when it comes time to poke holes in it for the gauges. Knowing that you'll get only one chance to do it right but several opportunities to botch the job, planning is a key factor.

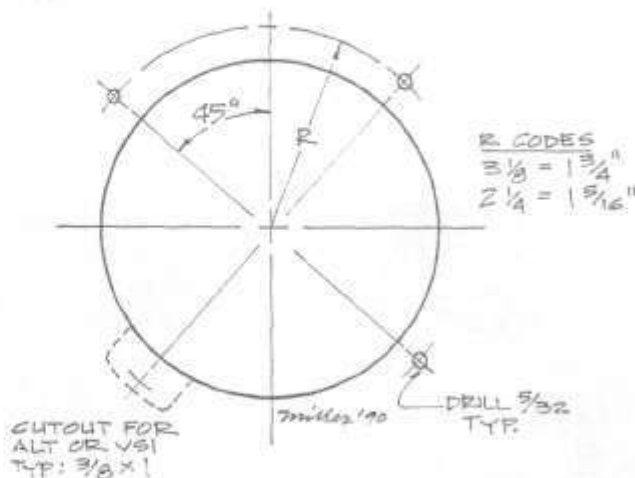
Shoving cardboard instrument cutouts around is great fun but after you've determined your choice of layout, it's time to get serious. If the instrument dimensions are in question, there are several sources besides the spec sheet that came with the new dial. As not all of us are able to purchase brand new instruments, the folks at Aircraft Spruce and Supply have been good enough to provide in their catalog the requirements for just about any item you may think of. Other sources are technical journals, EAA publications and other builders.

Armed with all the necessary dimensions, lay the panel on your workbench and use a drafting square, compass and 45 degree triangle to lay out the instrument positions directly onto the aluminum blank. The triangle will help locate screw holes while the compass will confirm location of cutouts and correct radius to screw hole locations. An automatic center punch is used to accurately mark each and every drill position plus the center of all instrument cutouts. The exact center of the instrument should be marked first and then, using the compass and triangle, confirm all other locations.

Take a break and read the instructions that accompany the circle cutter. Use some scrap aluminum and practice using the fly cutter as you won't get a second chance should you botch that expensive slab of instrument panel. Always clamp the work to the drill table. A chunk of 3/4" plywood goes underneath the panel while some thin plywood scraps will protect the panel's face from C-clamp scratches. The plywood beneath the blank should be as large as can be accommodated as it aids in supporting the aluminum.

Proper technique is to cut halfway through the aluminum, turn the panel over, realign the cutter, and finish the cut. Use a legitimate cutting lubricant, not your kid's crayons or that handy WD-40. Turn the cutter at the slowest possible speed. If you've done everything right, a quick swipe with a Scotchbrite pad will finish the cutout.

In opening up the panel for the instruments, it's necessary to allow an extra 1/32" for all the holes, ie: 3 5/32" hole for a 3 1/8" instrument; 2 1/32" for a 2 inch. You just can't fit a 2 1/4" gauge into an exact 2 1/4" hole due to manufacturing tolerances, paint buildup, etc.



Likewise, drill instrument screw holes at 5/32" and use brass 6-32 machine screws. The heads will hide the slightly oversize hole and will permit a slight amount of adjustment thereby allowing minor fine tuning of the face position. This allowance will be appreciated when attempting to line up slightly out of position drill holes. With the acreage involved in the KR panel, a 1/4" minimum of material between instrument holes will help keep the panel rigid as the various instruments are snugged down.

A Unibit is handy for fuse, switch and throttle holes although the price is sure to make your eyes water. The larger size drill bits always give me fits with thin metals so I quit using them.

Safety. Clamp your work and use safety goggles. The flycutter tool is only second generation from a sharp rock and if improperly used, has a nasty habit of hogging into the substrate and trying to turn the sheet aluminum into a whirling meatcutter. Use good sense.

Check and double-check. After cutting off more than my fair share of chair legs and finding that they were still too short, take a hint... measure twice and cut once. My wife still runs into the shop everytime a power tool cranks up and not so subtly asks, "Hey fool, did you measure that?"

Monte Miller
1900 Parkside
Denton, TX 96201
817-566-5871

CONVERTIBLE KR-1

I now have a KR-1 CONVERTIBLE. This was featured in issue #85 of the KR Newsletter. It is now more than eight years old and flying great. I had always toyed with the idea of building a headrest unit and decided to go ahead after selling my Starduster Too last year. I love open cockpit flying when the air is warm. Some will say "why screw up a great design?"



but my KR canopy was designed as a sliding canopy that could be removed in 30 seconds. I can now mount the headrest and side panels in less than two minutes... and head for some great open cockpit flying. To my surprise there was no effect on handling or speed... and much less wind than in the Starduster.

You know, Ken's KR-1 prototype was open cockpit for several flights, then changed to full canopy. The photos show 60BV in both configurations.

This KR was a project of our son, Brian, when he was 14 years old. He

was building it while I was finishing the Starduster. It was finished in 1982. Brian died in a helicopter accident 21 months ago. He owned a Cessna 140 and could fly the Starduster but never soloed and, therefore, did not get to fly the KR.

Any other convertibles out there?

Vince Hostetler
364 Martello Dr.
Grand Junction, CO 81503
303-243-1324

FIRST RIDE IN KR-2

I took my first ride in a KR-2 and what a refreshing experience it was. Eldon Rumbaugh of Junction City, Kansas had his plane down at Muskogee at the Hat Box Fly-In. He won a big trophy with his KR-2 and he won a spot in my "Good Guy Hall of Fame" for allowing me to fly in his KR-2. What a machine it is!

Eldon and I and several gallons of gas rode the little plane through its performance and it didn't whimper a bit. The plane responds to the controls like a playful puppy. Any doubts that I had about lack of aileron movement has vanished forever. We got to altitude about as quick as we could have in a Cessna 150 but it was cool and dry. The retractable gear worked with little affect on the flying attitude; cabin noise was not excessive and we cruised along at 155 mph at 3.5 gallons of fuel consumption. Not bad, I'd say.

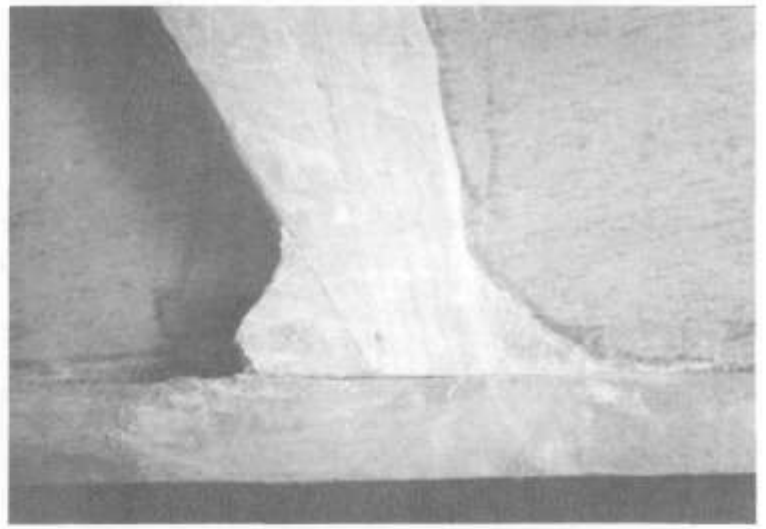
It really is refreshing for an aspirant builder to ride in a finished product. I hope that more successful KR builders will be as kind as Eldon and will wet the enthusiasm of those who are still dreaming and laboring over their own project.

Wayne Stringer
R. R. 3, Box 95
Fort Scott, KS 66701
316-223-5995

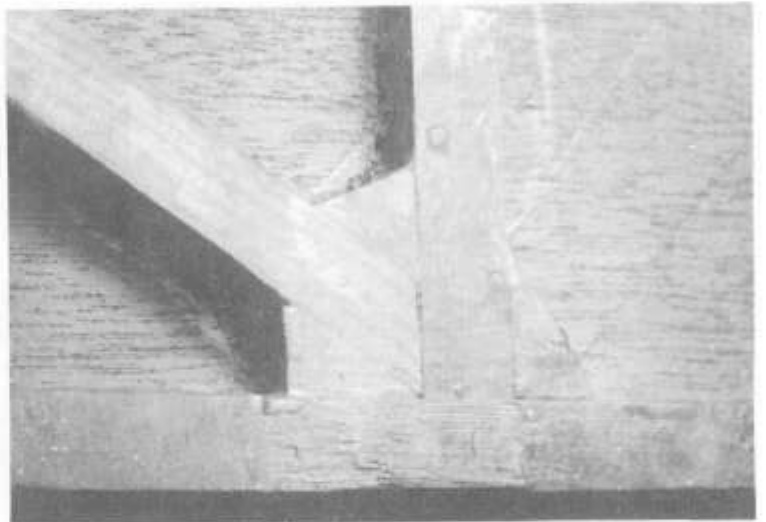
BUYER BEWARE!

To anybody who is considering buying a project started by someone else, please be careful! Make very sure you know what you are getting and what kind of workmanship you are buying. Last summer I bought a project from a person- who bought it from someone else. Basically the fuselage sides had been assembled and skinned and supposedly the remainder of the spruce and ply kits were there, all for about half the price of new raw kits. I gave the fuselage sides a quick looking at (although I didn't know what I was looking FOR at the time), scanned the (old) plan booklet and examined the spruce which was neatly bundled up. As closely as I could, trying to estimate if it was all there, I had driven an hour and a half to see this project. My wife was tired and hungry and my kids were having a real good time digging up the gentleman's flower beds. In my excitement to get started and feeling pressure from family to get going, I shelled out my money, loaded it up and took my tribe to dinner. I had to store my treasure away before I could convert the family room into an airplane factory. I did not look closely at the workmanship in the pieces already done, nor did I unbundle the spruce, yet.

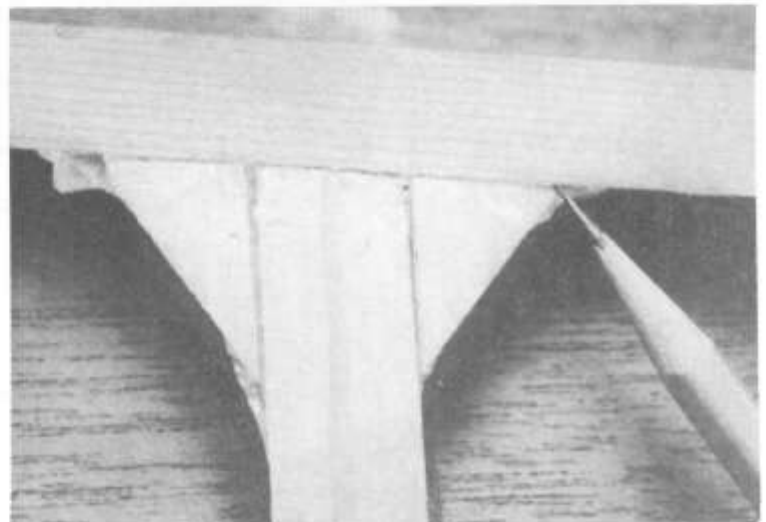
Finally, six months later, after doing a lot of study and research it was time to unpack my "bargain" and set to work. Was it ever a sad day for me! An inventory of the spruce showed it was all there all right... but fully half of it was badly warped, twisted or having been cut to size several years ago, had shrunk to less than tolerable dimensions. There were two full sheets of ply left but one of them was 1/64th too thin! Close objective inspection of the already done fuselage sides revealed gaps of 1/16" (and sometimes more!) in many glue joints, ill fitting glue joints, the grain of most of the gussets went the wrong way, the two sides didn't match and the ply peeled away from the framework under mild pressure in one tail section! The epoxy was gummy and rough in the nose area of the other side. There was a ton of cured epoxy coating on a lot of the framework. Quite frankly, in bright daylight, I had a pile of junk! I spent a month and a half anguishing over whether to try to salvage what I could and



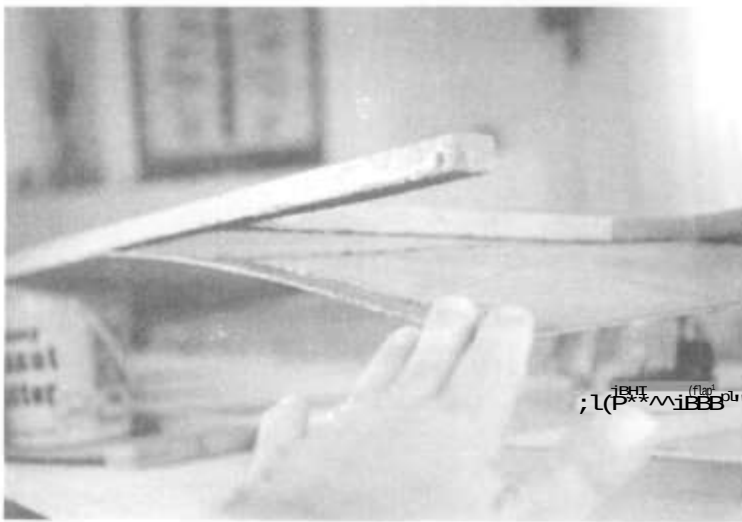
**CRACKED GLUE JOINT AT BOTTOM LONGERON
HOW ABOUT THOSE GUSSETS?**



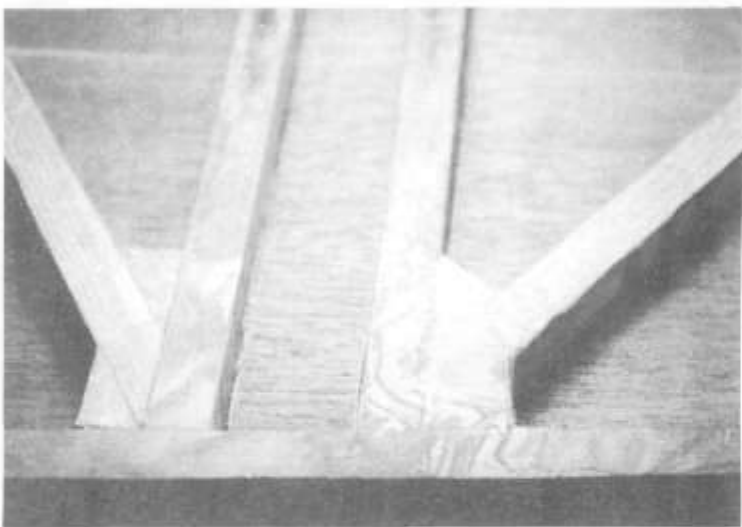
**TYPICAL GLUE JOINT. HOW DID I MISS THOSE
GAPS THE FIRST TIME? NOTICE HOW MUCH
EPOXY IS COATING THIS THING.**



**MORE GAPS, EXCESS EPOXY. NOTICE CRACK AT
PENCIL POINT.**



**MILD PRESSURE PEELING PLY FROM FRAME AT
TAIL END.**



SHINY AREAS SHOW EPOXY COATING FRAME.

buy necessary replacement materials, or chuck it all and start over fresh. In the end, I decided to start all over and fix my own mistakes. At least I would know exactly what I had then. It has been an expensive lesson but perhaps not as expensive as it could have been, had I stubbornly pressed on with the original purchase.

My advice to anyone contemplating buying a "bargain in progress":

1. Don't take your checkbook the first time you go to look at it. Plan to make at least two trips. If you can't afford another trip, it's too far to go the first time.
2. Don't take a bored/hungry spouse or kids.

3. DO take an unbiased second party, preferably knowledgeable of at least the construction techniques and tolerances used in the project.

4. Don't be rushed. Look carefully at the workmanship. Unpackage raw materials, make sure of their suitability. If the seller gets indignant, maybe that's a clue something is wrong.

5. Don't let your excitement override being a good consumer. There is nothing wrong with making sure you are buying good materials and workmanship.

I blame no one but myself for my wasted money. The seller of the bad project didn't misrepresent it or try to hide anything. It was my own anxiety to save a buck and some work that led me to ignore all the rules of good consumerism. It's an old saying, but a good one: **BUYER BEWARE!**

Ed Gossert
2111 Penny Lane
Rosamond, CA 93560
805-256-7030

FROM THE EDITOR...

Just want to thank all of you who have taken the time and effort to contribute to the Newsletter.

Next month I will be highlighting the KR's at Oshkosh, 1990. Had a lot of fun!! Stay tuned.....

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00.
INDIVIDUAL COPIES \$1.25 EACH.

"KEN AND I"
By Stuart Robinson

My decision to move away from Huntington Beach had nothing to do with Ken Rand or the business. I was happy with both. I was, however, very unhappy with Los Angeles and wanted my four children to grow up, as I had, in a rural area. After talking it over with Ken, he agreed that I could spend all my time on the KR-3.

The place I picked is 400 miles north of L.A. near the tiny town of Twin Harte in the Sierras. The KR-3 (the amphibian) was to be the plane I always dreamed of building.

My hat goes off to anyone who designs an amphibian because it is a massive exercise in compromise. To end up with an airplane that looks good, flies well, has a strong fast hull that will lift a good load without much spray and do it with a small engine is very hard.

The first prototype had problems. The GAW-1 airfoil with it's concave trailing edge could never contact the water or it would produce tremendous drag. The CG range (reported good to 50%) was not true. The first flight was at 41% and it was way too far aft. The bottom planing area was too small. The step was not deep enough. But most of all, there was not enough power to plane two people.

The first lift off was on water and ended with a flat, full stall, power off landing. The next two flights were from land. The first was around the pattern with a hard landing and the second was a slow half roll on TO with an inverted landing. Although no one was hurt (except for a sprained wrist) the bird was ready for redesign.

With the remains back at my shop, I set about building a new wing with a new airfoil, locating the spar aft six inches, lengthening the hull for 40% more bottom area, installing a deeper step. The new C.G. range was 17% to 29%. But with all this it still needed more power for water operation. The V.W. engine is just not suitable for that purpose. To this day, I have not seen an engine that is light enough and puts out enough power at a low enough RPM for the job.

I sold my half of Rand Robinson Engineering to Ken not too long after that and six months later Ken was gone. The victim of weather and a long cross country flight.

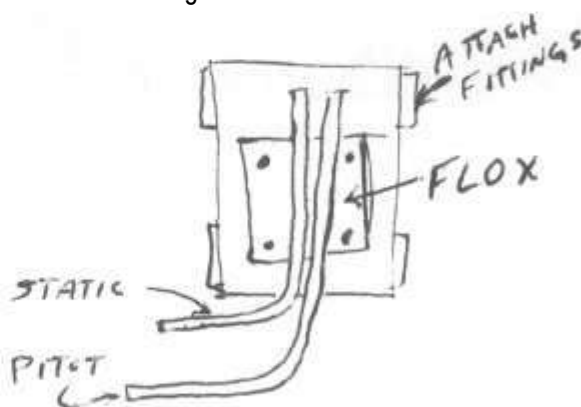
The lasting tribute to our aircraft, though, is the popularity of the KR-1 and KR-2 to this day. It has been 22 years since we first started building and the last I heard, the plans have topped 18,000 to all parts of the world.

I have gone on to other things and do not own an airplane or fly much any more. My three boys, however, can name any airplane they see, dissect and name any part of an airplane, and build and fly radio controlled models. Someday, if they want to badly enough, they also will learn the joys of flying.

Stuart Robinson
22352 Longeway Rd.
Sonora, CA 95370

PITOT AND STATIC TUBES

Here's how I made my pitot and static tubes. After forming the tubes from chrome car antennas as per Billy DeFreeze in Newsletter #52, I made a mold in a piece of foam and layed the tubes in it. I mixed up some floc and poured it in the mold. I now have a mounting block with the tubes permanently attached. I mounted it on the end of the stub spar between the wing attach fittings.



NOT TO SCALE.

I used screws on mine but epoxy probably would have been better. I used small wire tie wraps to attach the plastic tubing to the chrome tubing. They will always be accessible through the wing attach access holes. Hope this will help someone out.

Ted O'Dell
14033 Tuttlehill Rd.
Milan, MI 48160
313-439-2439

1990 KR GATHERING

The 10th KR Gathering will be on September 28, 29 and 30 at:

Rough River Dam State Park
R. R. 1, Box 1
Falls of Rough, Kentucky 40119
1-800-325-1713 or
1-502-257-2311

There is a 2500 ft. hard surface, lighted airstrip with fuel available. 1990 Program Chairman is Keith James.

Recreational facilities on site are: Archery range, boating with a big marina with boat rentals, cruise boat "Lady of the Lake", fishing, fitness trails, 9 hole par 3 golf course, miniature golf, nature trails, picnic tables with shelters, playgrounds, shuffleboard, swimming pool at lodge and tennis courts. These are all within walking distance from the lodge. The lodge is about 300 yards from the airport.

There are camping sites with water and electricity hook-up, plus dump station.

Falls of Rough, Kentucky is located approximately 100 miles north of Nashville, Tennessee.

People need to call early and book a room or cabin (1-800-325-1713). More than half the rooms are already booked, based on word of mouth. When you call, you have to mention that you are with the KR Gathering, otherwise they will tell you the place is booked solid. The KR rates are:

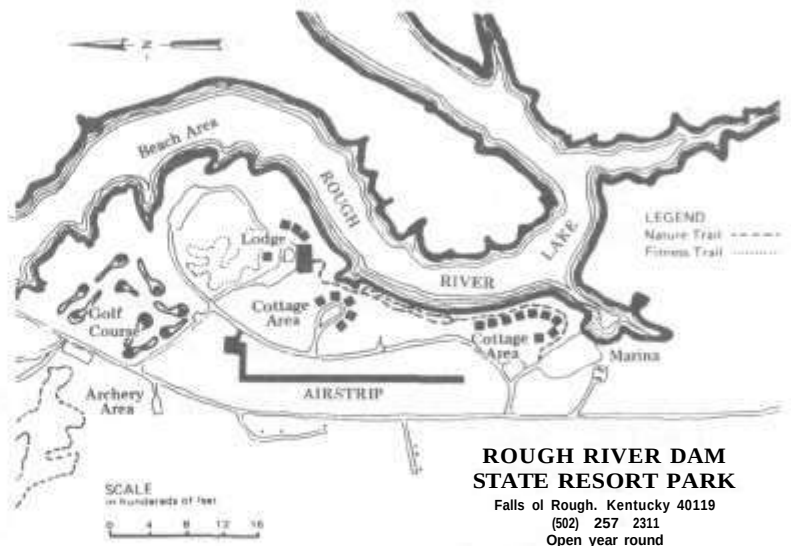
Single Room	\$36.94 per day
Double Room	45.95 per day
4 Bedroom Cottage	71.18 per day

I will also do a direct mailing in about a month to everybody on the computer list from the last two KR Gatherings. We are looking forward to all the fine airplanes and neat people that show up.

Keith James
1328 E. 45 Place
Tulsa, OK 74105
918-299-4445 or
918-745-8085 nights

FALLS OF ROUGH, IT

ROUGH RIVER STATE PARK LODGE (213) FROM TOWN: 3 NE COORD: 3V-36-35N 86-30-25W
APT ELEV: 577 FSS PHONE: (1WG) 800-452-5995
AIRPORT INFORMATION OR HOURS ATTENDED: 24 hrs
APT PHONE: 502-257-2311 ADDNL. TRANS:
RWT: 02-20 H2500x75 (ASPH) RWY:
FBO: Rough River State Park Lodge PHONE: 502-257-2311



RWGB RIVER STATE PASL has its own private airstrip that is located a short walk from the mail lodge. A dining room at the lodge on the lower level is available for breakfast, lunch and dinner seven days a week. Breakfast is served from 7 a.m. to 10:30 a.m., lunch from 11 a.m. to 2:30 p.m. and dinner from 5 p.m. to 9 p.m. Monday thru Saturdays. On Sundays they serve a buffet beginning at 12 noon to 4 p.m. The restaurant re-opens at 5 p.m. to 9 p.m. for dinner. The luncheon menu consists of entrees including various sandwiches, salads, soups and fruit plates. Their dinner menu specializes in fish, chicken, and beef selections at very reasonable prices. The main parking ramp at the airport is located approximately 1500 feet from the main lodge. A telephone is available to call the lodge should you desire courtesy transportation. For information call the resort at 502-257-2311.

WANTED

Exhaust system for the 1835... hopefully a tuned system and a set of Diehl wing skins.

Monte Miller
1900 Parkside
Denton, TX 96201
817-566-5871

FOR SALE

KR-2 for sale. For details write or call:

Merton A. Bak
El0680, Rt. #3, Highway 33
Baraboo, WI 53913
608-356-4949



GREAT PLAINS
AIRCRAFT SUPPLY CO. INC.

PH. (708) 464-4178 • ST. CHARLES, IL 60174
P.O. BOX 304



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AlftntiO OSHHOSH WI i>4903-M86
PHONL 414/426-4800

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 159, AUGUST 1940

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO: 413



KR NEWSLETTER

ISSUE NO. 160

SEPTEMBER 1990



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KRAircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



JULIO POSADA'S KR-1 N126JP

The above photo of Julio Posada at the controls of his KR-1 was taken before he was tragically injured in a job related accident.

Julio and a friend were installing a fence around a local airport with the help of a tractor-operated post hole digger. Somehow the sleeves of Julio's nylon jacket became entangled in the tractor's power take off, resulting in the amputation of both of his arms at the shoulder.

With the help of his friends, Julio trailored his KR to this year's Oshkosh event and was the recipient of the **1990 SPIRIT OF EAA AWARD**.

Congratulations Julio, we're lucky to have you as a member of our "family". His story begins on page two.

JULIO POSADA N126JP

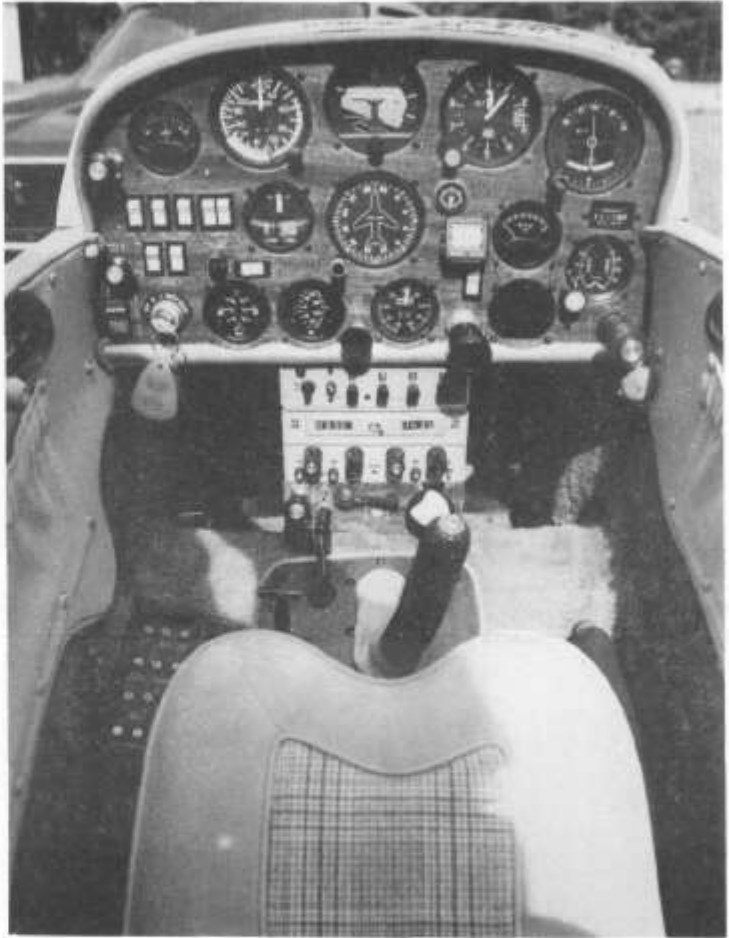
Hi folks! What a pleasure it was to meet so many of you at Oshkosh '90. Let me tell you about my plane. Construction began in July, 1977. First flight was in September, 1985. Eight years of on-off building effort that were worth every second not only in the value of its excellent (I like to call them mosquito-like) flight characteristics but also in the value of the enjoyment experienced, the education gained, the new friends made and the memories accumulated.



There are several innovations that I incorporated in my KR that make it much more fun to fly, more worthwhile and MUCH, MUCH HEAVIER (although I christened it, from its inception, after my favorite drink, it inadvertently lived up to its name, the Brass Monkey). The most obvious modification is the retractable canopy, able to be opened in flight. Notice that it is a three piece canopy. Entry/egress however is not effected through this mode as the opening is not that large, rather the whole assembly clam shells open, ala KR, making for a much more comfortable entry-exit. How did I know that the canopy would remain part of the airframe in flight? A simple test. I picked the Monkey up off of the ground using the leading and trailing edges of the center section canopy as support! Not bad eh? I have flown at 80 kts IAS with absolute ease of opening and closing, and faster, the noise, to me, became uncomfortable. It is amazing how much lift is provided by the canopy. Once I opened it, there was a nose down moment that I would have to trim out. The exhilaration of flying over the sometime mountainous, sometime pastoral Virginia countryside, coupled with the ability to taxi in a cool environment made

every second of the three months I spent on it worth it. And did you see it at Oshkosh? It looks tres chic!

The airplane sports several other mods among which are: Center control stick, modified push-pull gear retract mechanism so that I could (and did) install a full IFR panel, two inch longer gear legs, full wet wings holding about 30 gallons each (totally unnecessary but I did want to go long distances), three position adjustable



seat, cabin heat, flaps and to haul all this into the air with a modicum of ease, a Turbo Revmaster 2100-D with a 52" Maloof CS prop. Of course, full electricals including lights and pitot heat were installed. When I would take off at night on my chair-with-wings, I couldn't help but think that Walt Disney had no idea of what magic was!

Except for those modifications mentioned, my KR was built strictly according to plans and I would encourage everyone to adhere to the KISS (keep it simple, stupid!) principle tenaciously. My efforts at individuality cost me dearly in time spent on the ground and dead weight in the air, so a builder should weigh carefully his/her decision to modify. I would certainly advise against modifying the airframe in any manner.

Builders should spend as much time as possible on the preparation of any surface that is to contact resin, especially those that are to receive cloth. Joints that are not perfect are not only weakened but are also made heavier by the resin that fills their gaps. Fiberglass surfaces that undulate when they should be true and flat are made heavier by the filler necessary and the work to finish them much more intense due to the sanding required. How tired I got of hearing that admonition but how well tested is its veracity.

How does 126JP fly? It met every expectation I had of it except its speed and that was my fault. It tipped the scales at 655 lbs. empty which is a lot heavier than many KR-2s. It cruises at only 150 KTS and not the expected 180 KTS. Its rate of climb was just under 1000 FPM from an airport 2200 feet high at 33" MP and 3500 RPM and 90 KTS IAS with 160 lb. pilot and 18 gallons fuel on board. I have carried 33 gallons (15 gallons/wing plus 3 gallons in header tank) and 30 lbs. of baggage in complete comfort (well, the plane had no problems). I can't give exact climb figures for that flight as I was too busy monitoring all systems to stopwatch a time to climb. (I have no VSI in my plane, I hate VSI's...too much lag. I would always cover a VSI while in any aircraft in which I would be taking instrument training. Now an IVSI is another story but I found their cost prohibitive), I noticed a slight drop in ROC but nothing that made me uncomfortable.

126JP is incredibly agile! It is neutrally stable but very easy to fly. I never needed to move the stick more than one inch in any direction while at cruise to effect super quick changes in attitude, a characteristic that makes one giddy with glee while flying it.

Slow flight in my KR was done with absolute confidence. I could maintain level flight at 50 KTS IAS albeit with the tail shaking like mad and behind the power curve. The stall occurs slightly below this speed but no tendency to fall off on one wing was noticed. I was happily surprised at the amount of warning I received prior to the stall.

Take-offs were affected by dialing in 30" MP and 2700 RPM and, as the prop unloaded while rolling, I would decrease power slightly to remain within Maloof's published propeller RPM limits and to keep from overboosting the engine. As we began rolling I would, initially, apply aft stick but after a few feet, probably no

more than 100, I would neutralize and (I know many of you KR-2 drivers are going to balk at this) apply slight forward pressure to get the tail up. I don't know at what speed this happened, I was much too busy looking outside keeping things civilized but I do know that I wanted my tail up just as quickly as possible and I knew that if I had enough elevator authority to lift the tail, I would have more than enough rudder authority to keep the nose pointed in the healthiest of directions. When the Monkey wanted to fly, there was no way to keep it on the ground so lift-off was almost automatic and invariably at about 60 KTS and 1000 FT ground roll. I would begin systems management by first setting up power and then monitoring engine temperatures and pressures. I have one of those nifty Alcor CHT-EGT gauges with a six position switch and I can't monitor every cylinder plus the turbine inlet. I will list all my best figures in a later article.

At 35 square cruise was 150 KTS and fuel consumption was 5.5 gal/hr or there about. I preferred cruising at 33 square which yielded 140 KTS, 4.9 GPH and some savings on engine wear. I was not able to optimize my CS prop's pitch stops as my flying days came to a close prematurely so I may have been able to extract more performance from my KR especially in climb but, the truth be told, I was having much too much fun as it was, to experiment anymore with it.

Landing a KR is a thrill, isn't it guys? I always wheel-landed mine. I found that even with my 2" higher main gear legs, my three-point attitude was much too shallow to effect a full stall three pointer. Besides, wheel-landings became the easiest things in the world once an aero instructor tipped me off to dump excess lift by moving the stick forward slightly but smartly the instant the mains touch and just as quickly returning it neutral. The key word here is "slightly". You don't apply full forward stick or even anything close to it, one need only apply enough down elevator to level the plane or perhaps bring it just past level for an instant, while the mains are on the ground, to dump lift. In over 140 landings I've yet to grind or even nick a prop. I would then maintain enough forward pressure on the stick to keep the tail in the air for as long as possible during the roll out. When even full down would no longer hold the tail up, it was

Cont'd from page 3

time for the dancing shoes because when that tail wheel touches the ground, the plane wants to visit every section of the runway but the centerline and it required deft rudder pedal actuation to keep the white stripes up front.

My KR has 127 hours of flight time, about 3 hours taxi time (I practiced a long time before taking it up) and 3 minutes glider time (engine failure at 4500 MSL). It rendered every other airplane I ever piloted a bore to fly.

126JP made its Oshkosh debut in 1990 wholly and solely because of my two friends William White and his wife, Dale. In 1987, my airplane, along with several others on the flight line at Virginia Tech Airport was vandalized, sustaining damage which grounded it until repairs could be effected. I became incapacitated shortly thereafter and I thought I had seen the last of my KR-1's flying days.

William offered not only to repair the damage but also to rebuild the engine (he had been a VW mechanic for several years). This, in spite of the fact that he could never hope to fly the KR (William is 6'7", nuff said)! And, wouldn't you know it, Dale let him off from building their new house so that two weeks before Oshkosh he could repaint the airplane so it could be shown in new duds! They procured a trailer, loaded the Monkey up and drove 19 hours to Oshkosh. To beat all, they took care of me for a week! Ain't friends grand?

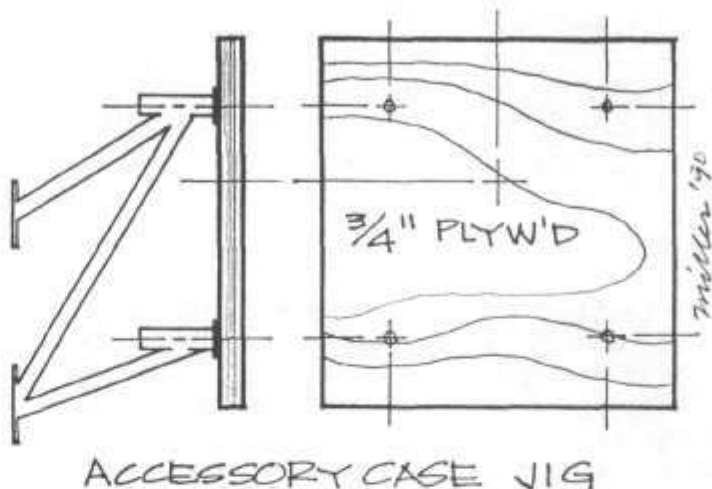
William has a 50% completed airplane in his basement (I won't mention brand) but after attending that type's forum and hearing the bickering and then attending the KR forum and experiencing the "family", he has decided to can his project and build a KR! Do you think I'll put my hands (figurative) in there and get into some of that action? YOU BET! The last day of Oshkosh my KR had just been disassembled and mounted on the trailer when this gentleman rides up on a scooter and asks if we are going to stay for the Awards Banquet. He looked at me and mumbled something about it being worth our while if we stayed and then rode off into the sunset.

They presented me with the "1990 Spirit of EAA Award". AIN'T LIFE GRAND???

Julio E. Posada
503 Southgate Drive
Blacksburg, VA 24060
703-951-1010

KR MOTOR MOUNT INSTALLATION

Before you jump up and bolt the motor mount to a vacant firewall, do a quick chore that will help insure the mount will remain aligned with your accessory case when it comes time to hang the engine. As there is a fair amount of flex in the free mount prior to securing it to the firewall, bolting down an empty motor mount can pull it out of alignment.



Using a piece of 3/4" plywood, layout and drill holes to align with the case bolt hole specifications. Do not measure the free mount as the flex, remember, could produce incorrect figures. Bolt the plywood guide to the motor mount engine pads. If it's necessary to use heavy force, it might be time to use a torch and realign the mount.

With the plywood form installed, locate the mount's firewall position and secure it to the airframe. There may be a slight spring in the motor mount after removing the plywood, but you'll be assured of fewer problems upon engine installation.

Monte Miller
1900 Parkside
Denton, TX 96201
817-566-5871



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD. OSHKOSH. WI 54903-3086
PHONE 4 14/426-4800

FLIGHT REPORT N86CT

I started construction on my KR-2 N86CT November 26, 1985. I decided to go with a tri-gear version since I had low time and no taildragger time. I decided on Bill DeFreeze's design, with very little modification. I made rny landing gear brackets from 4130. The cast aluminum brackets cracked. I made the nose strut with an oil filled cylinder and added nose wheel steering with rudder pedals. I bought wood materials, supplies and manufactured all aluminum and steel hardware. I used premoulded parts, turtle deck, cowling, fuel tank and deck. I used Dan Diehl wing skins which cut down construction time and easier to do. I glassed fuselage which added a little weight.



I used Dupont 70 black primer, wimbledon white and flame red acrylic enamel with hardener. I decided to buy a complete engine so I wouldn't spend time building up one which I had to tear down twice. The engine was a MAPI Magnum 75. The engine performs great now.

Completed construction May, 1988. FAA signed off certificate in June, 1988. Loaded up plane and off to the airport. Started running high speed test. Had problems with nose wheel shimmy and engine problems (which had to be torn down as mentioned above). While I had the plane home, winter was coming so I decided to modify my fuel tank and deck. Made them both removable which I recommend... makes an easy access to dash and foot pedals.

In the fall of 1989, went to see Herb Bull and flew a couple hours with Herb. Thanks, Herb, for taking the time to help me.

April, 1990, back to the airport to run test and everything was okay. On April, 11, 1990 at 11:00 a.m. I was running test at almost lift off speed... raising nose wheel and getting feel of the plane when a gust of wind lifted plane about five feet off runway. I pulled back throttle, bounced about ten feet in the air so I knew I was going to fly it this time. Firewall throttled engine came to life and found I was climbing 800" a minute. Climbed out to 2500' and was having a ball. Flew for about 45 minutes and decided to see if I could land it. Entered downwind about 110 MPH, left base about 90, crossed threshold 70 MPH. Then landed a little fast but it was one of my better landings and was I excited. At last I was a KR pilot, built and tested my own plane and if that won't make the old adrenalin flow, nothing will.

My first few flights showed head and oil temp running a little hot but the more the engine broke in, the cooler it ran. I have 25 hours on my KR and it flies GREAT!

So if you are building and you get discouraged... keep on until completion and you will be greatly rewarded!

SPECS

Swing over yoke
Tri-gear retract
Weight 670 Ibs empty
HAPI engine 2180 75 magnum
Sterba prop 52 - 52
Cruise 3100 RPM 150 IAS
Cyl Head temp climb 400 degrees
 cruise 350 degrees
Oil temp climb 200 degrees
 cruise 190 degrees
Cyl head and exh. temp, gauges

Plane is stationed at Daviess Co. Airport,
Washington, IN.

Jerry F. Johnson
R. R. #2, Box 192
Petersburg, IN 47567
812-354-6779

FROM THE EDITOR...

Oshkosh 1990 was an event of contrasts from the Concord and Stealth Fighter to gyrocopters and ultralights. The weather swung from sunshine to raging thunderstorms.

For the KR family, the event was the first time many would see the new selection of landing gear for the KRs. At the KR forum, Jeannette Rand and Dan Diehl described the new gear designs. They also talked about a new resurgence of interest in the KRs. Today it's hard to find unfinished KRs for sale. Builders are now completing them in record numbers. Gene Darst of Beaumont, Texas talked to the forum group about first flight preparation (information that will be in an upcoming newsletter). Roger Hansen of San Ramon, California (winner of both Best KR and Longest Distance Flown) talked to the group about his KR (highlighted in Issue #158). Special thanks to Steve and Linda Bennett of Great Plains Aircraft for their help in coordinating the KR dinner and lodging.

Many thanks to all of you who attended Oshkosh '90. It was a lot of fun finally meeting many of the builders who are enthusiastic supporters of the newsletter. Your words of encouragement were greatly appreciated by both myself and Judy!

Earl Teporten Judy

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00.
INDIVIDUAL COPIES \$1.25 EACH.



ROGER HANSEN'S N200RH, SAN RAMON, CA



**JEANNETTE RAND GIVING ROGER HANSEN
"BEST KR" AND "LONGEST DISTANCE" AWARDS**



HERB BULL'S N86QT, DEERFIELD. IL



DAN DIEHL'S N4DD. JENKS, OK



MARTIN ROBERT'S N191MR, TULSA, OK



MIKE CORRADI'S N244MC, PAPILLION, NE



KEN COTTLE'S, N335KC, COLUMBIA, MO



TODD UNRUH'S N818P, DAYTONA BEACH, FL



RANDY GROVE'S N6GM, BELLEFORTE, PA

WANTED

I want to trade my 1946 BC12D Class Taylorcraft (certified A/C) for a super nice, slick KR-2. My T-Craft has new interior, wheel pants, glass, paint and has only 12 hours since chrome major! Cruise low and slow at 90 MPH at 75%. Annual to 12/90. Would also consider trading my 52 PA 22/20 135 HP project (fuse needs cover) for nice KR-1, etc.

Call Mike:

Days 918-665-1544 or
Evenings 918-250-1535 after 6 p.m.
(central time)

FOR SALE

KR-1 100% complete. Has been in storage for 12 years. Bubble canopy. Contact:

Frank Alman
507-334-8613 home
507-281-0120 work

WANTED

Monnett Style "X" casting. Engine accessory case is no longer in production. I need one badly... help!

Reece Daniel
5576 Squires
The Colony, TX 75056
214-624-7619 after 6 p.m.

FOR SALE

KR-2 Completed once, but ground looped during taxi tests. Fixed gear, basic instruments and radio. Needs repairs on wheels, spar (center and rt. wing), cowl, engine and prop. \$2900.00 (includes trailer). Call or write:

James Jasper
3732 E. Darmouth
Mesa, AZ 85205
602-830-3445

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 160, SEPTEMBER 1990

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO 413



KR NEWSLETTER

ISSUE NO. 161

OCTOBER 1990



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



ELDON RUMBAUGH'S KR-2 N248RW

N248RW is a partnership airplane with Jim Wahle and myself. Unfortunately, he lost his medical while we were building it. We finished it in May of 1989.

First flight was May 13, 1989. I didn't have any taildragger time, so it took about 2-1/2 hours for me to figure out how to keep it straight down the runway. The only thing about the first flight that was unusual was the big smile on my face.

(Cont'd page 2)

Cont'd from page 1...

The first few flights we took the cowling off to check it over. I just knew something would be falling apart, but it wasn't. Now the cowling comes off every 25 hours to check everything including valves and oil change. The Limbach (2000cc) runs perfect, no carburetor problems like too rich or too lean. With a Great American Prop 52" x 48" I don't get the take off RPM of 3400 like Limbach recommends. With 3000 RPM tail up in 200 ft.- off the ground in approximately 600 feet. 1200 ft. climb at 80 MPH on a standard day. Off from a field elevation of 1056' - oil temp 180 - CHT 325 - on a 100 degree day the oil temp will go to 225. It flies straight and level. 3000 RPM cruise 150+ MPH at 3400 RPM 170 MPH. When we were building the KR, I had no idea it would turn out this good. In the 20 years I have had a license I accumulated only 140 hours of flying time. In the last 18 months, I put 200 hours on the KR-2.

Last fall I was privileged to go to the KR Gathering in Covington, TN and brought home the Best KR-2 plaque. This year at Muskogee, OK "Hatbox EAA Fly-In" received a trophy for the Best Scratch Built, at the "26th EAA Gayhawk Chapter Fly-In" in El Dorado, KS received Best Kitbuilt and at Lola, KS "Farm and City Days Fly-In" best experimental.

The KR-2 is a lot of fun. If anybody is thinking of building one... do it. You will be glad you did!

Eldon Rumbaugh
Rt. #3, Box 121E
Junction City, KS 66441
913-238-4554

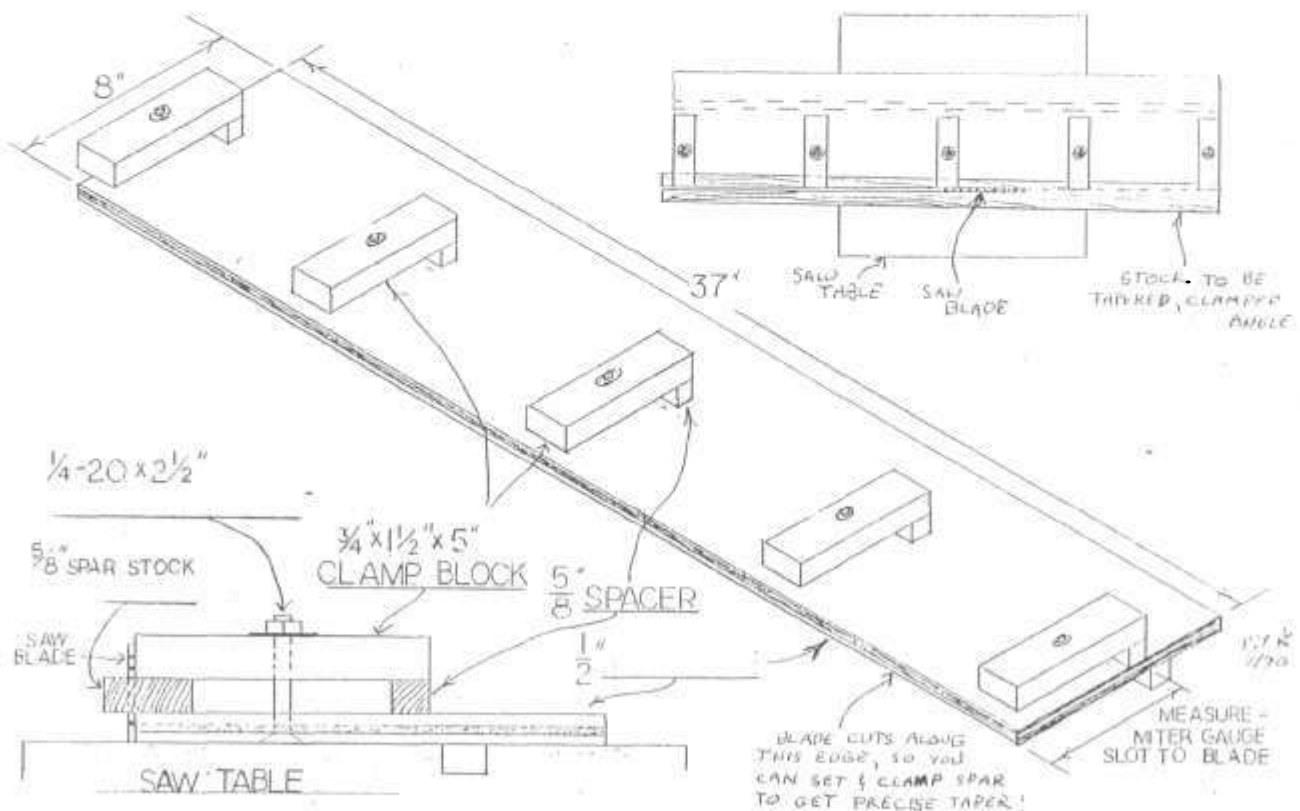
Editor's Note: A special note of thanks to Eldon, as well as the other KR pilots, who bring their planes to fly-ins. No amount of advertising can compare to seeing these wonderful planes in person.



QUICK AND EASY JIG

Here is a fairly quick and easy jig to cut straight, accurate tapers on the tail spars. When you build the jig, install the wood strip that rides in the miter gauge slot first. Install it **further away from the blade side of the jig than the distance from slot to blade**. Then, run the jig base through the saw, using the same blade you will use to taper the spars with. Now you know **exactly** where the blade will cut! After installing the clamp blocks, it is a simple matter to line up the material to be tapered with the edge of the jig, precisely where you want the cut to be! Using the jig is easy. On your spar blank (which has been cut to length and width) mark a centerline along it's length. Mark the end width of the spar with reference to this centerline. Mark the beginning point of the taper on the edge of the blank. Now, since your jig shows you where the blade will cut, line up the end and edge marks with the edge of the jig and tighten the clamp blocks. Check all the measurements and alignments three more times. Then carefully run the jig through the table saw. It works best to have the waste piece hanging over the edge of the jig and the clamp blocks holding the "keeper".

Ed Gossert
2111 Penny Lane
Rosamond, CA 93560
805-256-7030



Editor's Note: The following is an excerpt of an article by George Leskien which appeared in the January 1981 issue of **Canadian General Aviation News**. The article was submitted by **Don Leitch**, British Columbia, Canada. As you read the article, bear in mind that it is one person's opinion and should not be considered the "final word" regarding design and building considerations for a KR. I have included it in the Newsletter because I think it contains some good points and "food for thought". If you have questions about the article, I suggest contacting Rand Robinson Engineering.

**** HELP FOR KR PILOTS ****
BY GEORGE LESKIEN

It is a well established fact that relatively short and stubby little aircraft are temperamental and sometimes over-responsive on the controls, which is largely due to weights, forces, ratios and moments. Turbulent air will in most instances magnify response conditions. However, that does not mean that these types of aircraft are not safe to fly when they are properly balanced and the pilot in the cockpit remains alert. Although I personally have no interest in owning a KR-2 due mainly to the small cockpit size, I would not mind flying one. Naturally, I would thoroughly check its workmanship, engine installation, general condition and appearance, and most of all, have convinced myself of proper weight and balance data.

The KR-2 structure could be improved in some areas but it seems rugged and firm. When correct materials and processes are used (subject to up-dated info) and never exposed to severe-rapid temperature changes or excessive moisture, its practical safety limit at yield is around 4.6 to 4.9 g (plus) at 950 lbs. T.O.W. in the weakest areas. This is quite acceptable and meets FAR part 23 Approx. A (of 4.4×1.05 equals 4.62) for utility class rating, when effective wing area is calculated as per Engineering and Inspection Manual, Part II, Chapter I—determining wing loading. In view of the wing chord angle in relation to the fuselage (listed as 3-1/2 to 5 degrees to the top longerons) it is evident that the wing area across the fuselage section will not produce any lift during cruise or higher speeds. Hence, the actual wing

loading will change from 12.1 • 14.4 lbs. sq. ft. resulting in reduction of the load factor to 3.8-4.1 g, rating the aircraft only for normal category.

The airfoil for the wing has been specified as RAF 48, developed in the early 20's. The published data shows features which require attention when establishing flight-balance requirements. The centre of pressure (C.P.) for this airfoil changes from .4 of chord at cruise to .3 at climb and .28 at stall (18 degrees for R.N. of 7 mil.). Beyond the stall the C.P. is supposed to move back again, but in an attitude which will make powerless flight impractical.

Also the C.P. is below the centre of gravity (C.G.) of the loaded aircraft which is estimated at approximately 8-1/2" at its best (minimum) thus creating a "tail-heavy" condition in an "nose-up" attitude. This represents a Static C.G. change of up to 2-3/4" between maximum cruise and critical stall speeds.

Assuming a glide ratio of 12 to 1 without prop drag, possibly the best attainable the KR-2 could climb with 65 net HP and 65 per cent prop efficiency up to 900 fpm when T.O. weight is 950 lbs. or up to 1,150 fpm at 800 lbs. The speeds would be 80 or 73 mph at an angle of attack near 8-9 degrees and flight attitudes of 14-1/2 and 16-1/2 degrees. The mentioned glide ratio reflects an aerodynamic attitude of approximately 5 degrees.

In the event of a sudden engine failure the correctly balanced KR-2 with its surprised pilot rapidly changes from normal flight into an aerodynamic attitude (angle of attack) of at least 21-1/2 degrees not allowing for engine pull moment and increased drag produced by the stalled propeller. Plus 21-1/2 degrees is 3-1/2 degrees beyond the beginning of stall condition.

A clean wing may still be controllable. But what effect will the aileron joints have on the air flow? What control effect will the stabilizer have in this attitude? Its airfoil thickness is below 10 per cent of chord with a relatively sharp leading edge. Thus the airflow is very likely commencing to break off near 10 to 12 degrees. The built-in angle of incident, stated as 3-1/2 to 5 degrees, will almost balance the situation, but not quite. A depressed elevator in this condition will result in earlier loss of clean airflow and thus considerably reduce control capability, while the wing still has

maximum positive lift.

The construction method for the KR's is relatively simple, but how skillful is the amateur builder to produce two equal wing sides, accurate outlines for airfoil contours and to finish the joints near hinge points? Physical departures from those requirements can alter the characteristics of the airfoils and reduce the effective angle of attack for wing and stabilizer, lift factors and aerodynamic moments.

The wing twist (specified as 1-1/2 to 3-1/2 degrees, subject to which instruction are followed) should have little effect on controllability of this aircraft as long as both wings are matched. However, it should be noted that a larger wing twist reduces optimum speeds in powered flight and produces an earlier but slower transition into full stall condition.

All above details should not present any major difficulties to the KR pilot making his initial test flights as long as he fully understands all possible limits, sets his own standards accordingly and provided the aircraft is correctly balanced.

Unfortunately, the published weight and balance details are too brief for an amateur builder to produce accurate results, and is very much misleading to ensure safe flight conditions. Definition of facts are completely missing. The most important detail for the C.G. range 4 of chord has to be regarded as dangerous for initial test flights or inexperienced pilots and may have been the main culprit for most KR accidents. (Listed range .15 to .4)

It was earlier explained that stall commences at 18 degrees angle of attack and C.P. at .28 of chord. Hence, this number should never be exceeded until all control responses have been proven to be acceptable. It is unfortunate that this point has never been noticed previously by anyone of all the many KR builders.

The published wing area is 78 sq. ft. Without having any actual test data of fuselage lift effect one cannot count the area across the fuselage section. This results in 66 sq. ft. effective area at 17'-8" net span. Hence, the average chord become 44-3/4" and limits the rear C.G. location to 13 13/16" behind the I.E. of the 50" centre chord.

The glide ratio near stall is poor and will reflect 9 degrees nose-up attitude or even less with stalled propeller, placing

the C.G. 1-1/4" backwards. The stall will begin above 61 mph for the 800 Ibs. and 66 mph for the 950 Ibs. KR-2. Flight in this attitude is very hazardous for the inexperienced KR pilot. A sudden impulsive full forward movement of the control stick is very likely to cause almost complete loss of intentional elevator control resulting in rapid drag increases, progressive increase of angle of attack and rapid loss of wing and stabilizer lift. At an angle of attack near 25 degrees aileron control will have been lost completely and the aircraft will tend to tip sideways. Weight or force changes either side of the longitudinal axis will accelerate this condition. These events when happening below 1,000 ft. AGL, will almost certainly have tragic endings, even with the best pilot behind the controls.

After this dramatic explanation, to bring home the seriousness of the situation, some slight adjustments have to be allowed for. In the explained situation at 18 degrees angle of attack the stabilizer has begun earlier to lose some control effect. However, its drag will result in some lift force. Unfortunately, at this angle the stabilizer is in the very turbulent airflow of the stalling wing, thus reducing much of the remaining stabilizer effect. It would be irresponsible to consider more than 15 Ibs. net stabilizer lift in this situation. This force allows only about 1-3/4" C.G. rearward change for the 800 Ibs. or 1-1/2" for the 950 Ibs. KR-2.

From the details in the three previous paragraphs we can conclude as the safe C.G. range to be only between 14.18" to 7.6" (best 10.5 to 11.8") behind the leading edge of the 50" wing chord for a 950 Ib. KR-2 and 14.69" to 7.6" for a 800 Ib. KR-2. For the readers who wish to follow this up on their own, I suggest they read FAA publications. AC65-9A General Handbook - Airframe and AC43.13-1A Aircraft Inspection and Repair.

In concluding this sensitive and critical subject, I wish to make the following constructive suggestions for all current and potential KR flyers to follow until satisfactory flying experience has been gained:

1. Realize that you don't fly a Cub, a Cessna or similar aircraft which have some static self-balancing characteristics incorporated in their geometry. The

stabilizer of your KR has to do extra work in a nose-down or nose-up attitude.

2. Establish your weight and balance and get it within the range stated above.

3. Test the engine operation in an 18 degree (best to 25 degrees) nose-up attitude on the ground before you make that first flight, and try it with an almost empty tank.

4. After initial lift-off, hold the aircraft close to the ground as long as possible before you begin the climb with a gentle and slow transition at above 90 mph.

5. Climb straight out to 1,000 feet at a rate below 400 fpm before commencing a turn after levelling out, keeping the speed always above 90 mph.

6. Retract the gear only if and when you are familiar with the stick control and have the aircraft until full control.

7. Get a feel for control responses at full and semi-idle power and try flat effect, while flying well above 1,000 ft. AGL.

8. Enter circuit with gentle turns and make a long approach with gear down at about 80 - 90 mph with partial power.

9. Begin flare out only very close to the ground. Whenever you are uncertain about landing, apply cautiously full power for go-around, holding a horizontal attitude until 90 mph is reached.

10. Once you are confident with circuit flying and landing, get all instruments calibrated before any other tests are made and more advanced maneuvers including steep turns, maximum climbing with engine power loss are tested as well above 2,000 feet AGL.

Finally, don't make any shortcuts and don't let impression or successful owner reports in the KR Newsletters influence our judgment or speeds. Be prepared for power loss until you know your own KR which may take up to 100 hours or even more if improvements are made during initial time.

P. S. Note: Speeds have been stated for normal temperature and pressure at sea level. Maximum lift factor (no flaps) has been reduced as R.N. near stall is only around 2.2 mil.

ROGER HANSEN'S KR-2 N200RH DESTROYED DURING FORCED LANDING

Last month Roger Hansen's KR-2 that was featured in the July, 1990 issue of the Newsletter was destroyed while making a forced landing.

Roger said he and his wife were just east of Mt. Hood, Oregon when he heard a clunk followed by an immediate rise in the oil temp. What had happened is that the exhaust pipe coming out of the turbo had broken away and was spilling hot exhaust onto the oil pan. Roger knew immediately what had happened and with the fuel line only 4" behind the broken pipe, "it was time to get this thing on the ground". With 25 nautical miles to the nearest airport he picked a road, made a pass to check for wires and then came around for the approach. The road was 24'4" wide and the plane's wing span is 23'8" wide. He said, "It was like threading a needle."

On roll-out the right wing tip caught a roadside reflector which resulted in the plane cartwheeling at 50 MPH. Roger and his wife escaped any serious injury, a fact Roger attributes to a good shoulder harness. He also warns builders not to have their shoulder harness attach points tied back to the tail. In his accident the tail broke away and, had the belts been attached to the tail, it would have resulted in a tragic outcome. His plane has a rollover structure that his belts are attached to and he credits it for saving their lives.

You can see a beautiful in-flight color photo of Roger's plane in the October 1990 issue of Sport Aviation (thanks to the folks at EAA for the wonderful exposure).

Although it's sad to see eight years of work gone in eight seconds, Roger says, "Hey it's only a plane and planes can be replaced....the main thing is that we're walkin' and talkin'."

We can all thank God for that!



**EXPERIMENTAL
AIRCRAFT
ASSOCIATION**

WITTMAN AIRFIELD, OSHKOSH, WI 54903-3086
PHONE 414/426-4800

OSHKOSH 1991

ATTENTION: Those interested in being with the KR Group at the University of Wisconsin dormitory in 1991. U of W has stated request for groups wanting adjacent rooms be submitted together. Gladys Muse, 2194 Freydale Road, Marietta, Georgia 30067, has volunteered to coordinate your reservation request. You may use the form below. Be sure to: Make check (\$27.00) payable to **UNIVERSITY OF WISCONSIN, OSHKOSH**. Then mail the check and completed form to Gladys, to arrive in Marietta no later than December 1, 1990. We need to get these in early to avoid the rush. Forms getting to Gladys after that date will be forwarded as a courtesy only.

Reservations are taken on a first come, first serve basis. Special notice will be made of medical requests and of requests for specific halls. All requests for groups wanting adjacent rooms should be made TOGETHER. The first consideration in assigning rooms is the desired date of arrival and departure, and assignment to a particular room and/or hall cannot be guaranteed.

1991 ROOM RATE: \$27.00 PER EVENING PER ROOM

TO MAKE A RESERVATION:

-Complete the form in this brochure.

-A \$27.00 deposit is necessary for EACH room requested.

-The balance is due on or before MAY 1, 1991.

-Make checks payable to : University of Wisconsin Oshkosh.

-Checks MUST be in U.S. Dollars, drawn on a U.S. bank.

-Mail the form and deposit to Gruenhagen Conference Center, 208 Osceola St., Attn: EAA Reservations, UW Oshkosh, Oshkosh, WI 54901

-Please allow six weeks for confirmation.

ON MAY 2, 1991, RESERVATION DATES FOR WHICH FULL PAYMENT HAS NOT BEEN RECEIVED WILL BE CANCELLED.

1991 EAA RESERVATION REQUEST FORM

Last Name _____ First Name _____ MI _____

Street Address _____

City _____ State _____ Zip code _____

DAYTIME Telephone Number _____

Please circle and write your desired ARRIVAL AND DEPARTURE dates.

Before 24th	Wed 24	Thr 25	Fri 26	Sat 27	Sun 28	Mon 29	Tues 30	Wed 31	Thr 1	Fri 2	After 2nd
----------------	-----------	-----------	-----------	-----------	-----------	-----------	------------	-----------	----------	----------	--------------

Desired Arrival Date: _____ Desired Departure Date: _____

Number of Rooms: _____ Cost per room per night:

_____ Double (s)

\$27.00

_____ Single (s)

Amt. enclosed: \$ _____

A minimum deposit of \$27 is due for each room reserved. If payment in full is not enclosed, balance is due on or before May 1, 1991.

For medical reasons I wish to be:

_____ on the first floor of any hall

_____ in a hall with elevators

_____ in a hall with elevators or on a first floor

Special Requests: _____

Place with KR Group

Mail to: Gruenhagen Conference Center, 208 Osceola St.,
Attn. EAA Reservations, UW Oshkosh,
Oshkosh, WI 54901

On May 2, 1991, reservation dates for which full payment has not been received will be cancelled.

It is our policy to honor requests for specific rooms or halls, if possible, but we are UNABLE TO GUARANTEE OR PROMISE that each request will be filled exactly.

FOR SALE

KR-2 Project. On gear, HAPI engine on fire wall, woodwork complete, excellent workmanship, many extras. \$8,000 and 1100 hours labor invested. Asking \$7,000 OBO. Will consider selling engine and airframe separate.

Pete Burwell
361 Pennsylvania
Shreveport, LA 71105
318-869-1475

FOR SALE

KR-2 1835 Engine on and running. Cowling practically ready for prime. Fuselage, wing stubs and tail feathers primed. Controls hooked-up. All materials to finish the project... \$4,500

Wayne Stringer
Rt. 3, Box 95
Ft. Scott, KS 66701
316-223-5995

FOR SALE

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00.
INDIVIDUAL COPIES \$1.25 EACH.

KR-2 KIT Extras.. (1) canopy, (1) canopy
frame, (1) premoulded turtle deck. In new
condition and worth \$575... asking \$350
FREE FREIGHT.

Ronnie Culver
400 Garden Path
Round Rock, TX 78664
512-251-4103 or 512-255-1724

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 161, OCTOBER 1990

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO 413



KR NEWSLETTER

ISSUE NO. 162

NOVEMBER 1990



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



AL CAMPBELL'S KR-2 N651AC "RAINBOW RIDER"

I would like to take this opportunity to let my fellow KR builders know what it is like to fly with the new Diehl, fixed, taildragger landing gear.

My KR has flown about 315 hours with the original designed, Rand Robinson retract gear system.

Due to the heavier than normal weight of my airplane, I believe this gear was always stressed to it's limit even in good conditions. However, the times I have suffered retracts with the gear on the ground were usually when runways were water covered and imposed an unusually high load to the gear latch levers.

(Cont'd page 2)

(Cont'd from page 1)

Rainbow Rider weighs 712 lbs. empty and has flown many times at 1206 lbs. gross. This sounds heavy and it really is but the airplane could have actually handled more weight if the landing gear could have held it. I don't recommend this but it has proved to me how tough the little airplane really is.



Due to cracking that was prevalent in the aluminum wing spar castings (which had been changed three times), steel attach brackets were installed. Even with this modification, it only fixed the cracking problem but did not help the problem of shearing the little "I" beam fittings which the attach handles locked onto when the gear was down. Three of these have been completely sheared off when landing on runways that had water puddles on them.

Each time it cost a propeller and a crankshaft which was found cracked during magnaflux inspection at the (half moon) prop hub keyway.

Amazingly, the firewall of the airplane never received any damage despite having torn off the bottom engine cowl and crushing the bottom mounted oil cooler up against the firewall. Each time resulted in putting on a new engine cowl, landing gear spar castings, down latch levers and the "I" beam supports.

With all this parts replacements, it was pretty tough convincing my wife, family and friends how cheap and fun it was to fly a KR-2. One year on a trip with poor weather, I could have probably rented a lear jet and come out money ahead for the amount of flight time versus dollars that was put on the airplane. Oh well, you can't win'em all and besides, all my friends would have thought I was stuck up arriving at an airshow in a lear jet.

I am very happy with the new gear designed by Dan Diehl. It has raised the nose of the airplane and has allowed me to land about 15 MPH slower, due to the increase in angle of attack. There appears to be no difference in top speed with the wheel pants in place. These pants, if removed, show a 10 MPH loss in speed.

The gear is a fiberglass leg with a steel axle and accomodates the regular KR-2 wheels with the 4.00 x 5.0 lamb tires.

Recent flights have indicated excellent grass strip performance, the gear appears to have just the right flex for rough

landings and does not have a tendency to porpoise.

One characteristic observed that was not expected, is the increased rate of climb the airplane has over the old style gear and the much smoother performance at high speed.

Flight tests have indicated about 100 Ft/Min faster and at 207 MPH (unintentionally achieved coming out of a straight down vertical roll), it was silky smooth.

With the retract gear, it has lots of buffeting which showed up as shaking on the ailerons at speeds above 190 MPH.

Although it is not advisable to be rolling a KR-2, the maneuver happened while executing a hammerhead stall, after a sharp vertical pull at the end of a high speed fly-by. The power was left on a little too long, resulting in a torque roll to the right. Much to my surprise this little rocket was headed to mother Earth like a guided missile. After pulling the power off, a 4 "G" pull-up maneuver (according to my newly installed G meter) was required to get back to level flight.

It sure was fun after it was all over. Once again, I highly recommend the new Diehl landing gear and feel it was the best investment ever made on Rainbow Rider. It has made it a comfortable airplane to fly or land and will no doubt make it the economical airplane Ken Rand meant for it to be.

Enclosed is a current facts sheet for Rainbow Rider that pretty well covers all the technical details of it's construction and accessories.

Al Campbell
8807 Brigadoon
San Antonio, TX 78250
512-681-1715

FACTS SHEET FOR RAINBOW RIDER

INSTRUMENT PANEL:

VFR/IFR panel with Loran C navigation

GAUGES:

Airspeed	Tachometer	Fuel level
Turn & bank	Cyl. temp.	Amp meter
Gyro compass	Exhaust temp.	Hobbs meter
Altimeter	Voltmeter	Tara 720
Rate of Climb	MfId.press.	STS 110 Loran
Art. Horizon	Oil press.	Oil temp.
Vac. Ind.	Port. G meter	
Liquid Compass	VOR Navigation	

Electric trim tab indicators (rudder & elevator) overboost indicator light and horn

FUEL HANDLING:

Facet fuel pumps each wing
31 gallon total capacity, 8 each wing
15 forward of instrument panel
(explo-safe) explosion proof material
in all three tanks, same as used in
late model military army tanks and
troop carriers

FLIGHT TEST FACTS:

Maximum altitude reached 18000 ft.
Max airspeed 206 MPH at 14500 ft.
Normal cruise 190 MPH @ 10000 ft. (3400
RPM @ 28 inches manifold pressure)

AIRCRAFT SPECS:

Weight: 712 lbs. empty
1206 gross
Wing: 21.5 ft. wing span

PAINT:

Ford "Ondo" Blue metallic (base coat)
Ford "Dark Blue Metallic" (lower strip)
Ford "Silver Platinum" (center strip)
All paint is Sherwin Williams Ultrabase
#7 with one coat of acrylic clear
overcoat.

PAINT PREPARATION INCLUDED:

Feather fill for filling of wood/
fiberglass grain
Kondar surface primer
Two dull coats of Ondo Blue Metallic
Clear coat over Ondo Blue
Dark Blue Metallic plus clear coat
Silver Metallic plus clear coat.

OIL PUMP:

Dual gear rotor shadek pump modified for
scavenging turbocharger and
pressurizing engine oil galleries

PROPELLER:

"Almost constant speed" Warnke Prop, 52"
diameter by 56" pitch (with P tips)

WING MATERIALS:

White Canadian Spruce
Mahogany plywood
10 oz. bidirectional fiberglass
50/50 mix safety epoxy
T88 structural adhesive (glue wing skins
to spar)
Green urethane foam (fillets and wing
tips)
Kledgecell structural foam

WING SKIN PROCESS:

(Vacuum bagged kledgecell wing skins
like those built for a Lanceir but
without heat control of layup)

LANDING GEAR:

Fixed fiberglass main gear by Dan Diehl
Leaf spring tail with Diehl wheel
Go kart "Isuza" wheels x 4.00 by 5.0
6 ply Lamb tires

BRAKES:

Modified Cessna 172 rudder pedals
Engenetics disc brakes
Haggar calipers @ 6.0/1 leverage ratio
800 PSI line pressure for caliper

ENGINE:

Volkswagen type 3 beetle bug crankcase
Machined for oversize crankshaft and
cylinders
Displacement raised from 1600CC to
2180CC
Total seal piston rings (gapless)
Scat C20 camshaft (low lift and
duration)
Diehl accessory case with alternator,
starter and vacuum pump drive system

CARBURETOR:

Posa super carb 32MM throttle body with
mixture control

OIL COOLERS

VW type 4 (transporter engine cooler)

TURBOCHARGER:

Rajay series 300 (B40)

IGNITION SYSTEM:

Primary = single "slick" impulse
coupling magneto
Secondary = electronic ignition
(available from Great Plains Aircraft)
does not use a distributor cap or
rotor

ALTERNATOR:

20 AMP flywheel enclosed stator and
rotor

1990 KR GATHERING

Thoughts on the 1990 KR Gathering at Rough River Dam State Park, Falls of Rough, Kentucky.

Boy, did we have a good time and everything went so smooth!! I arrived Friday evening at the airport, with my plane on the trailer. Hit the ground running and did not stop until I left on Sunday morning.

To all the people who helped me, I offer you my heartfelt thanks. I could not have done it without the wonderful help I received.

This year, we elected to hold our gathering in a place that would appeal to women. It was also to be a family environment. From all reports, they seemed pleased. Some of the wives who did not attend, after finding out about the good times, said they would be at the next gathering. Some families brought their kids this year.

The 10th KR Gathering has really grown. The quality of KRs just gets better and better. The really strong point I see from these events are the friendships that are started, the bonds of friendships already developed are renewed. To illustrate an example of how our KR Gatherings influence people, let me talk about just one person (but this is not an unique example).

Last year at Covington, Tennessee, Joe Gagliano from Lawrenceburg, Indiana came to the Gathering. He was interested in the KR but unsure. After meeting all the friendly people at Covington, his mind was made up. On returning home, he ordered his plans and started cutting wood. He is also the person who sent me the information on Rough River Dam State Park. See what new blood will do for a group? This year I talked to people who were interested in KRs and came to look. Some expressed that they were ready to build, especially after getting a ride in a KR.

I heard comments that people thought about skipping Oshkosh and going to the KR Gathering instead because it was more friendly, lots of flying and had more KRs than at Oshkosh.

The weather was good for the Gathering. Planes started coming in on Thursday. More planes came in on Friday and Saturday. There was lots of flying and builders got to take rides to slack their thirst for flying. I heard later on that a bunch of KRs were on the ground due to bad weather.



**KEN COTTLE N335KC "BEST KR-1"
"PEOPLE'S CHOICE AWARD" "BEST PHOTO ALBUM"**



**ELDON RUMBAUGH N248RW
"BEST KR-2" "BEST ENGINE INSTALLATION"**



**NORM LEONARD N5826A
"LONGEST DISTANCE FLOWN IN A KR"**



DAN DIEHL N4DD
"MOST INNOVATIVE UTILIZATION OF KR"



HERB BULL'S KR-2 N86QT



TODD UNRUH'S KR-2 N818P

If anyone has videotaped the Gathering, I would like to hear from you. There are some KR drivers who would like to see what Rough River 1990 was like.

Jeannette Rand and her daughter were in attendance. We were all pleased that they could come.

We are getting people who are traveling long distances to attend the KR Gathering. "Sparkey" Anderson, last year's longest distance award winner from California was back. This year he was in a motorhome. He brought his wife so she could enjoy the event... "She said he will fly to the next event." When I first saw "Sparkey" on Friday, he was riding an old bike. I asked him how he got that bike in his KR. He just grinned.

Willy Wilson and his wife flew in from England for this event. (Willie flies the Concorde for British Airways.) It was his birthday on Saturday so we did him in at the Awards Dinner. Steve Alderman took him flying and afterwards said, "Since I let you fly my KR, are you going to let me fly the Concorde?" Willy said NO.

Our computerized list of people who attended the 1990 KR Gathering is ready. If you would like a copy, you can send a stamped, self-addressed legal size envelope to me.

It was suggested that the Sonera people be invited to the next Gathering. The group at the dinner thought it would be a good idea. We already have a lot of different experimentals showing up at our Gatherings. So... look for more planes next year. VW motors come in all planes and sizes (pun).

At this time we are still receiving prospects for the next Gathering. We do not know where it will be held for 1991. I will let you know via the KR Newsletter when a place is chosen.

I decided that I did not wish to do the judging of the planes, so I had some judges do this tough job for me. I had a case of brain fade during the dinner, otherwise I would have acknowledged their hard work in judging. Jim Faughn, Sparkey Anderson, Max Calkin and Jim Rawlings judged the planes and Al Campbell did the photo albums. They did a great job and my thanks go out to them!

Approximately 150 people were at the Gathering on Saturday. The Awards Dinner was Saturday evening at the Lodge with 100 people in attendance. After dinner, money was collected and after

CONT'D PAGE 6

expenses, there was \$200.00 left to put towards next year's Gathering.

During the dinner, I had the pleasure to help Jeannette Rand present the various awards. Wicks Aircraft Manager, Jerome Hediger, gave away a lot of door prizes. The group really enjoyed all the goodies.

The KR pilots that flew in were given metal plaques that were engraved for their dash. They said "Participant 10th Annual KR Gathering Rough River Dam State Park 1990".

This year I decided to award a plaque for Best Photo Album. It is an effort to promote better construction of a KR. It allows builders to look at other people's work or projects. It will allow others to assimilate knowledge of what works on a KR. Then by retroactive introspection, improve their workmanship. Probably also help them take better pictures of their parts.

Ken Cottle's photo album is almost an encyclopedia on how to build a KR. It sets a high standard for those who wish to compete.

"Longest Distance Award to Attend a KR Gathering" went to Willie Wilson, Norwich, England.

Jim Faughn received a "Special Appreciation Award" for past event Chairman of KR Gathering 1988-1989.

Al Campbell received "Best Interior" award.

Next year, in addition to our usual awards, we will have a nice trophy given for BEST SPOT LANDING. We will video tape this and show it after the Awards Dinner. I learned a lot this year as event chairman. Perhaps next year will be even better!

Keith James
1328 E. 45th Place
Tulsa, OK 74105
918-749-8085

VIEW FROM A CONCORDE PILOT

Suddenly they were there! Three of them with a fourth in hot pursuit, fast and low over the trees.

That's why we had come to Rough River... to see KRs flying!

Back in England my KR-2 has been "growing" for 4-1/2 years now and it is nearly done but I had never seen one fly, let alone flown in one.

Soon, over at the "strip", Margaret and I met Dan, Al, Marty and Steve and all the others and felt honored to be part of the KR family.

My first unforgettable flight was with Al Campbell. Flying is no novelty for me after 26 years with British Airways but I felt excited by the experience of getting to know Al's "neat" little plane. Later I went along with Steve Bennett and was most impressed by the performance of his machine and the skill of the pilot!!

Since our trip to Rough River, I've redesigned my cockpit canopy and turtledeck, based on what I saw and experienced and when that is done my little bird will be ready to fly. Watch for up-dates!

Thanks to everyone. We had a lovely time in beautiful Kentucky.

P. S. We will be back again!

Willie Wilson
3 Lawnsdale, Delamere Park
Cuddington, Northwich
Cheshire, CW8 2UT
ENGLAND



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD, OSHKOSH, WI 54903-3086
PHONE 414/426-4800

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00.
INDIVIDUAL COPIES \$1.25 EACH.

KERRY VAUGHN PERISHES DURING FLIGHT TEST OF LANCAIR

I first met Kerry at the 1988 Covington Gathering. That year his plane C GKAV won the "Best KR-2" award at Covington, as well as at Oshkosh. Kerry sold his plane to Paul Millet of Montreal (featured in the June, 1990 issue of the Newsletter) and began construction of a Lancair. There is a color photo of Kerry with his KR-2 on page 102 of the November issue of Sport Aviation.

On September 20, Kerry was test flying his newly completed Lancair. He made a few "circuits", landed and told his wife she might as well go home and that he was going to fly a little longer. According to Per Lindstrom, a close friend of Kerry's, on one of Kerry's take-offs his engine stalled at approximately 200 feet AGL. Kerry then made a tragic attempt to turn back to the runway.

Kerry was with us at this year's Oshkosh dinner. He said although he was building a Lancair, his heart was still with the KR "Family". Kerry will be missed by all of us who knew him.

He leaves a wife, Michelle and two children.

I hope you will join me in remembering them in your prayers.

Cards can be sent to:

The Vaughn Family
773 Tempo Mead Drive
Hamilton, Ontario
CANADA L8W2V7

From the Editor. . .

Kerry's death is a sad reminder of an occurrence that has taken the life of many pilots. Engine failure on take off followed by an attempt to turn back to the runway without sufficient altitude or airspeed.

I had a flight instructor who on every take off would say shortly after leaving the ground... **engine out... what are you going to do!?**

As we flew, he would constantly be asking me if the engine quit, where would I land. When we would fly into a new airport, he would tell me to study the areas around the airport because if the engine quit on take off, there wouldn't be time to "look around" for a spot to land.

I know what I'm saying is nothing new to you but one of our friends is gone

because he apparently made a tragic mistake.

As you're going down your check off list in preparation for each flight, I hope you will have a notation that reminds you to think about what you will do if your engine quits on take off. Maybe the last thing on your check off list should be the name KERRY.

On another subject... Last month's article entitled "**Help for KR Pilots**" brought criticism from a few of you. I received comments like "who is the author", "what are his qualifications" and "why would I print something that seemed to have negative comments about KR's?" Some of you took offense at the author's statement "to not be influenced by successful owner flight reports in the KR Newsletter".

First, regarding the author's qualifications. I have been told he is a knowledgeable aeronautical engineer. As I stated at the beginning of his article, you should "bear in mind that it is one person's opinion and should not be considered the final word regarding design and building consideration for a KR".

Secondly, regarding why I would print something that seemed negative toward KR's. I see the objective of this Newsletter to provide you with unbiased information regarding the building and operation of KR aircraft. It is not my responsibility to insulate you from anything negative about KR's. In fact, if there is something that could affect your safety, I'll print it.

Third, regarding "not trusting glowing flight reports". [hope you will understand that everything printed in this Newsletter are "opinions" and that you should always treat them as such. I hope before you entrust your life to someone's "opinion", you have looked at their ideas critically and assured yourself that you agree with them.

Your opinion is the only one that counts!



FOR SALE

KR-2 New fixed landing gear. Wheels included. Must sell...\$400 or best offer.

Cham Gill
3100 Willow Spring Rd.
Central Point, OR 97502
1-800-424-2413

HELP!!

Does anyone have a flying KR-2 with a fuselage shorter than the plans call for? I think I've goofed and need info. Thanks!

Lee LaFarlett
228 Ada Dr.
Trumann, AR 72472
501-483-2795
501-932-1201 (Day)

WANTED

Correspondence with someone that using the Revmaster 2100DT in their KR-2. Am having high HT problems.

James Takemoto
4633 E. Colfax Ave.
Denver, CO 80220-1201
303-388-0407

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 162, NOVEMBER 1990

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413



KR NEWSLETTER

ISSUE NO. 163

DECEMBER 1990



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



ROBERT MUSE, SR. KR-2 N28RM

Having spent 33 years inspecting aircraft for the Airforce, Robert decided to accomplish a lifelong desire to build his own airplane.

At Covington a few years back, he was asked what was the hardest part of the construction. He said, "that is was trying something new like laying out the glass but after I got into it, it was quite easy and I enjoyed it." When asked what modifications he made he replied, "well, the plans don't really give any dimensions from the top longeron up and I didn't buy any premolded parts so I don't know if it's modified or not... it's just the way I put it together." When asked how does it fly? He simply said, "I like it... it's a lot better flyer than the pilot."

Some helpful tips and Ideas from Robert begin on page 2.

TIPS AND IDEAS
BY BOB MUSE, SR. OF MARIETTA GA

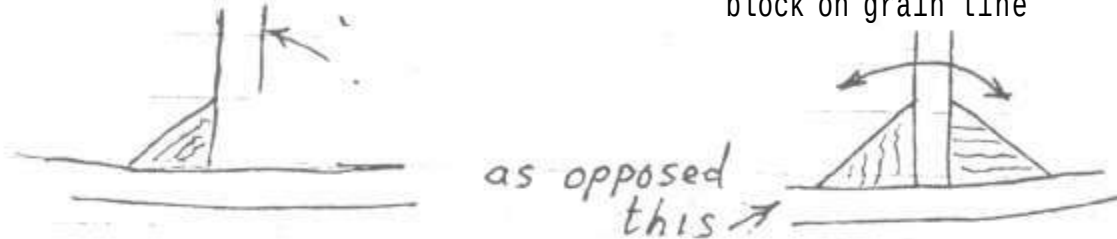
I have been asked about these items many times so this is the way I did my KR-2.

1. FUSELAGE CONSTRUCTION FRAMEWORK

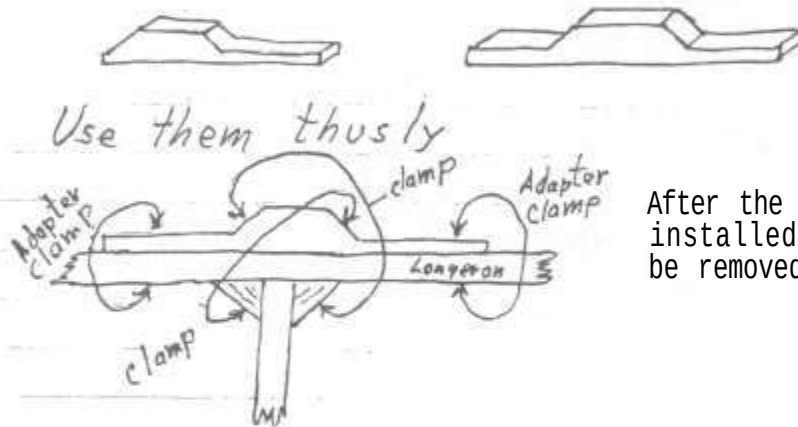
The corner blocks were made of scrap 5/8 x 5/8 spruce and positioned so that the grain length was in the direction of stress.

Torsional load on upright

Torsional load would tend to split block on grain line

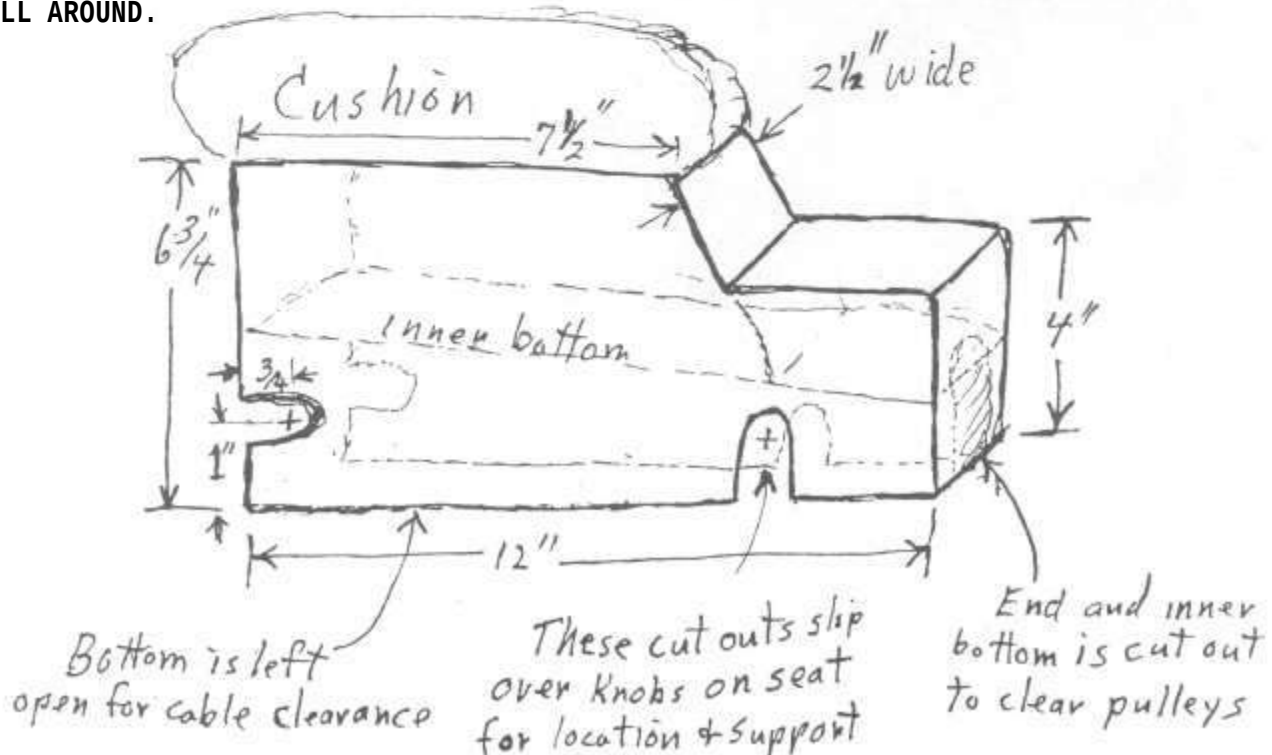


2. CORNER BLOCKS CAN BE HELD IN PLACE WITH SMALL CLAMPS AND ADAPTER BLOCKS

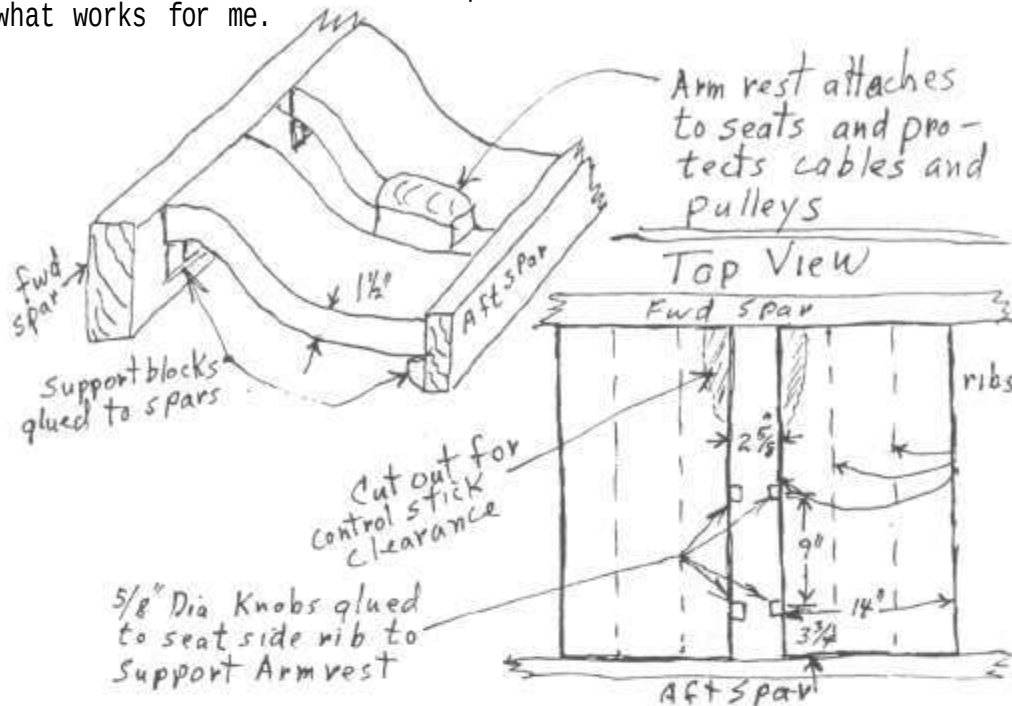


After the two block clamps are installed, the adapter clamps can be removed and used elsewhere

3. ARMREST IS CONSTRUCTED OF 3/32" PLYWOOD BOXED WITH 1/4" X 1/4" CORNER BLOCKS ALL AROUND.



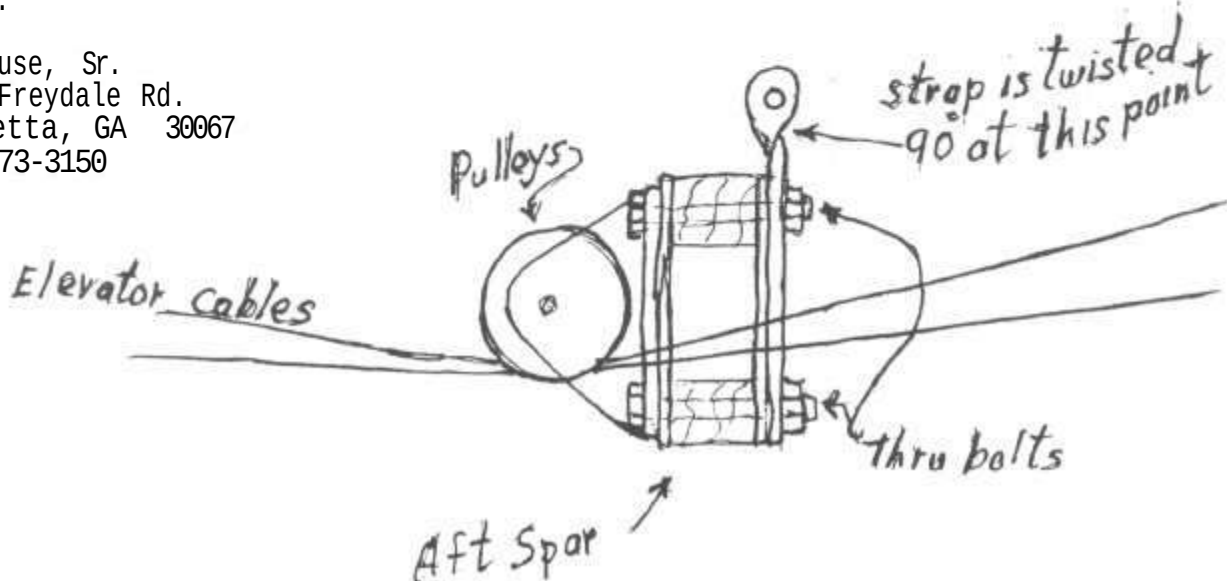
4. **MY KR-2 SEAT IS SOMEWHAT DIFFERENT BUT NOW HAS BEEN COPIED SEVERAL TIMES.** It is made of solid foam with four 3/32 plywood ribs covered with 4 layers of fiberglass. They are positioned between the forward and aft spars. Actually, they fit snug and I have not found the need to bolt or fasten them down. I do have a seat cushion on top which is secured to the spars with Velcro but the seats have remained in position. This is what works for me.



Each layer of fiberglass should be a continuous wrap from top around forward end on bottom, around aft end and back to top.

5. **KR-2 SEAT BELT ATTACHMENT.** If you use a center stick as I have and put the elevator cable pulleys on the forward side of the aft spar here is a suggestion. The pulley bracket bolts go through the spar and need a back up plate. I used two 4130 steel straps the same size as the aft spar wing attach steel. One bolt through lower spar cap and one through the upper spar cap. The 4130 straps extend above the spar where I twisted them (with heat) 90 degrees to accept the center seat belt attachment. Of course there are two brackets, two back-up bars and four bolts.

Bob Muse, Sr.
2194 Freydale Rd.
Marietta, GA 30067
404-973-3150



TODD GOUDEAU'S "MISS LILLY" FOR SALE

Earl, I thought I'd let everyone know the good news that after nine months, a lot of anticipation and a little labor, my latest project (my own design) is finally out of the garage, and let me tell you this baby is awesome, expensive, but worth every penny. I think it may be awhile before it's up and running but I like to sit and stare at it for hours. Since it's coming out on June 27, 1990, performance figures are as follows: Temp runs about 98.6, fuel consumption is about 32 oz per day (Similac low lead). However, it still has a bad leak. Length is 25 inches and empty weight is 15 lbs 3 oz. Gross weight 16 lbs 10 oz. Landing gear doesn't work well yet but we're working on it and looking for about .2 MPH at sea level.



"MR. JACOB"

Now for an up-date on "Miss Lilly". After Oshkosh '89 at about 80 hours TT, I converted her to a fixed gear KR. Although I wanted to use Dan Diehl's kit, the arrival of "Mr. Jacob" forced me to pinch pennies and fabricate my own, which I did out of tig welded 4130 steel and a fiberglass leaf spring off of a Gruman Tiger (split down the middle, made a right and left). I am very happy with the way mine looks and feels but I recommend Dan's kit highly. A friend is using it to convert his KR and it's first class! The end result is that I lost 10 pounds and picked up 3 or 4 MPH. It is a lot more quiet (no gear chatter, or air noise from the wheel wells) and a lot more solid, besides I think it looks fantastic! I built fairings on the gear legs to make



the gear look wider and more tapered and built a pair of tight/sleek wheel fairings. The wheels are 7 feet apart now which helps on ground handling and brake/turning power. The only other changes since Oshkosh or the last



Newsletter I was featured in, is a new Narco Com 810 radio, a G-meter and I had by exhaust pipes aluminized. Total time to-date is 126 fantastic trouble free hours. The trophy count is up to six among four states and she still draws a big crowd wherever we go.

Now for the sad news, due to the new project "Mr. Jacob", and the need to buy a hangar for him and Suzy, "Miss Lilly" must be sold to a new loving owner. I know, I know, everyone keeps telling me I'll kick myself when she's gone but priorities remain. (The wife did say I could keep enough to start another project, Yeah!) Please call for details or just to talk about her. Thanks, keep'em light keep'em flying guy! Asking price is \$11,700 Nego.

Todd Goudeau
3630 Truesdale Dr.
Missouri City, TX 77459
713-437-1904

FROM THE EDITOR . . .

OOPS! There are two things you should not do when you are tired... One is fly an airplane and the other is edit a newsletter.

Last month's issue contained a couple of "missed approaches". First off, the winner of the "Longest Distance to Attend the KR Gathering" was referred to as Sparky "Anderson". It should have been M. T. "Sparky" Sparks from Santee, CA. As you can see, there is little similarity between Sparky Anderson, Manager of the Detroit Tigers and "Sparky" Sparks, KR Pilot Extraordinaire (except our Sparky is better looking)! Sorry to both Sparkys for the mix-up!

In the last issue I also mentioned that **Norm Leonard** received the "Longest Distance Flown in a KR" award at this year's Covington event and forgot to mention he flew in from Gillette, Wyoming.

Last but not least, I was told that **Willie Wilson** was a Concorde pilot. Willie informed me that although he's had an enjoyable career with British Airways, so far he's not flown the Concorde (however, he probably knows someone who has flown the Concorde, so that's close enough). I think I heard someone say Willie will be piloting an upcoming Space Shuttle mission... should make an interesting flight report!

Thanks to all of you who have been so supportive of this Newsletter over the past year! It's your involvement that makes the Newsletter so interesting.

Judy and I would like to wish all of you and yours **HAPPY HOLIDAYS** and a **WONDERFUL AND SAFE 1991!!!**

Judy & Earl

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$15.00 PER YEAR- U.S., \$20.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$75.00. INDIVIDUAL COPIES \$1.25 EACH.



SPARKY (DOES HE LOOK LIKE TOM CRUISE OR WHAT) SPARKS "KR PILOT EXTRAORDINAIRE"



SPARKY (WHAT THE HECK IS A KR) ANDERSON

POSA THROTTLE CONTROL

The most frequently utilized fuel metering system for the Volkswagen aero conversion continues to be the Posa carburetor. Properly adjusted, these units perform very well and are available at reasonable prices. Incorrectly adjusted, the Posa is degraded as nothing more than a poorly metered leak; often thrown out and replaced with a more expensive and complicated system.

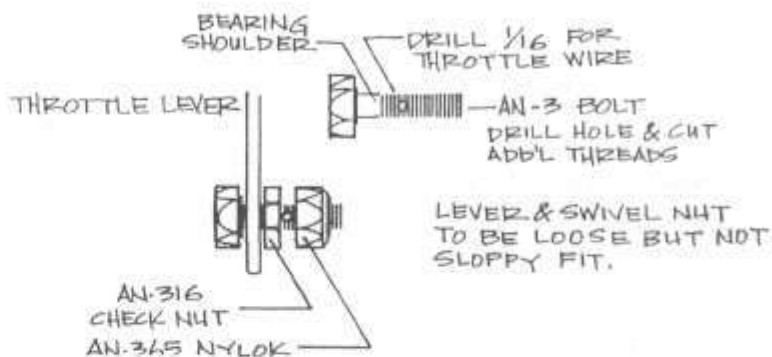
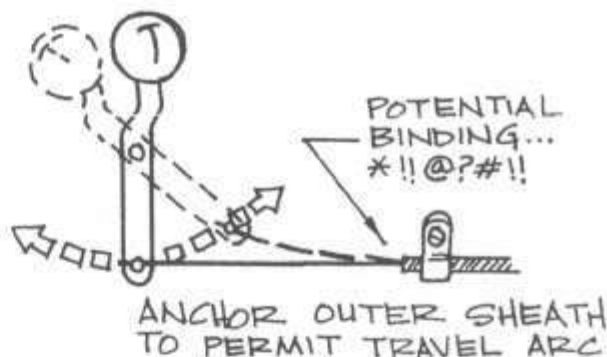
However, before the important job of tuning the carb is begun, the Posa will require some sort of properly installed and adjusted linkage connecting the cockpit to the carb. A throttle control that is working smoothly will help make the final tuning drill just that much simpler.

Developed for motorcycle installations, the Posa "injector" (as it was originally called) requires a pulling action to open the slide and advance the RPMs. In its simplest form, the slide is actuated by a sheathed cable which terminates in a barrel fitting that attaches to the slide itself. Here's where it can get messy...

A typical aircraft panel-mounted throttle control advances the revs as it is pushed forward, or firewalled, as the hot rocks say. However, our Posa wants a pulling action to advance. Look at installations using this type of throttle control with a Posa carb and you'll find all sorts of bellcranks, walking beams, shafts, bearings and brackets. Usually complex, costly and always heavier than necessary.

The alternate choice is to use a throttle lever (quadrant) that will transform the push in the cockpit into the required pull at the Posa. A lever control can easily change the direction of movement and at the same time eliminate all the linkage headaches. Ultimately, the throttle control system can be simple, lightweight and effective.

The cockpit control need not be elaborate or expensive. Several aircraft supply sources offer quality components that are far lighter than that surplus T-6 quadrant your brother-in-law wants you to use. An effective control could also be built in your own shop at minimal cost. The chief requirement is that the lever have some sort of friction lock to prevent throttle creep. Fiber washers and a nylok nut work fine.



The throttle cable, complete with the necessary Posa fittings already installed is available from Mosler/HAPI. Most motorcycle shops will also carry similar outer cable and fittings. Just be sure to use a solid wire rather than braided cable. Why? Ever try to push a rope? The cleanest way to cut the cable sheathing is with a Dremel cut-off wheel. A swivel fitting (see sketch) is easily fabricated in the shop and will provide a means of attaching the inner cable wire to the throttle lever. The cable itself should be anchored throughout its length to avoid excessive flexing or contact with hot exhaust plumbing. Also, be aware of the need to allow for the required field of travel as the lever moves through its transcribed arc (see sketch).

Monte Miller
1900 Parkside
Denton, TX 96201
817-566-5871

The following are articles that appeared in the September/October 1990 EAA Technical Counselor News publication in the "Safety" section.

MAGNETO SWITCH SUGGESTION

Technical Counselor, Gene Darst reports his new KR-1 has a new prop from Sterba a 52-46, has been flown up to 195 miles per hour indicated air speed. It flies hands off. On landing it was below 45 indicated, he must get to altitude and stall, etc. yet, it is a dream to fly. The mag switch is a miniature toggle switch. Gene accidentally hit it off at 1800 feet - got awful quite - checked fuel throttle - then realized it was the mag. Gene flipped it on and away he went. A switch guard is on it now and he made it out of .025 20-24-T3 aluminum built out of two pieces. He suggests everyone make one so that they do not have a problem in the air. He was about to pick a spot to land - deciding - gear up or down when he spotted the problem.

A CASE FOR THE VISIBLE VOLTMETER

By Al Ross (edited for brevity). While reinstalling the starter on my KR-2, I inadvertently allowed the battery cable to contact the exhaust pipe. The insulation on the battery cable prevented an immediate short, but after two or three minutes of running the engine, just enough time to taxi about halfway to the takeoff end of the runway, the heated exhaust pipe melted the insulation and allowed the cable to contact the pipe, connecting the battery to ground through perhaps 15 inches of battery cable. My first indication of a problem was the voltmeter reading very close to zero, and the ammeter indicating about 20 amps (max. for my alternator). The only logical reasons for zero voltage were a dead short or a bad meter circuit, so I got the plane off the runway ASAP and quickly(!) removed the cowl and disconnected the positive cable from the battery. (I always carry tools since an incident with my Revmaster engine caused a forced landing!) A boiling battery coupled with a warm cable disclosed the problem, and I rerouted the cable away from the exhaust pipe.

JOINING POLYFOAM TO FOAM

I have a story that may be of interest to builders that are using two-part polyfoam to join blocks of foam.

I've been slowly building a KR-2 for more than eight years in Fairbanks, Alaska. This last summer I finally had it all together and painted, but wasn't able to fly it since I was in the process of selling my house, packing (including crating up the KR-2 and putting it on a LI-HAUL car hauler trailer, which is a story in itself) and moving to Boise, Idaho.

It's been in the 90 to 100 degree range since I got here and I can see where each polyfoam seam is. The heat raised a welt wherever a seam expanded; in some cases about 1/8" high. I now have a major job ahead of me sanding, patching and repainting.

Throughout the years of construction my airplane was never subjected to temperatures above 75 degrees in my garage, so I assume that the polyfoam never completely expanded. I'm sure this must have happened to someone else but I've never read of it; so let this be a warning to other cold-climate builders. The airplane is painted white but full sun still gets it pretty hot. I probably could have flown it in Alaska for years with no problem, but who knows?

My main concern now is: What will happen when my KR is exposed to warmer temperatures next summer? Will I have to sand, patch and paint again? I would like to hear from anyone who has experienced this problem.

Dan Voda
P. O. Box 5126
Boise, Idaho 83705
907-479-5069



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD, OSHKOSH, WI 54903-3086
PHONE 414/426-4800

FOR SALE

1835 MAPI 170 hours, mag, alt. starter,
Posa, oil cooler, four pipe exhaust.
\$3,000 with prop, \$2,800 without.

Also have KR-2 RR alumunim extrusion kit
box never opened. \$225.00

Bud Powell
4900 18 Mile Creek Rd.
Westport, KY 40077

FOR SALE

KR-2 Project 80% built. All Rand premold
parts used, with Revmaster 2100D Turbo
charged engine, all engine and flight
instruments. Excellent workmanship. No
time to finish \$4,500.00 Firm. Call after
7:00 p.m.

Timothy A. Wildes
Route 5, Box 232C
Douglas, GA 31533
912-384-0399

FOR SALE

Revmaster 2100 D engine. 1982
manufacture. Never run or installed in a
plane. Forged crank, long prop hub (2"
extension), Revmaster oil cooler, rear 20
amp alternator, geared starter, Posa
carburetor. \$1,850 plus shipping FOB
Rimrock. Will ship within continental
U.S.

Al Ross
P. O. Box 474
Rimrock, AZ 86335
602-567-5527

FOR SALE

Two KR-2 wheels. Tires. Mechanical
brakes. Slightly used, good condition.
\$75.00 pair.

Bob Fabian
Rt. 4, Box 451
Mountain Home, AR 72653
501-492-5759

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 163, DECEMBER 1990

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413

*Season's
Greetings*



KR NEWSLETTER

ISSUE NO. 164

JANUARY 1991



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



**GENE DARST'S KR-1 N585D OF BEUMONT, TEXAS
1830CC, SUPER POSA CARB**

First flight went very well. Gene kept the tail of the plane on the ground until reaching 35-40 MPH then raised the tail and the plane lifted off perfectly after about 400 feet of roll. He made a gentle turn and climbed to about 3,000 feet and leveled off. Gene did show a fairly high cylinder head temp of about 400 degrees. After about an hour, he made a perfect landing.

(cont'd page 2)

(Cont'd from page 1)

Gene said he was a bit surprised at how noticeable the "ground effect" was upon landing. He said he's had his plane "float" 2000' down the runway.

The engine temp problem was caused by air inlets being too large, causing a build up of too much air pressure in the cooling baffles. Gene reduced the size of the inlets and installed exhaust ports in the cowlings, resulting in a cruise oil temp of about 325 degrees.

The construction of Gene's KR is to plans, with extreme attention to detail. The leading edge of the plane's wings are within .005 true. All wing surfaces are balanced.

Gene said he thoroughly enjoys the plane and will keep us informed.

TIPS ON FIBERGLASS FUEL TANKS BY GENE DARST

Some reports of resins "epoxy" flaking off and softening inside fuel tanks were quoted in the KR Newsletter. KR Newsletter reports that Glassair people are using a "Vinylester". This resin is "fuel proof". In checking my supplier in Houston, Texas, I find that most companies manufacture fuel acid proof resin and Atlac 382-05A is a "fuel proof" resin.

I have used it in acid pumps for refineries in the area. The supplier says that it equals or exceeds properties in "Vinylester" resins.

As for myself, my Turner T-40A Fuel Tank is 20 years old now and made of marine grade polyester resin and I've had no problems yet.

In the construction process, I left the top open to install baffles. I then completely "jell coated" inside of the fuel tank. "Jell coating" is a must in fuel tanks. Anyone that wants more information, contact me.

SOME TIPS ON FUEL TANKS

1. Always build test sample of materials used. Build flat sheet of glass. Submerge it in fuel - "auto" - "AV gas" - "battery acid". You can also use a heat lamp to raise temperature of "fuel" - "acid" above 100 degrees F to check if glass breaks down. Do this outside in open air. Epoxy or polyester resins add

very little strength to fiberglass parts. Your strength is in the glass cloth. Resins are to hold shape of part but do not get part too dry.

i.e. "Snowy white glass" after lay up of part, or sample, take squeegee and press down and if squeegee leaves indent then there's too much resin. Best to try this on flat test sample.

2. Most designs of aircraft are proven and tested to be safe for flight. Let me remind you though, each person (aircraft builder) should test his own work.

i.e. Glue joints, fiberglass parts, metal fittings, cracks, etc. The designs are safe, be sure your workmanship is also. I always test drill sample holes in metals before actual part is drilled. Also test ream holes. Various metals drill differently.

BE SAFE - NOT SORRY!

For more information, feel free to call me. I will try to explain proper methods of aircraft construction that I am familiar with.

Gene Darst
Tech. Counselor #290
585 Iowa St.
Beaumont, TX 77705
409-835-1990



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITJMAN AIRFIELD. OSHKOSH. WI 54903 3086
PHONE 414/426-4800

KR CORROSION CONTROL

The importance of corrosion control within the KR airframe should not be overlooked. With such a simple design, each component is critical and should be treated accordingly.

Moisture or contact between dissimilar metals is the first step toward a corrosion problem. The lumber used in your project has a specific moisture content so take the time required to do it right the first time.

Aluminum components, after trial assembly, should be taken apart and some form of protection applied. A Scotchbrite pad used in conjunction with a solution of Alumiprep #33 will provide a final alodine #1001 treatment or a coat of epoxy-base paint. Read and follow directions anytime and all the time; you're working with acids and other nasties.

Avoid using steel wool on aluminum. Tiny pieces of metal can become imbedded in the aluminum and cause problems. Most builders have long since swapped metal wool for the superior Scotchbrite.

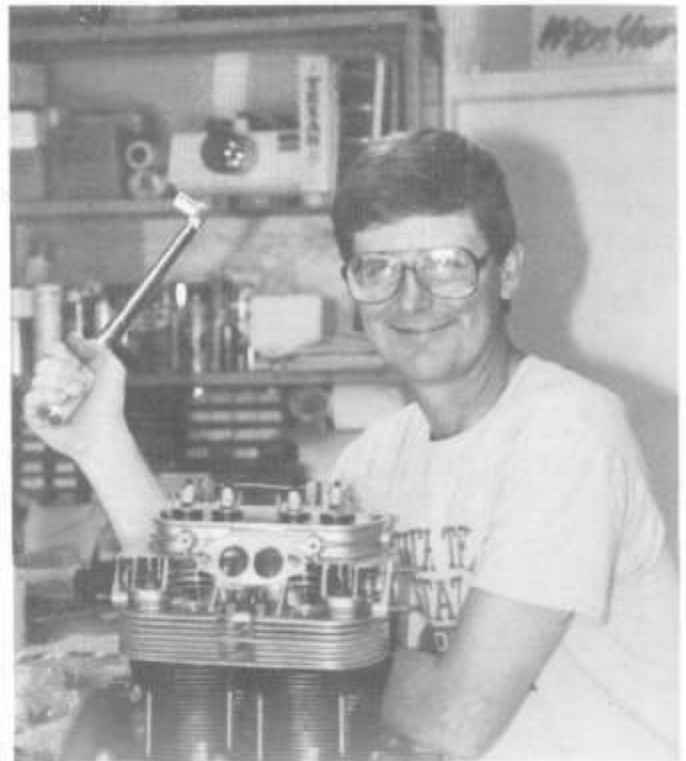
Steel parts can be cad plated (good choice for the wing fittings) or Scotchbrite sanded to bare metal, prep, prime and shot with a coat of epoxy paint.

As the Nike Shoe commercial says,
"JUST DO IT".

Monte Miller
1900 Parkside
Denton, TX 96201
817-566-5871



MONTE'S INSTRUMENT PANEL



MONTE "THE WRENCH" MILLER

RUNWAY SHORT?
INFLATABLE RUNWAY
NEW • AVAILABLE IN STD 500' and ECONOMY 1000'
COZI
OVERSHOOT? BRAKES BAD? OVERGROSS?
DEPLOY THIS LITTLE POCKETSIZE PLANE
SAVER AND GREASE ON IN. ORDER NOW!
29 - BIG EARL'S AERO 3995
MUNI AIRPORT. SHEEP MONTANA

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00.
INDIVIDUAL COPIES \$1.25 EACH.

BUILDER'S REPORT

Please note pictures of my KR and an explanation of modifications I have made on the ship.

If you look closely, you can see a line of screws in the top strip. (Editor's

Note: Unfortunately, due to the small detail, you won't see them in the photo buttrustus, they're there.) The turtle



deck, the boot cowl and the tail cone are removable. All this was done to make the airplane highly serviceable. It has dual sticks and mechanical heel brakes with 2-1 multiplier bellcranks to improve the braking power. This is very effective.



The tail cone is separately removable to make access to the elevator control cables. The rudder cable passes through the fuselage through split nylon blocks, so that preassembled cables can be installed.

The handle showing in the center of the cockpit is the retract handle. Under the handle is a safety bracket that slides sideways from under the handle, allowing the handle to be pushed down to unlock the gear for retracting. It works in reverse to extend the gear.

Also, you will see in the pictures a door in front of the landing gear. This is a spring-loaded door that closes off the opening. The gear also retracts into a fairing built onto the bottom of the wing.

I have not completed my testing but the ship cruises at 150-155 MPH and has been flown well over 175 MPH. Its response to the controls is quite effective.

"Jibet" was finished in 1989 and test flown November 26, 1989. I do not have many hours on it, as I have been involved in other activities. Anyone wanting to see "Jibet" can see it at Creve Coeur Airport in St. Louis County.



Earl, I have a personal comment to make regarding Kerry Vaughn's death (see November, 1990 Newsletter), as I had a similar experience with Jibet. The engine quit on take-off about 150 feet in the air. I set up a straight-ahead glide to a field I had in sight. As I retarded the throttle, the engine returned to life. This was about 50 feet above the ground. I was able to maintain enough power to return and land. If this ever happens to you and you cannot get the engine back running, NEVER, NEVER, NEVER try to turn back and land at the airport. Retract your gear and slide it in on its belly. It will do less damage to the airplane and you can walk away from it. This was caused by a fuel-supply problem, which has been corrected.

I hope all the rest of you builders finish-up your projects and can enjoy the pleasure I am having flying "Jibet".

James Rawlings
741 Woodbriar Lane
St. Charles, MO 63303
314-441-7517

SOLVING THE PROBLEM OF POLYFOAM HEAT EXPANSION

I was reading Dan Voda's story about the llquia foam expanding in the heat in the December Newsletter. About 15 years ago we found this to be true and it was discussed at the Oshkosh forum and mention was made in the Newsletter. It's funny how these problems keep being rediscovered. If a person could read all the Newsletters before building his KR, he could really save himself a lot of trouble. Now with 163 issues it would take about two years of spare time reading to do this. By then you could have finished the airplane.

Oh well, here is what we found. The foam is like an epoxy. The two liquids get hard when mixed together. They also produce a gas which makes bubbles in the liquid during the curing process. The resin, if we can call it that, gets hard in a few minutes and traps the gas bubbles.

Now, we all know that epoxy gets soft when heated and gas will also expand when heated. So if the cured foam gets warmer than it has ever been before, it will grow. The only cure we found was to heat the foam up to about 150-170 degrees F. This will let it grow as much as possible and in service should not reach this temperature.

After sanding and the top skin of the foam is gone, it will expand again if heated. So before you lay on the glass, give it one more heat cycle to be sure you've done all the expanding. Since the foam is a great insulator, it takes a while to heat very deep. We used a space heater and built an oven out of a big piece of cardboard.

One other thing, don't use a vinylester resin on the liquid foam as it may melt it away. Use only epoxy resin on it.

As for Dan Voda's problem, he needs to do his sanding on the bumpy area, then heat up the entire wing. I remember on Bob Passmore's KR-2, we put his wings in an old dead station wagon behind his house and covered the car with a dark colored tarp. They stayed out there all summer while we worked on the rest of the plane. The foam grew and then when we finally finished them, they were perfect and ten

years later they are still smooth. Remember if the foam ever gets hotter than it has been before, it will grow.

Hope this will save someone some trouble.

Dan Diehl
1855 North Elm
Jenks, OK 74037
918-299-4444

ACCIDENT REPORT

I am writing to you to let you know of a situation that I don't think some builders of homebuilt airplanes are aware of. On August 17, I was flying my KR-2 when the engine started to cut out. I tried everything to keep it running but to no avail. I was at 1200 feet over a very busy highway and had to try landing on a road in a development of homes. As a result, I was downwind and couldn't stop on the short landing site. I came to a crossroad and dove under power lines and contacted a car with my left wing. It flipped me and I slammed into a curb and landed upside down, saturated with gasoline. I had turned off the gas and battery power before attempting to land. I tightened my seat and shoulder harness which was attached with steel cable to the tail post. It save my life. Well, enough for the experience of the destruction of my plane.

The cause of the engine failing was the impulse coupling on the Bendix 3000 magneto. The FAA inspector and myself tore down the systems and when we pulled the mag, the impulse was totally destroyed and jammed. I would suggest anyone flying with this mag to check the impulse coupling. I hope no one has to find out the hard way as I did. Also be sure to have a shoulder harness and use it.

Nelson R. Heinrichs
177 Mill St.
West Creek, NJ 08092
609-296-4349

1991 KR GATHERING

The 11th KR Gathering with a special invitation to all Sonerai Aircraft, will be September 13-15 at Kentucky Dam Village State Park, Gilbertsville, Kentucky. It is located 25 air miles S.E. of Paducah, Kentucky in the area call "Land between the Lakes". It is also approximately 100 miles North of Memphis, Tennessee. The runway is 4,000 feet long by 100 feet wide and hard surfaced. There is night lighting and fuel on site. Bring your own tie downs.

I have reserved 40 rooms and 10 cabins. Rates are:

40 rooms in lodge	\$43.19	single
	52.38	double

10 cabins (5) 1 bdrm	\$65.25
(5) 2 bdrm	74.44

(cabins are fully stocked)

For reservations call:

1-800-325-0146
Kentucky Dam Village State Park
P. O. Box 69
Gilbertsville, KY 42044

Be sure and state that you are with the KR Gathering, otherwise you will find out the place is booked solid. There are places around the park, to mention a few: Fox-Fire Motel, KOA Campground, Ramada Resort, Belair Motel.

Tentative schedule:

Friday: Arrivals, fun flying, technical meeting & assistance after dinner.

Saturday: Morning- judging of aircraft
afternoon- spot landing contest
evening - awards dinner at lodge

Sunday: Fun flying and departure

Program chairman:

Keith James
1328 E. 45 Place
Tulsa, OK 74105
918-749-8085

INSURANCE FOR KR AIRCRAFT

I have been contacted by someone who represents a couple of insurance companies that will provide insurance for KR aircraft. He also buys and sells KR parts and misc. equipment, (intercoms, Lorans, headsets, etc.) complete KR's or those in need of repair. Here are three KR's that are for sale, along with a "brief" summary.

FOR SALE

KR-2, certified day/night VFR, 150 total time. 65 HP Monnett, alternator carb. heat, conversion VW, single magneto, posa carb. 509 last empty weight, fixed gear. Needs brakes, paint work and current license.
\$4,000.00

KR-2, certified day VFR, 100 total time. 2100 Revmaster, dual magnetos, alternator, electric start, 3 bladed prop. Retractable gear, standard mechanical brakes. Extra canopy, new fuel tank, new tires. Disassembled for new fuel tank. Needs paint, reassembled, current license.
\$4,500.00

KR-1, certified day VFR, 140 total time. 65 HP Monnett conversion VW, single magneto no electrics. Retractable gear, standard mechanical brakes. Had minor damage, most repairs finished. Needs paint and current license.
\$2,000.00

FOR MORE INFORMATION, CONTACT:



SCOTT F. SMITH

AIRCRAFT SALES AND INSURANCE

2525 NW 71st Place
Ankeny, Iowa 50021

(515) 289-1439
Mobile (515) 240-0160

**KEN AND I
BY STUART ROBINSON**

The prototype KR-1 and KR-2 had many uneventful flights but no one remembers "uneventful". My most "eventful" flight came on the day I lost a spinner.

There was a time when we even made the spinners out of foam. After glassing, they were bolted to the prop hub with one long bolt down the center. This worked fine if the spinner was well-balanced. If it were not well ballasted, the bolt had a tendency to fatigue.

I flew the KR-1 back from a fly-in one day and it was IFR all the way (I follow roads). The bird was cruising along at 145 MPH which, to me, was more comfortable than 165 MPH. I had just passed a C-150 and wagged my wings when - BLAM - the whole bubble canopy blew apart and I went through some very heavy pilot induced oscillations. With throttle back, I set up to land on the freeway that was 3,000 feet below. Well, a KR-1 takes a long time to descend 3,000 feet at 80 MPH. During that time, I decided that maybe an airport would work just as well.

Fullerton was about 15 miles to the west so I added enough power to zero the ROC.

I had always wanted to fly an open cockpit but that was downright uncomfortable. By the time I found the airport, my eyes were hurting bad but at least my leg had stopped jumping up and down. I followed a Cessna 172 around the pattern and the tower gave me a big "green" one so I kept it at 80 all the way down. The float and three point touch down were normal. I don't think my body bothered the tail feathers at all.

The only damage to the airplane was a missing canopy, a lost spinner, and a two foot hole in the wing where the canopy had swung over and hit before leaving the aircraft. Surprisingly, nothing hit the tail feathers: Not a scratch. From that day on, however, we used normal aluminum spinners with normal aluminum back plates like normal people.

Stuart Robinson
22352 Longeway Rd.
Sonora, CA 95370
209-586-7781

N64591 FOR SALE OR TRADE

KR-2 A65 Continental Engine. New prop and paint. 500-5 wheels. Approximately 300 total time on E & A. \$7,500 or trade for Ercoupe Tri Pacer or other tri-gear plane. (See Photo)



My brother and I have spent the last three years rebuilding (very parttime) and he will be flying it soon if all taxi tests go as planned. It has 300 hours on it (approximately). We reworked the cowling, patched the underside (the gear had folded) painted it, put on a new prop, did a new weight and balance so now she is ready to fly. I will be able to watch it but I can't fly a taildragger because I am a paraplegic so I would like to sell or trade it for a plane I can fly.

Roscoe Hardy
HC-64, Box 210
Rimrock, AZ 86335
602-567-4935

FREE MAGAZINES

I have a large number of many aviation magazines that I would like to give away. They include the following:

- 146 Sport Aviation
- 61 Kitplane
- 64 AOPA Pilot
- 38 Homebuilt Aircraft
- 36 Private Pilot, Flying &
other misc. info, sheets

If you would like some or all of these magazines, please let me know. All you will have to pay is the mailing cost.

Dick Dougan
2317 Hedge St.
Pontiac, MI 48054
313-666-1185

WANTED

Would like to meet with KR builder in College Station/Bryan TX area. Also interested in starting KR-2 project and would like to acquire kit/plans.

Brian Bowman
P. O. Box 4582
Bryan, TX 77805-4582
409-779-0060 (day/work)
409-690-0570 (24 hr/computer modem
messages only)

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 164, JANUARY 1991

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413



KR NEWSLETTER

ISSUE NO. 165

FEBRUARY 1991



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



KEN COTTLE'S KR-1.N335KC

Ken's plane won "Best KR-1", "Peoples Choice" and "Best Photo Album" at the last KR gathering.

Recently Ken converted his 1835cc to a 2180cc with the help of Steve Bennett at Great Plains Aircraft. Prop went from a Sterba 52" x 47 pitch to a 52" x 54 pitch. New prop reduced static by 200 RPM. Ken's KR climbs out at 1500 FPM at 80/85 MPH. Ken said the 2180 made a big difference in performance. The engine produces 70 HP at 3200 RPM. The plane weighs 533 lbs. and trues out at 160 MPH. Ken's idea for a fuel line begins on page 2.

(Cont'd from page 2)

I've enclosed some sketches I made for a couple of builders who inquired about the way I have my fuel system set up for gravity feed and fuel pump pressure system. I know this isn't the safest thing to put on the inside but I didn't have any room on the outside of the firewall. The engine runs with or without fuel pressure but is most efficient on fuel pump.



I had an electrical problem when I left Oshkosh last year and returned home without the fuel pump available. It ran just fine all the way except on take off and climb out...tended to lean out some, causing cylinder head temperatures and EGT to increase some and you could feel some loss of power. I flew it for a year or two before installing the pump and recommend a pump. I do not cut the pump off during cruise as it is the type that only runs to maintain a given pressure and feel no need to keep up with turning the pump on and off for take off and landing.

The biggest problem I had with Ellison was finding an adequate air intake system that didn't cause turbulence at high RPM and change the mixture and run rough. I drew a sketch of the box I ended up with

after making a few that didn't work. I made it around the NAPA Air Filter #2374 listed. This works well for me because of the limited space I have under the cowl. The only change to this would be to make it larger. I could filter the plate area on the front but since it works so good, I assume the filter area is adequate; if not may be someone will advise necessary area.

I listed brands and part numbers only so you will know what I used and what works for me. I am not endorsing parts (my disclaimer).

Ken Cottle
712 Randy Lane
Columbia, MO 65201
314-442-9250

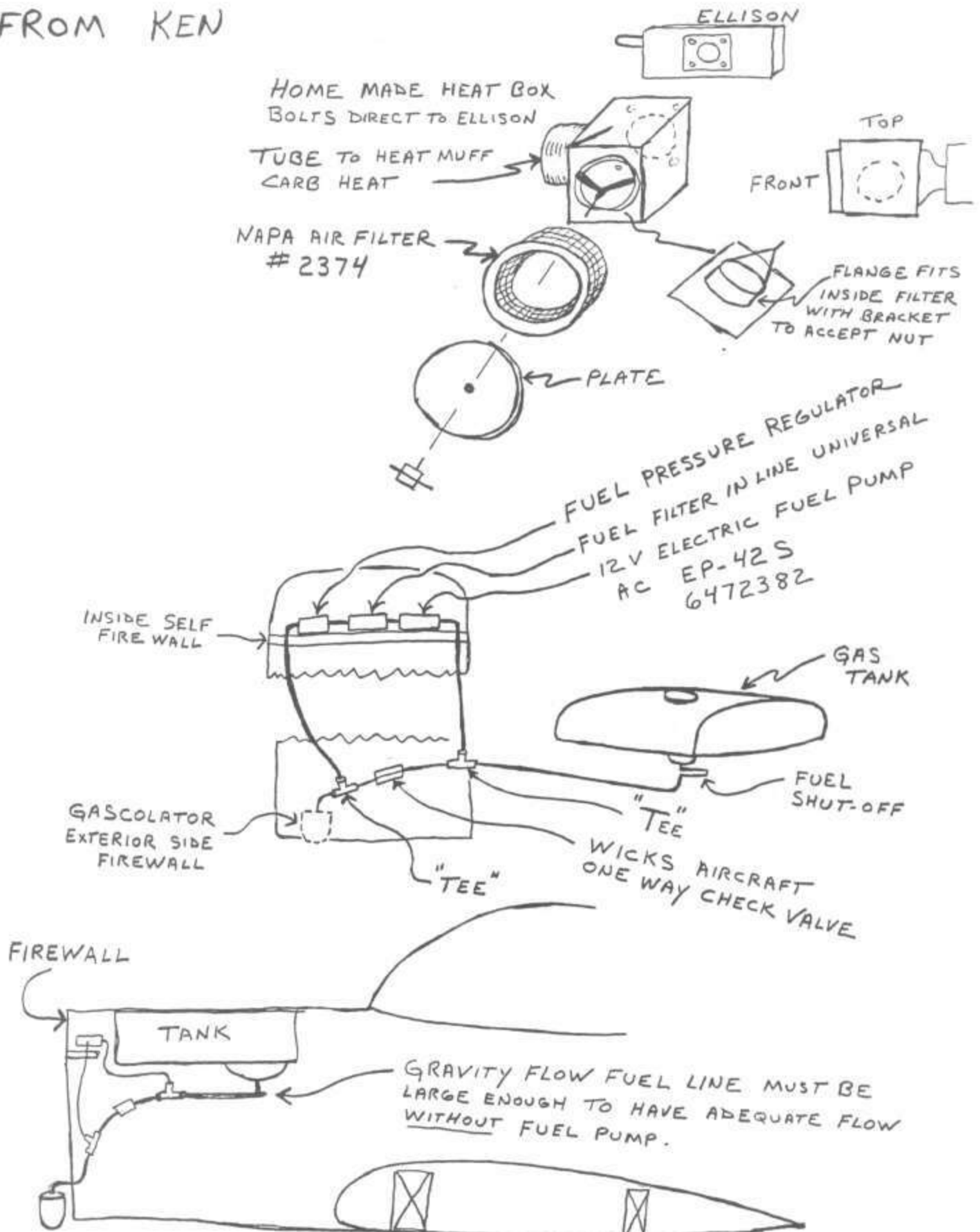
MAG IMPULSE COUPLING FAILURE

As a long time A & P, I feel compelled to comment on an article in the last Newsletter concerning the mag impulse coupling failure on Nelson Heinrich's Bendix 3000 mag. The FAA has issued an A.D. on ALL Bendix impulse type mags (#78-09-07) to inspect the couplings each 500 hours. You should alert the builders that anyone using a Bendix mag should get ahold of Bendix S.B. #5998 and check their mags. There is also an A.D. (#82-20-01) that cautioned of some soft flyweights that found their way into service and it's possible that some mags have been picked up at boneyards with no records as to their time or condition. These 2000/3000 series mags can be dangerous if not maintained properly.

Even though homebuilders aren't subject to A.D.'s, we should avail ourselves to them, at least on engines, props and accessories that we "borrow" from certified aircraft.

John Sickafoose
642 Ray Ave. N. W.
New Philadelphia, OH 44663
216-343-3964

FROM KEN



BUILDERS REPORT

I am at the "boat" stage of my KR-2 and have a few tips that others may find useful.

The first of these was my method of squaring the fuselage. Actually, it wasn't mine, but I can't find the article in the Newsletter that I got the idea from. This is kinda bad because I'm the one who has the complete, computerized index but I guess some things slipped through the cracks. It worked so well for me that I thought it was worth repeating. The idea is shown in Figure C. I put eyebolts in the table and used small (1" or 2") C-clamps to fasten wires and turnbuckles to the tops of the fuselage. I put these at 6 places down the length of the fuselage and used the turnbuckles (hardware store variety) to draw in the sides. A couple of points should be noted.

1) The sides will raise off the table, with maximum rise occurring at the apex of the curves. If you skinned your sides beforehand, like I did and according to plans, there is no way to prevent this. Just be sure you measure the rise on both sides and be sure it is equal. When you turn it back right side up and mount the spars to get your level line, now that the top longeron is curved, use a water tube level to put the front of the firewall and the top of the rear fuselage level. Block it there and it will be the same as if you leveled a straight top longeron. It may be that if you skin the sides after the frame is built, that you can achieve a straight top longeron. I couldn't.

2) To square the sides, measure diagonals and tighten the proper turnbuckle until both diagonals are equal. If both wires in Figure C were exactly the same length and positioned exactly symmetrically, the sides would be square. Measure the diagonals with a stick about four feet long. I used a cheap yardstick with a one foot extension glued on. The extension was pointed at one end and I transferred the inch marks to both sides of the yardstick so that I could measure more easily.

3) When you glue your belly cross-pieces in place, you can tighten each turnbuckle about 1/4 turn and this provides plenty of clamping for gluing. To keep the pieces from sliding (isn't epoxy a wonderful lubricant when wet?) use several small

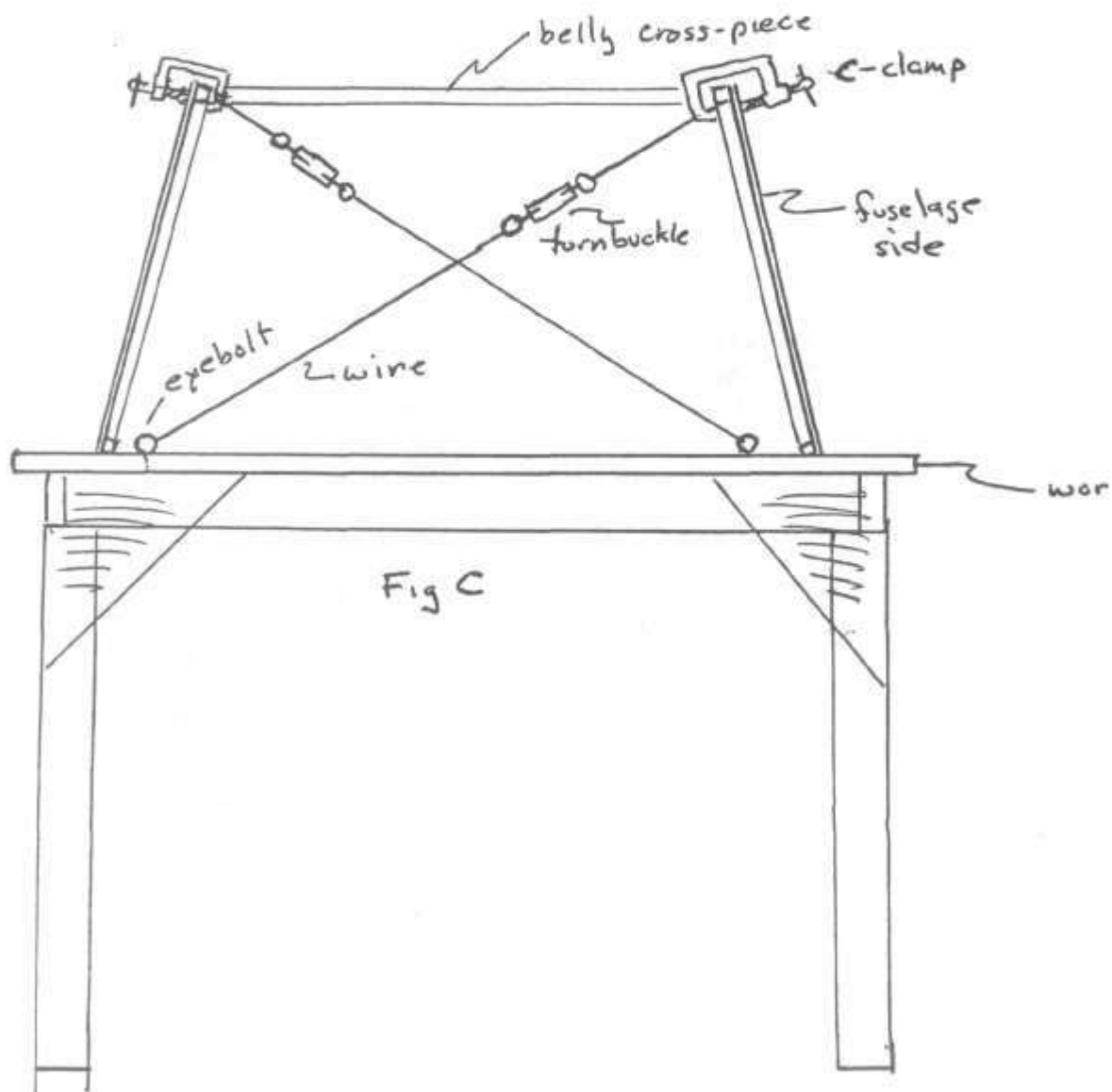
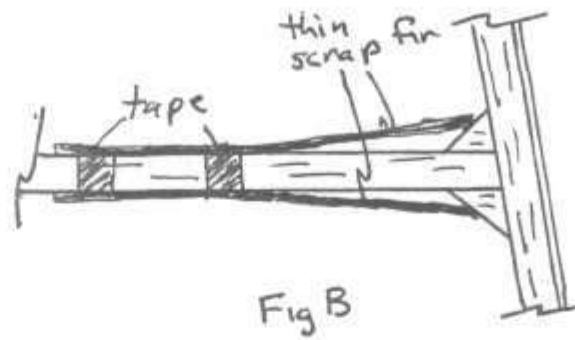
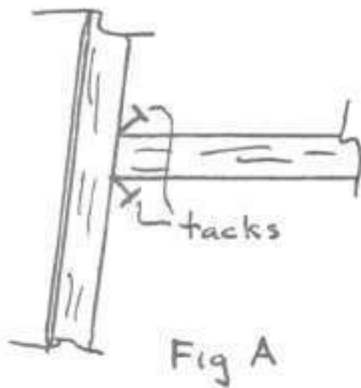
tacks as shown in Figure A. Remove when the glue is dry, then glue in the corner blocks. I used two thin scraps of fir as shown in Figure B, taped to the crosspiece as clamps for this process. There is enough friction to prevent up/down sliding and you can adjust the clamping power by varying both the thickness of the scrap and the position of the tape. After all your belly crosspieces are in place and before you remove the turnbuckles, glue in some more pieces of scrap fir to take the place of the wires and turnbuckle. This will ensure that your fuselage will not change square during subsequent manipulations. Be sure these pieces will not change square during subsequent manipulations. Be sure these pieces will not interfere with installation of the auxiliary longeron which runs most of the length of the front fuselage.

I know there have been countless suggestions for scarfing plywood but here is another one. I used a belt sander with the plywood clamped firmly to a workbench. With a fine grit paper to slow the pace, I found it easy to achieve the correct taper. I found a method for pulling staples that works reasonably well. I wrap a free end of the string which I stapled over, around a one inch stick. To pull the staple, I lay the stick on the ply and turn it to wrap the string, forcing the staple up. I found that this method gave greater control and resulted in less string breakage than simply pulling on the string.

One last item: I just got done helping a friend install some Diehl wing skins. There were three of us working a fairly leisurely schedule and we had both top and bottom skins installed by 3 p.m. Sunday. We started after work Friday, when we installed the forward spars and tips ribs. It was impressive how well it went together and how good it looked. I am convinced that this is the only way to go and know that I am saving my pennies for a set of those things. Definitely recommended!

Tom Lubben
6803 S. 3rd Ave.
Kenosha, WI 53143
414-652-5352

FROM TOM LUBBEN



**KEN AND I
BY STUART ROBINSON**

Oshkosh is the Mecca of all homebuilts. There have been more homebuilts finished because of Oshkosh than any other reason. They arrive with paint still wet, hours just barely flown off, and radios strapped on with shipping tape. No homebuilder will pass up Oshkosh even if he has to drive there.

Of course, we had to get there. It was our job. Most of the time we loaded the KR-1 on the back of the company truck (an older model International that still ran) and drove round the clock for three days. On arriving, we set up our tent like most normal people and staked out a patch of grass for any KRs that might show up. The next week or so we spent soaking up airplanes and talking KR for 14 hours per day. Once in a while some nice person from the group would take us out to supper which was great. Neither Ken or I could cook worth a darn and hot dogs can get tiresome.

Oshkosh fly-ins always went smoothly and we met many fine people. The only incident that I can remember was when Ken took off behind a Howard DGA (stands for damn good airplane). The Howard is a big brute and stirs up some air off the wing tips on lift off. The FAA man with the ping pong paddles must have thought the KR-1 could handle it so he waved Ken off. Well, Ken gave it his best shot but it was a little more than the ailerons could handle. He ended up landing on the grass and rolled part way up the bank. Ken knew what he was doing but the spectators didn't. He managed to scatter a few.

Stuart Robinson
22352 Longeway Rd.
Sonora, CA 95370
209-586-7781

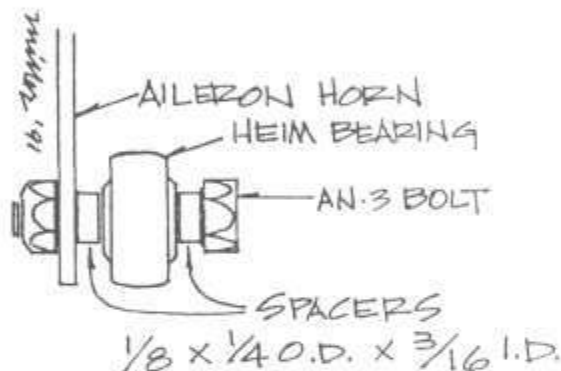


**EXPERIMENTAL
AIRCRAFT
ASSOCIATION**

WITTMAN AIRFIELD. OSHKOSH. WI 54903-3086
PHONE 414/426-4800

AILERON CHECK

Here's a tip that can eliminate an existing problem or prevent one from occurring. Should you have a shortage of aileron movement (less than the specified degrees of deflection or a tightening of control "feel" at full deflection) check the clearance between the heim joint bearing on the short aileron pushrods and the aileron control assemblies. Make this check with full control stick deflection, both directions. Look for evidence of the heim joint jamming the control fitting. Should this condition exist, it will be necessary to install small tube spacers at each bearing location. Occasionally, the close bearing to control fitting tolerance is too snug, thereby interfering with control action. (See sketch)



This simple yet effective idea should be credited to the late Carey Anderson of Liteflight Hardware. Carey's long-running infatuation with KR Aircraft lead him to produce truly outstanding metal components, many of which grace my aircraft. His sharing of ideas prompted this note.

Monte Miller
1900 Parkside
Denton, TX 96201
817-566-5871

HELP!!

I have received a number of requests for information regarding the installation of a Corvair engine in a KR.

We also need more articles and photos for future Newsletters. If you can help us out on either of these items, it would be greatly appreciated! Thanks! Earl

BY-PASS VALVE

I was talking to Dan Diehl recently and he suggested that I send in a sketch of my fuel system to show how I set up the by-pass valve. I have an Ellison Carb and Dan said that he gets a lot of calls from other builders about setting up the fuel pump and by-pass for the Ellison.

Hopefully, the included drawing will help some of the other builders. The pump is bolted directly to the firewall and the fuel hose is held up against the firewall with clamps. Although the pump is supposed to allow fuel to flow through if it should fail, I felt more comfortable with the by-pass. The Ellison needs the pump to run at full power but the system will still work on gravity feed. All you have to do is remove power below 3000 RPM and the EGT will stay within limits. If anyone has any questions about what I did, please give them my number.

Ed Fernandez (N849T)
849 Hawthorne Dr.
Walnut Creek, CA 94596
415-934-5049

FOR SALE

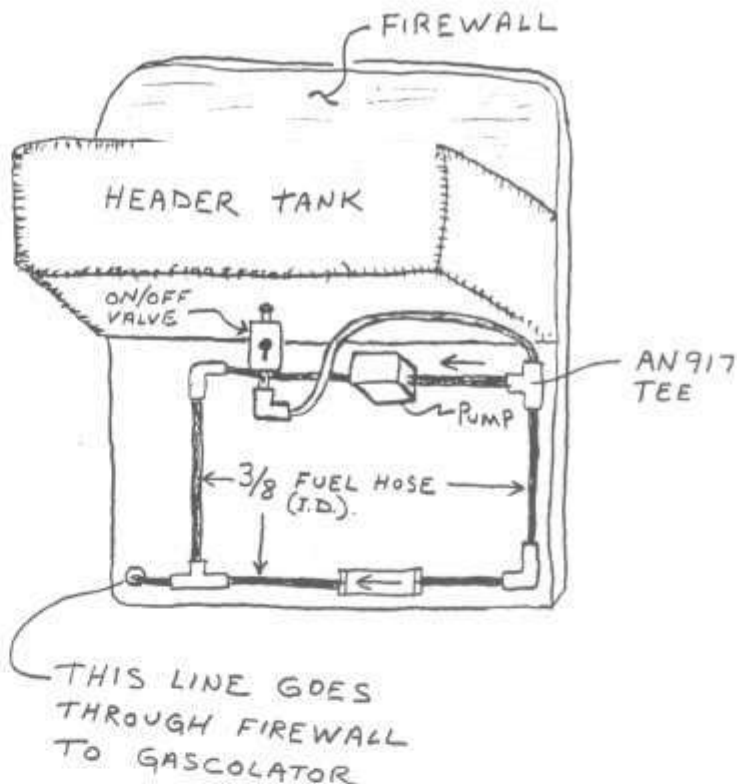
KR-2, 155 hours, 1900cc, Super Posa, stock. Dual controls, stock retract landing gear. \$4,500.00

KR-2 (lengthened and widened) woodwork completed. All building materials, plus too many instruments and equipment to list. \$2,000.00

Or both for \$5,500.00

Earl Teporten
P. O. Box 579
Lakeville, MN 55044
612-435-7275

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$95.00.
INDIVIDUAL COPIES \$1.50 EACH.



1. On/Off Valve -Shut-off valve
104 HD 06 x 06
2. Fuel Pump -Facet electric pump
(P/N 40108) for 3/8" fuel line
3. 1-Way Valve -Free flow 1-way check
valve (P/N 10630) for 3/8" fuel line
4. Fittings connecting hose to pump,
1-way valve, etc. are AN917 (Tee),
AN916 (Elbow) with AN840 (Hose Nipple)
and AN842 (90 Deg. Nose Nipple) to
suit routing.

All part numbers are from Aircraft Spruce
Catalog.

WANTED

Intake system for 1835 single port head.
Also need exhaust system, engine
instruments and HAPI style secondary
ignition system that plugs in original
distributor hole. Call or Fax.

Jerry Pryce
549 Tipperary Dr.
Vacaville, CA 95688
707-447-4349

FOR SALE

KR-2, 50 hours, AF & eng. full panel, King NavCom, elec. flap, 2100 cc Revmaster w/Judson, T'charger, new Posa carb., dual alternators. Needs cowl lengthened for new carb., mech. brakes connected. Elec. R.G. needs connected. Painted. \$15,000 in it. Will take \$3,500 as is, where is.

Bill Beeson
15601 Aster
Westminster, CA 92683
714-531-4101

FOR SALE

Would you like to take your plane home and save the hanger rent?? Send a SASE

Write to:
Col. R. W. Moore
P. O. Box 622
Toccoa, GA 30577-0622

The wing folding and unfolding can be done by one person in 15 to 20 minutes.

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 165, FEBRUARY 1991

SAFETY NOTE

The following Safety Note appeared in the May, 1990 issue of Sport Aviation. Ted O'Dell from Milan, Wisconsin submitted it for publication.

Safety Note: Upon being climbed to high altitude for the first time, the first kit built Pulsar gave its pilot a scare when a loud pop was heard coming from the rear of the airplane. After landing, a crack was discovered along the trailing edge of the completely sealed elevator. It is believed that the lower pressure at altitude caused the sealed elevator, which was built at an elevation of about 1,000 feet above sea level, to pop along the weakest point, which was the trailing edge. Pulsar designer Mark Brown has contacted all his builders and modified his plans to show venting of the control surfaces. Builders of any composite aircraft that has a completely sealed component should consider vents.

FIRST CLASS U.S. POSTAGE PAID LAKEVILLE PERMIT NO. 413

PLEASE PRAY FOR OUR BRAVE MEN AND WOMEN IN THE GULF



KR NEWSLETTER

ISSUE NO. 166

MARCH 1991



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



MIKE KELLEMS¹ KR-2 N56WC

Mike Kellem is selling his 1978 KR-2 which has 400+ hours. It has a Revmaster 2100, VFR and Loran. It is well proven, airworthy, economical and a joy to fly. No bad habits. \$6,000.00. Might trade KR-1 or KR-1 project as part trade. Contact:

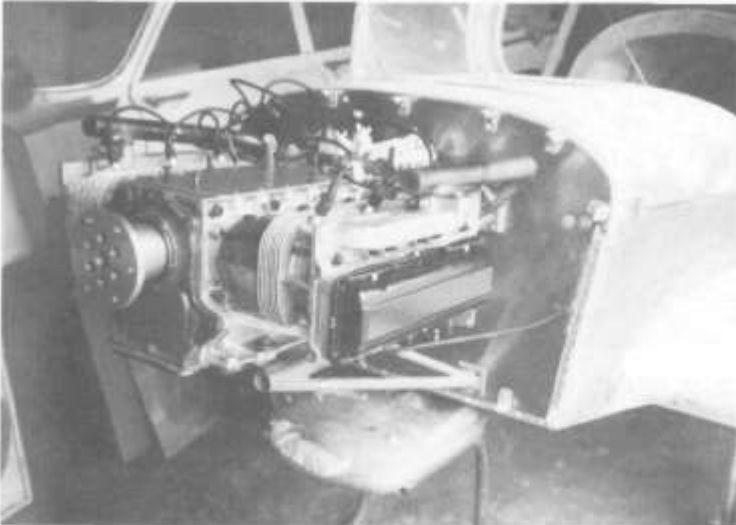
Mike Kellems
P. O. Box 507
Burkesville, KY 42717
502-864-5658 evenings/weekends

CORVAIR ENGINE IN A KR

I have built my KR around the 110 HP Corvair. It is to plans except I added four inches to the bottom rib of the rudder, as I feel the KR needed a little more rudder authority. I also added a foam and plywood turnover structure in the turtledeck. I also made the cowl and tank removable and the rib between the spars (outer) is strut and gusset construction.



The engine is a 1964 110 HP with the torque peak at 2600 RPM. The conversion is taken from Bernie Pietepols conversion, with changes to fit the KR. The hub I got from Gordon Dathe who was handling them for Bernie.



Since the pictures were taken, I have majored the engine and plan to use the Corvair cooling fan and shroud for the first few flights. I have been using a 60" diameter x 60" pitch prop and get 2700 RPM static. According to GM charts that is about 85 HP. I do not intend to

fly with this prop, as I only have about 3 to 4" clearance in level attitude.

With the cooling fan I have to make a new top cowl which I am in the process of doing now.

There is no starter, so hand propping is necessary. Eventually, I hope to adapt a starter after it is flying.

I started out with the Posa Carb but it didn't seem to run smooth so I tried a MA2 carb off of my 65 HP Lye and Viola (it worked beautiful). It gives me the same performance as the original Corvair carbs.

I haven't weighed it for some time but looks like it will be around 625 lbs. The fan and shroud add 15 lbs. which will be about the same as the ring gear and starter.

I plan to put the two batteries in the tail. They are dry and weigh five lbs each. I may have to add a little lead but hope not.

It has been quite a challenge to adapt the Corvair engine but have enjoyed doing it even if it has taken a little more time.

I hope this will help with your inquiries.

Howard Hoops
2109 Westport Dr. 2
Anaheim, CA 92806
714-535-0174

LAKELAND SUN & FUN KR DINNER

The 1991 Lakeland "Sun & Fun" KR dinner will be Tuesday, April 9 at the Holiday South. Sign up at the Wickes Booth by noon on Tuesday. The cost for the dinner will be \$11.00, with your choice of: Roast beef, baked ham or baked chicken.

Virgil Salisbury
5445 SW 89th Place
Miami, FL 33165
305-271-3608

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$95.00.
INDIVIDUAL COPIES \$1.50 EACH.

Comments made in the past that you hear or read about and are sometimes repeated over and over are soon believed. If this is true, then I am confused by the articles I've read in the KR Newsletters. After purchasing all the back issues, I found there were different articles pertaining to tricky handling in crosswind take-offs and landings.

I am guessing that a short fuselage is the reason for the handling difficulty. If this is true, then increasing the fuselage behind the canopy 14 inches and lengthening the nose as needed along with more horsepower and a tri-gear installation, overall handling should improve.

All this involves weight, so add the larger wing and increase the stab 12 inches for better lift. Adding a sliding canopy would be beneficial also. I'll keep all construction light and strong, an evil eye on the C-G and many other things such as the gear placement, instruments and painting.

Since my son and I weigh in at 195 and 180 respectively, we are committed to the stated changes unless we both join a Weight Watchers Club.

So please...to KR-2 builders who have made any or all of these mods, please write and tell me if it worked and how it was done. When I receive your letter, I will return your postage and my thanks. P.S. Yes..we have already purchased the spruce and plywood kits for the KR-2.

Joe (60 year old dad) &
Bob (pilot & son) Manning
61 Weston Ave.
Braintree, MA 02184
617-337-8558

INFO NEEDED ON PITOT/STATIC SYSTEMS

We have had a number of inquiries regarding the proper placement and installation of pitot/static systems. If you have a system that has proven to give accurate indications, please submit it for publication. Thanks!

At the Watsonville fly-in some years ago when we only had the KR-1, I got up early on day two and wandered out to the flight ramp. As I passed by the KR-1, a young man said he was building one and would like to see it fly. So I fired it up, taxied to the active and took off. Well, the Pacific Ocean was not too far away and there was the normal cool, damp, breeze. I climbed to 1,000 feet and positioned myself on the upwind leg to show off some slow flight. Holding Vs + 2 [46] I went drowning along with a ground speed of about 25 MPH using very little throttle.

The Posa is not suppose to ice up as a Venturi type carburetor will but they will form ice on the slide valve under the right conditions. Even then the slide valve can brake free if the push - pull rod has a hard case to work in. Unfortunately, we used a choke cable. "Pull" was fine but "push" with a stuck slide valve just stretched the case.

With the slow flight demo over I fed in power but nothing happened. If I had left things alone, I could have flown for the next 20 hours at that power setting. But I pulled back and lost what little I had.

My next mistake was to try to enter the normal left hand pattern instead of making a quick 180 and entering downwind with a right hand pattern. As it was, the best I could do was slowly increase speed to 65 MPH and stretch it for the center of the field.

The tower was at mid field and the display area was next to the tower. The FAA was just setting up shop in the tower as I came whizzing by at eyebrow level, gear up. I thought about using the taxi strip but figured I was in enough trouble already. With a quick, steep, 90 degree turn and gear down, I made the runway and plopped down just as the wings leveled. As I rolled off the active onto the grass, a pick-up with four guys hanging on the back came roaring down the taxi strip and I figured it was time to turn in my license. But they were nice and helped me push the bird back to the ramp. Even the FAA seemed to understand.

Stuart Robinson
22352 Longeway Rd.
Sonora, CA 95370
209-586-7781

SPINNER INSTALLATION

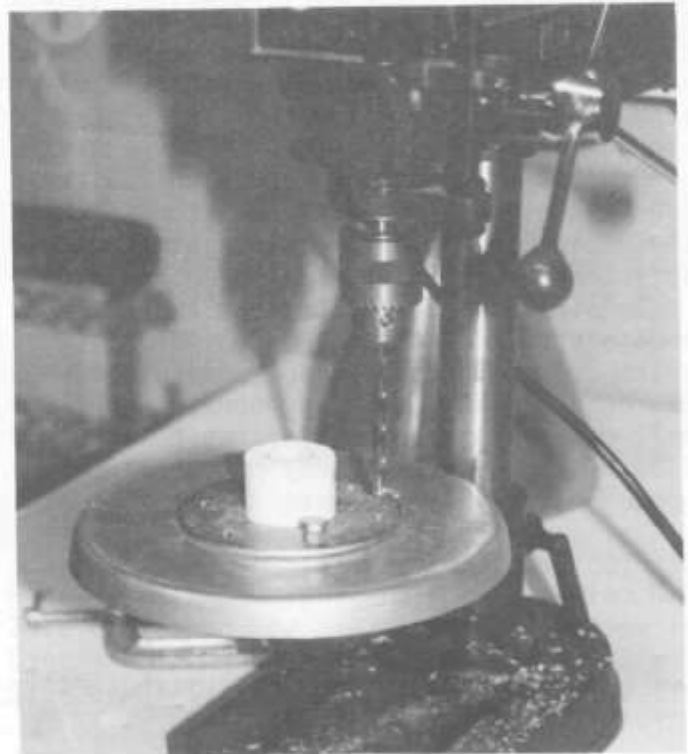
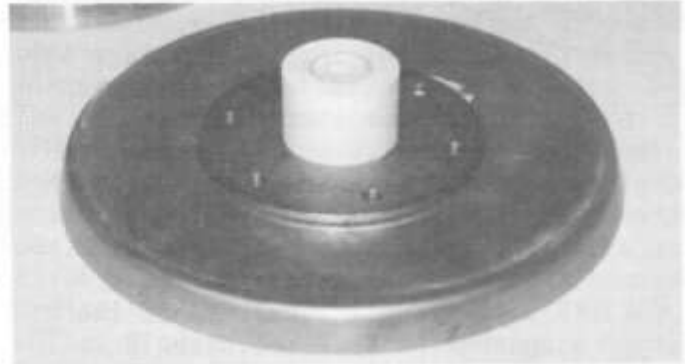
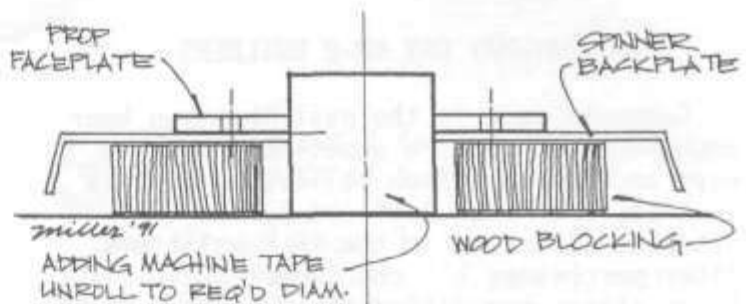
See if this story doesn't sound familiar; you finally get some time on Sunday afternoon to work on your KR project, the weather is cooperating, you're not depriving the family of any quality time, you're motivated, the parts are on the bench, biorhythms are in sync, you are master of all you see, until...

I need to install my spinner. At least, get it snugged onto the prop hub so I can start the cowl installation. Remembering that there's a how-to chapter in one of Tony Bingelis' homebuilding bibles, I'm reading along only discover that the high guru suggests to "use a lathe to turn a wooden plug" that will be used to align the spinner backplate with the prop hub faceplate. A lathe! Turn a plug! With one short sentence, my afternoon is about to be shot.

Not to be outdone, a search for a two-inch "something" to use as an alignment guide is launched. The tomato paste can is close but too big. No two-inch dowels laying around nor is there anything in wife's sewing stuff. Mild anxiety attack now on short final.

Back in the shop, I'm opening and closing doors and drawers at warp speed as the afternoon slips by. Just as I shove a tool drawer closed, I spot something that may save the day. Grabbing for the heavy drawer with just enough speed to insure that my fingers are inside at the exact instant of closing, the yelling brings family and a few neighbors. I spend the balance of the day nursing a swollen hand but sure of how I'll accomplish the spinner chore...when I next get some time.

Anyway, I didn't have to buy a lathe, which pleased my wife and allows me to live indoors for awhile longer. The "something" that saved the spinner project was nothing more than a roll of adding machine tape. Unwinding the big roll of paper to the exact required diameter and securing it with a dab of scotch tape solved the plug problem. The rest of the job went smoothly just as Tony instructed. Now I'm sorry I wrote him that nasty letter about his RV-6. It also looks like I'll be able to play the violin again...old joke.



The use of a drill press is mandatory. After drilling the first hole, push a bolt thru the faceplate/backplate parts and into the wood blocking. This will prevent any accidental slippage during the remainder of the drilling operation. Align the bit carefully with the faceplate, clamp the work, and drill slowly to avoid tearing the thin aluminum.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871

A NOTE FROM KEN COTTLE

Thanks for using the picture of my plane on the front cover of last month's Newsletter. When I see my plane sitting out there like in the picture or on the ramp, I still get a feeling of awe that I built that airplane. I really feel blessed to have been given the ability to learn the necessary skills during the process of construction. The patience, the means, the desire, a very encouraging and understanding wife, lots of support from people like Dan Diehl, Steve Bennett, Ed Sterba, the KR Newsletter and all the good people who helped by sharing their experiences and ideas. This sharing and companionship, as well as, becoming a part of it all is really rewarding. There are a lot of nice people in this world.

Regarding last month's article on Ken's plane the new prop was incorrectly identified. The prop should have been a 54" x 52 pitch.

Ken also noted that behind the air filter he made, he used an aluminum baffle around it that fits up to the cowl to direct the intake air to flow around and onto the filter.

Ken Cottle
712 Randy Lane
Columbia, MO 65201
314-442-9250

FOR SALE

Would you like to take your plane home and save the hanger rent?? Send a SASE

Write to:
Col. R. W. Moore
P.O. Box 622
Toccoa, GA 30577-0622

The wing folding and unfolding can be done by one person in 15 to 20 minutes. This unit bolts on beside the wing attach fittings using the 3/16" bolts and you will not have any change to the airplane. The parts are made on a jig and you should be able to bolt it on in about a hour or two. To fold the wings you will unbolt the (8 each side) wing bolts and the aileron linkage (and gas lines, if one has wing tanks) and pull the wing out 5-1/2" and turn the wing 90 degrees with the leading edge turned down, then fold the wing back along the side of the plane. I will carry mine on a trailer behind my motorhome.

The kit will have an adjustable tripod to hold the other end of the wing, so one person can fold the wings.

I am also working on a way to use two bolts (5/8) to hold the wing on and not having four bolts, also only two (3/16) bolts for the rear spar attach fitting instead of four. This will speed up folding the wings, as you will have only one half of the bolts to unhook.



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD. OSHKOSH. WI 54903-3086
PHONE 414/426-4800



R. W. MOORE ALSO SUBMITTED THIS PHOTO
OF HIS WELL-PLANNED KR-1 INSTRUMENT PANEL

FUEL MANAGEMENT/ELLISON THROTTLE BODY

I'm a little reluctant to beat a dead horse. However, fuel management is so important we should all share ideas to make the system operate with top efficiency.

I have accumulated 65 hours on N89MM a GPASC 2180CC powered KR-2, all with the Ellison throttle body. Performance has been excellent. To date, I have been unable to see any difference in performance with or without the fuel pump operating.

I've included diagrams of my fuel systems which I will attempt to explain.

First of all, my tank has a vent pipe protruding from the top (facing forward, of course). The tubing is flared (alah Bellmouth) configuration. A stainless steel screen is epoxied across the opening to keep the bugs out. A good fuel system starts with a positive vent.

I elected to mount all my components in the engine compartment with the exception of the on/off valve. I mounted this valve on the firewall (pilot compartment) and ran an extension rod to the instrument panel directly in front of the pilot. This makes it easy to operate with the left hand.

The gascolator is mounted on the firewall in the engine compartment. The piping diagram should explain the routing to the throttle body. The check valve was purchased from a hydraulics supply house locally. The valve as purchased consists of a brass body, ball and spring. I removed the spring to make it a quick operating valve, with no flow restrictions. The KR has a very low fuel head, especially when the fuel quantity is low. Fuel flow through the valve is somewhat restricted depending on the force or pressure required to compress the spring. There is no need for the spring as it relates to our fuel system. Without the spring, any amount of fuel head will open the valve and any amount of reverse pressure (fuel pump operating) will close the valve.

My engine has a GPASC tuned exhaust system. The Ellison throttle body barely fits in amongst the four pipes. With all the heat generated in this area, I chose to dispense with an air box (see illustration). This set-up may rob me of

a little power but I feel it will greatly reduce the chance of a manifold ice build-up.

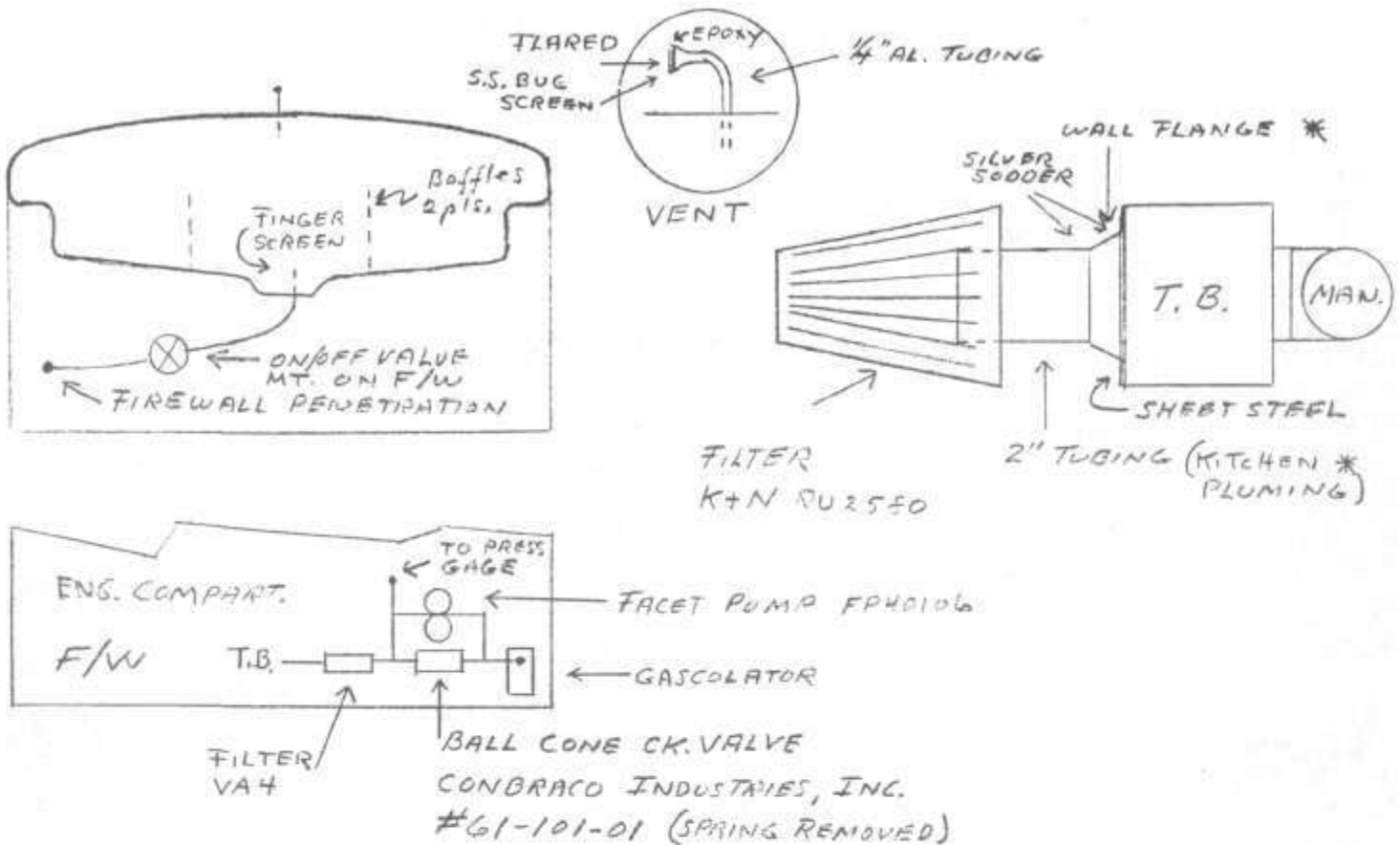
The throttle body is set to the rich side of the fuel curve. I run my engine up to 2000 RPM (after warm-up) in the full rich position. The engine usually runs a little rough. I lean just enough to obtain smooth operation. Movement of the mixture control is approximately 1/4-3/8". The engine picks up about 50 RPM. 2000 RPM seems to be a good speed to set the mixture control because it gives me smooth operation at all other speeds from idle to max. This setting is my take-off and climb position. When I settle down to cruise, I lean accordingly, using EGT and CHT as a guide. Prior to landing, I return the mixture control to the take-off position established on my run-up. Works super.

In closing, I'd like to leave you with some schools for thought. The check valves supplied by the aircraft supply houses (P/N 10360 and equiv.) are good valves, however, I believe they were designed for systems with a higher fuel head. There are two things you can do to make them more efficient. Mounting at the lowest point in the system in a vertical position with the arrow pointing down will help. The other and more positive thing is to remove the spring.

I make no guarantees but the information I've passed along has worked for me. Lots of luck!

Mike Matre
3828 E. Kemper Rd.
Cincinnati, OH 45241
513-769-0724

FROM MIKE MATRE

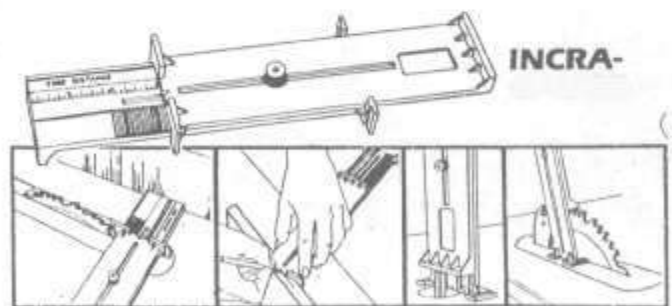


JIG IDEA

I have discovered a simple tool that makes measuring and layout tasks very easy. It is called an "Incra-Gauge". It is available from several mail-order woodworking tool suppliers. I've enclosed a blow-up of an advertisement out of one such catalog. The "Incra-Gauge" is made by:

Taylor Design Group, Inc.
P. O. Box 810262
Dallas, TX 75381

Ed Gossert
2111 Penny Lane
Rosamond, CA 93560
805-256-7030



Use as a height setting gauge, marking gauge, center finder, fence alignment gauge and for precision measuring. Easy to set or adjust and very accurate to allow quick and sure settings of machines, fences and blades or bits. The full 8-inch range will handle most shop operations. Set-up error is less than 17500 of an inch. Durable space-age plastic construction.

806-161 Inc Each Each for 2 or more

FUEL TANK WARNING

If you're using Randolph Sloshing Compound to seal against car fuel on premoulded fiberglass tanks, better check to see if it has adhered to the fiberglass that has a smooth finish inside. I looked in filler hole of tank and noticed a place peeled loose. I took a rod and put it down into tank and you could peel it loose, so I had to cut my tank apart to clean it out and it came off in sheets. So if you are using this product, be sure you check your tank if this comes loose, it would clog your finger screen quickly.

Jerry Johnson
R. R. #2, Box 192
Petersburg, IN 47567
812-354-6779

FOR SALE

KR-2 Retract gear complete with wheels and tires. Premoulded cowling, wing tips, VW motor mount. For info and prices contact:

Bruce Messner
1st Ave. N.W., Box 304
Westbend, IA 50597
515-887-3366

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 166, MARCH 1991

KR COMPUTER BULLETIN BOARD

Brian Bowman, P. O. Box 4582, Bryan, TX 77805-4582 (phone: 409-779-0060 work FAX 409-823-1544) has established a computer bulletin board for builders of KR-1 and KR-2 homebuilts. There is no charge to participate... you pay only for the phone call. Brian's 24 hour computer modem message number is **409-690-0570**.

SERVICE ALERT

Those using VW conversion with heavy duty oil pumps take notice. Sudden oil pressure drop from 60 to about 10 lbs. was traced to outer driven gear to slip on the shaft after warm up! The inner gear was keyed but the outer one was pressed on. The shaft had a keyway but the gear not. Revmaster 2100DT with about 45 hours.

James Takemoto
4633E. Colfax Ave.
Denver, CO 80220-1201
303-388-0407

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413



KR NEWSLETTER

ISSUE NO. 167

APRIL 1991



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



MARTIN ROBERT'S KR-2, N191MR "BEST KR" AND "FIRST PLACE" AIR RACE AT '91 SUN 'N FUN
(Photo taken at Oshkosh '90 - Martin has since added wheel fairings)

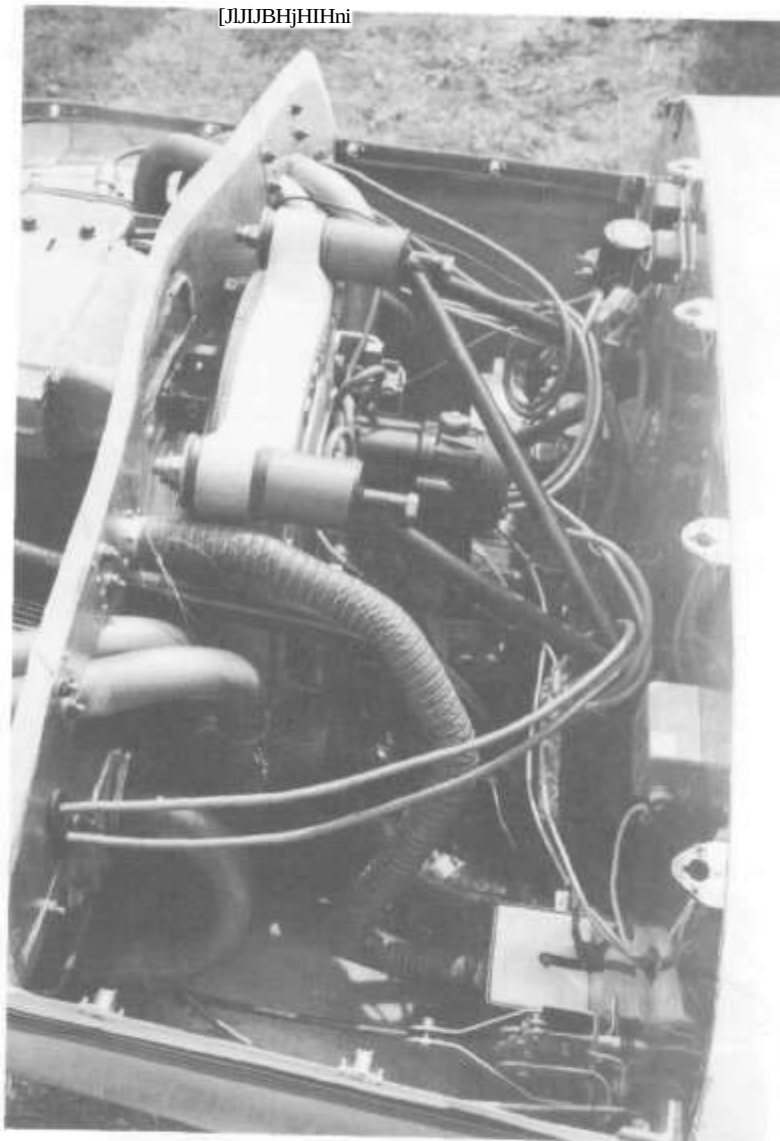
Martin Robert's plane not only received "Best KR" at this year's Sun 'N Fun but also "First Place" in the 100 Mile Air Race (100 HP and below classification). Martin's plane averaged 192 MPH over the course and over 200 MPH on the straightaways.

Second place in the same air race went to a KR-2 flown by Monte McLean of Fort Walton Beach, Florida.

(Cont'd page 2)

Martin's plane is powered by a Great Plains 2180 VW generating 90 HP at 3800 RPM. Solid lifters, stock cam, Super Posa Carb, Ed Sterba Prop 52 x 54, dual ignition from Great Plains, weight 630 lbs. Wings are built to plans and Martin installed full length fiberglass aileron gap seals.

The day of the race was rather hot and because Martin drew the 35th position for take-off, he had to idle for awhile before his turn. Because of the lengthy delay, his plane had trouble idling and difficulty accelerating on take-off. But once airborne, it performed flawlessly.



If you would like further info, you can contact Martin at 918-663-8112 8279 E. 37th St., Tulsa, OK 74145.

Congratulations to Martin and Monte for their achievements!

I hope to have a full report on this year's Sun 'N Fun in next month's Newsletter. Stay tuned.

The following is the first in a series of articles from Monte Miller regarding VW engines.

THE VW ENGINE FOR THE KR AIRCRAFT

Every KR builder reaches a point in the building process where a decision must be made concerning the engine. The motor mount may be installed and the firewall ready but still the question remains; how, where, and when will the engine appear?

This series of articles will track how one builder answered those questions and built a Volkswagen aero conversion. The "why" of distinct choices will also be explored. However, before the checkbook or the toolbox is opened, it will be necessary to provide a brief background of both the builder and the project. With that knowledge, you will be better equipped to understand certain specific choices made and then to apply that knowledge to your own project. Remember, too, that the following is only one way of many different routes to achieving a flying KR-2.

The engine at the center of this activity is a self-built Volks conversion displacing 1835cc and is installed on a KR-2 with the Rand fixed gear option. Nothing out of the ordinary on the airframe or engine; stock, if that word can be applied to any experimental category aircraft.

The entire airframe/engine project has been funded "out of pocket". Like many homebuilders, priorities must be maintained and the author is no different than most. A wife, mortgage, two sons and two different college tuitions leaves precious little excess disposable income. It has been necessary to utilize time and patience in lieu of piles of hard cash. This establishment of priorities is commonplace among builders who wish to test fly a project with the same spouse that they originally bought plans with. Sound familiar?

Should you be one of the fortunate ones capable of writing a check for a new-in-the-box engine, great. There are many excellent choices available to you. However, if you are faced with similar assets and responsibilities as mine, then I hope this series will benefit you, perhaps save some money and get you airborne just a bit sooner.

To keep your interest up or perhaps answer your very first questions, my complete engine, from prop tip to

tailpipes, cost less than \$2,300 in 1990 dollars. All new engine parts except the stock 69mm VW crankshaft. Purchases were spread over a twelve month period.

ENGINE SPECIFICATIONS

1835cc (69mm x 92mm)
Dual Port 041 heads with
single HD valve springs
Diehl accessory case with
no electrics
Slick 4216 mag and harness
Champion REL37B plugs
Posa 32mm carb
Ken Brock exhaust system
7.9 to 1 compression ratio

I mentioned background information on the KR project. The KR series of aircraft derive their excellent performance on relatively low horsepower through aerodynamically clean design and light weight. As such, a goal throughout the construction stage has been to meet the design weight of 480 pounds empty. The easiest way to achieve this goal is to build the KR as it was originally designed; simple with no frills. That equation, for me, means no electrical system. Within my geographical TCA, that also means no transponder and encoder. Besides the expense of the FAA mandated equipment, weight would continue to climb. It is not impossible to have an electrically-equipped KR-2 that also meets the design goal, just very difficult.

One last item on KR philosophy 101 and we'll dismiss for the day. When should you begin work on your engine requirements? The best time is right now. The first step is mandatory and will save you countless hours of head scratching. Order a copy of Rex Taylor's "How To Build A Reliable VW Aircraft Engine" and Steve Bennett's "Building A VW Aircraft Engine". Don't cheat yourself by ordering only one as you will miss out on the knowledge these two gentlemen have gained through years of engine construction.

By the time you have read both books twice, the next KR Newsletter will be on the way and we'll start naming names.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871

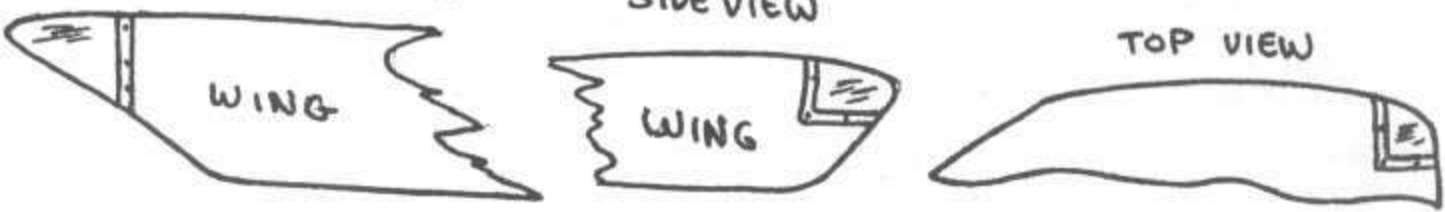
WING TIP
NAV. LIGHT

MAT. $\frac{3}{32}$ " LEXAN PLASTIC
 $\frac{1}{4}$ " SOLID WOOD
BRASS SCREWS

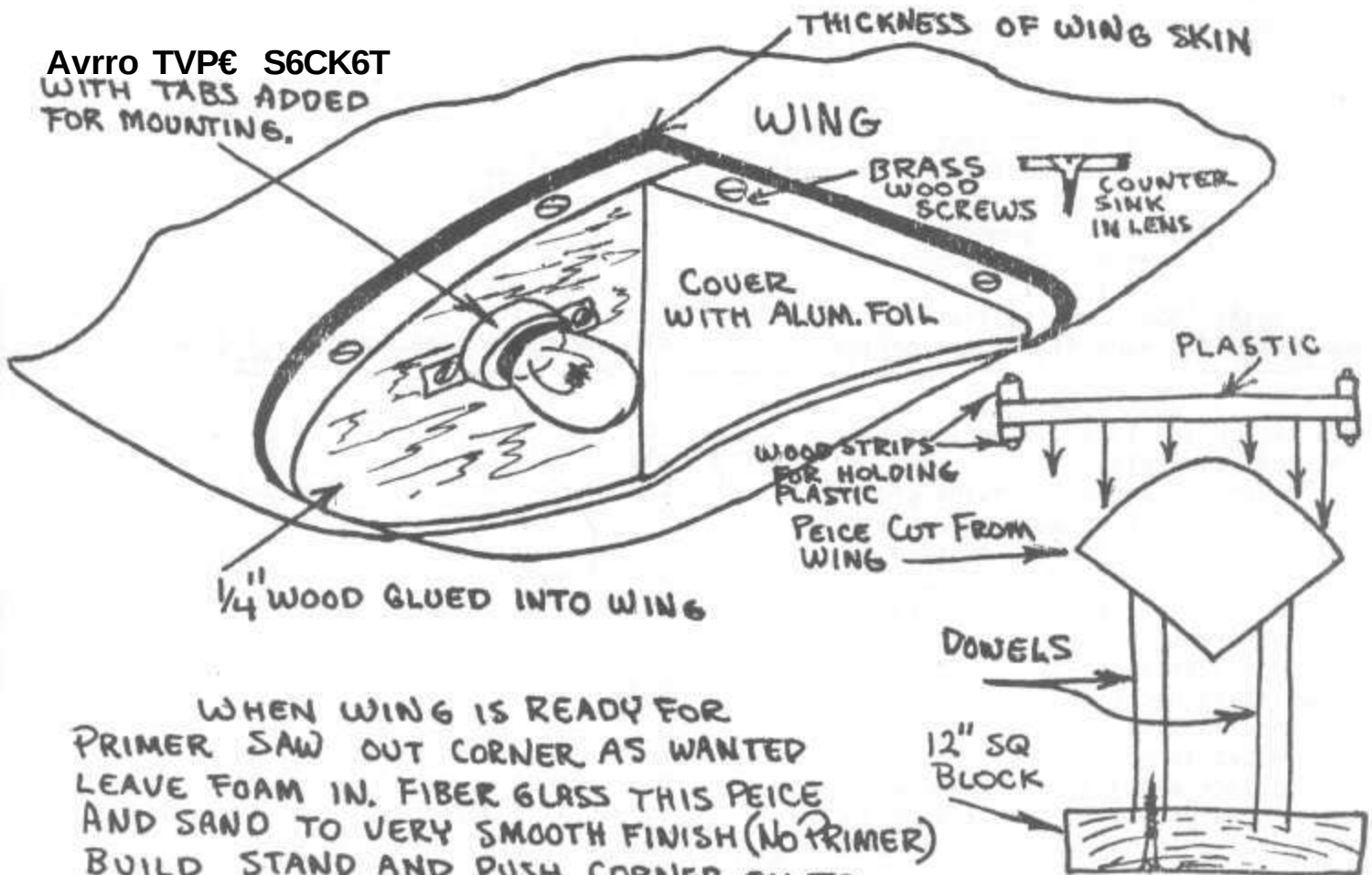
FRONT VIEW

SIDE VIEW

TOP VIEW

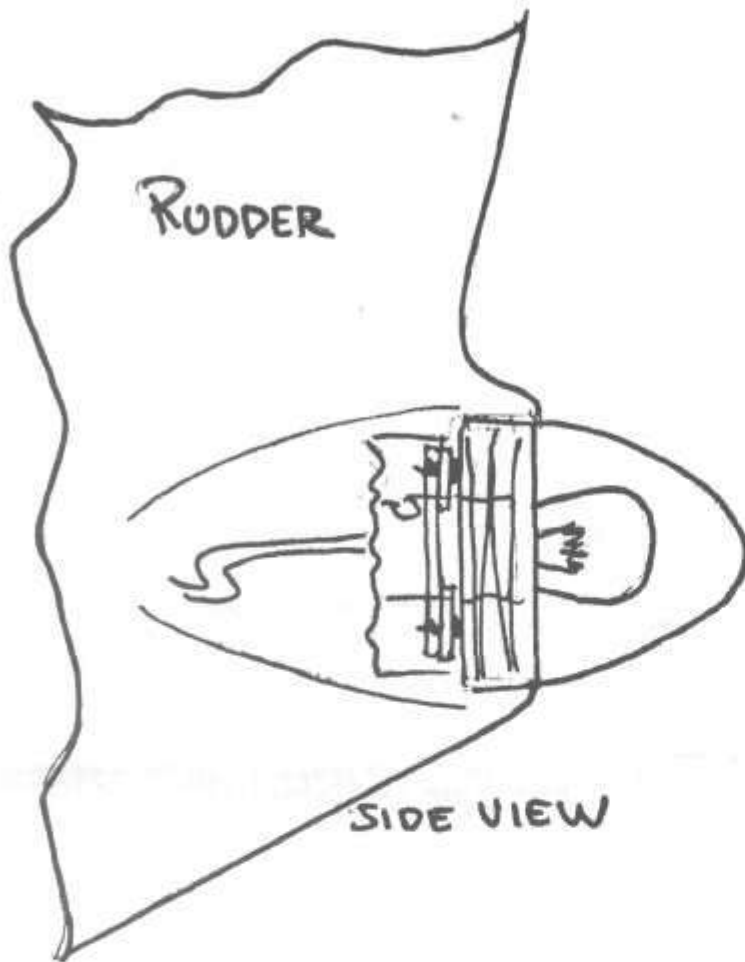


Avrro TVP€ S6CK6T
WITH TABS ADDED
FOR MOUNTING.



WHEN WING IS READY FOR PRIMER SAW OUT CORNER AS WANTED LEAVE FOAM IN. FIBER GLASS THIS PEICE AND SAND TO VERY SMOOTH FINISH (NO PRIMER) BUILD STAND AND PUSH CORNER ON TO DOWELS STRIPS TO PLASTIC (SIZE AS NEEDED) HANG IN OVEN AT APRX 350° OR JUST WHEN EDGES (3MIN) START TO BUBBLE, REMOVE AND PUSH DOWN OVER CORNER, HOLD TILL COOL (USE GLOVES-IT'S HOT) MARK EDGES AND TRIM. SET FLAT SIDES ON $\frac{1}{4}$ " WOOD MARK FOR CUTTING. (ALLOW FOR THICKNESS OF PLASTIC) PAINT INSIDE OF LENS WITH A CUSTOM CANDY GREEN - CANDY RED. USE ALUM. FOIL OVER WOOD FOR REFLECTOR.

NAV (TAIL)

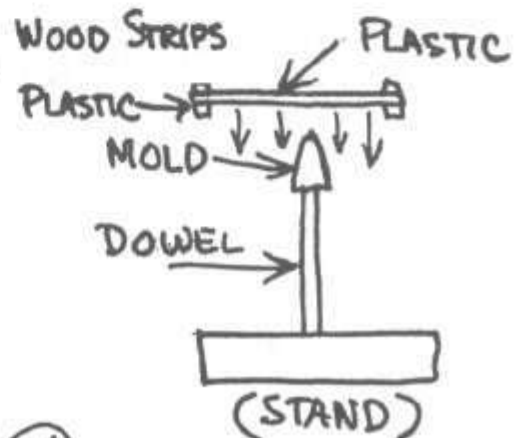
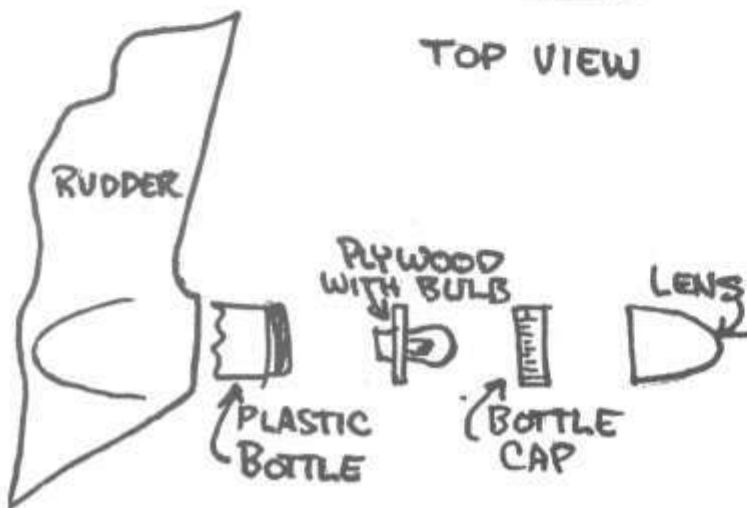


LOCATE SMALL PLASTIC MEDICINE BOTTLE WITH SCREW ON CAP.

CUT BOTTOM $\frac{2}{3}$ RDS OF BOTTLE OFF. CUT TOP OUT OF CAP ALSO.

FORM RUDDER WITH FOAM TO ACCEPT BOTTLE WITH CAP ON. RESESS IN TAIL UNTILL CAP IS FLUSH WITH EDGE OF OPENING. SHAPE WOOD BLOCK TO OUT SIDE SIZE OF CAP. HEAT PLASTIC (LEXAN) IN OVEN AND PUSH OVER WOOD MOLD. COOL-TRIM & EPOXI TO BOTTLE CAP. LEAVE ABOUT $\frac{1}{8}$ " OVER-OPENING FOR SCREWING CAP ON.

EPOXI $\frac{3}{32}$ PLYWOOD IN BOTTLE FOR MTG. LIGHT BULB.



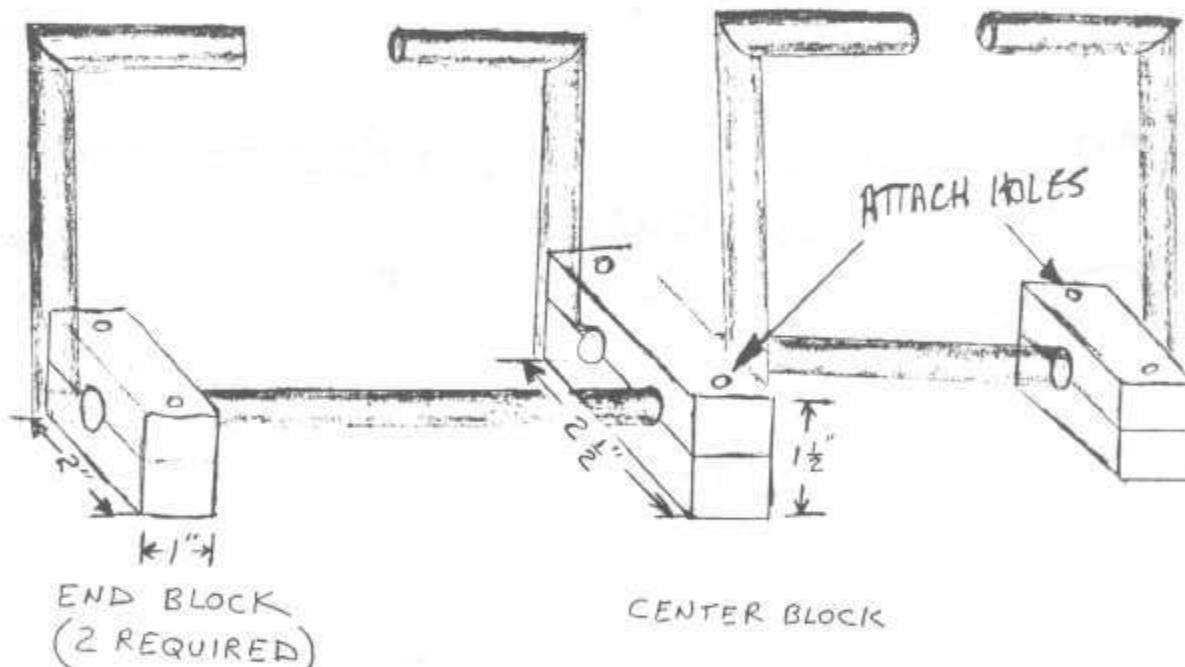
Handwritten signature

BUILDER'S REPORT

I've really enjoyed the newsletter and reading about other KR builders. Sometimes during the building of my plane, I have felt pretty lonely. I bought the plans back in 1976 and the materials kit in 1979. I have pretty much been on my own during the building process and I must admit that there were times when I despaired of ever finishing the project. I guess the first really hard spot was when I tried to figure out how to set up the outer wing panels to get the proper washout. After rereading the book and looking at the drawings many times, I realized that maybe the reference marks indicated on the drawings had something to do with the washout. Without confirming this, I immediately set my fuselage to level these marks, using a water level, and started the process of attaching my outer spars. It is amazing to me now that it took me so long to figure out how to do it but I firmly believe that this fuzziness in the plans is what has caused so many KR's to be stalled at the end of the boat stage.

So far, I have stayed with the plans almost religiously, with the only modification being the way I have attached the rudder pedals. Using a steel piano hinge didn't look like the way to go to me. It was heavy and most (all) of the stress was taken by the end elements of the hinge. It seemed logical that, since the stress was applied at the end of the assemblies, the support should be at the ends also. So I designed a support system using some industrial grade nylon to provide both support and act as bearing surfaces.

I have included a drawing for what I did. I don't know whether or not this has been done before. Since it is such a logical thing to do, it probably has but I submit it for whatever it is worth. It saves a few ounces and is probably a bit stronger than the piano hinge arrangement.



INDUSTRIAL GRADE NYLON BEARING BLOCKS

Split the nylon as indicated before drilling holes for the rudder bars. Drill the attach holes as indicated. Attach assembly to your floorboard prior to gluing said floorboard into place. Use whatever size attach bolts you feel comfortable with and reinforce the floorboard at the attach points. I used aluminum strips. Dimensions are a starting point and worked for me. Adjust as necessary. (See diagram)

Dale Work
2791 Prince Harold Ct.
Herndon, VA 22071
703-476-9021

I have developed a slightly different method of mounting the wing attach fittings to the spars. I had some difficulty in getting the caps drilled straight, even with the use of the drill guide described in the plans. The drill guide was a help but did not completely eliminate bolt misalignment and slop. (A close fit between the bolts and the wood leads to equal load sharing by all bolts and is critical to development of full joint strength.)

Pilot drill the spar caps in accordance with the plans at 3/16" using the drill guide. Remove the fittings and open the holes up to 5/16". Seal off one side with tape and lay the spar flat on a bench, tape side down. Fill the bolt holes with warm (runny) epoxy and let the epoxy soak into the wood for a few minutes. (Keep refilling the holes as the epoxy soaks in. It is surprising how much the wood will absorb.)

While the epoxy is soaking in, prep one side of the attach fittings for bonding with steel wool and acetone. Place a fitting on the spar and slip the bolts in. This will be a little messy as most of the epoxy will be displaced. Turn the spar over, being careful not to lose the bolts. Remove the tape, epoxy the surface (replenishing any lost epoxy in the bolt gap) and place the second attach fitting over the bolts. Snug the nuts down and double check the positioning of the fittings. (This is your only chance so get it right!)

The benefits of this technique are several:

1. A significant increase in joint strength is gained by bonding the fittings to the sides of the spar cap.
2. Since the bolts all float until the epoxy sets, their load contributions are perfectly balanced.

3. The bolts and fittings are encapsulated and free from corrosion.

The plans approach to fitting attachment is not particularly difficult and the strength of these joints, if properly done, is quite adequate for normal G loads. The above technique is a way to make the joints "bullet proof" at virtually no cost in time, weight or money. What more can you ask?

Howard Kaiser
1339 E. Carmen St.
Tempe, AZ 85283
602-839-6387

A couple of issues ago, I ran an ad for my 10 year old KR-2, as well as, a project in the boat stage. I received a number of inquiries from people interested in the planes and wondering what was going to happen to the Newsletter.

I think I owe you a brief explanation. As most of you know, a couple of years ago I started my own business. Although its doing well, I thought it might be a good idea to shift my priorities. The closer I got to selling my completed plane, the more I realized I really didn't want to and have decided to keep it. The boat stage project is, however, still for sale.

Regarding the Newsletter, Judy and I are still very committed to its success. However, I want you to understand that although we edit the Newsletter, its success depends on your input. We hope you will take the time to be a part of the Newsletter by submitting photos and info. Thanks for your continued support!



THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN
INDIVIDUAL COPIES \$1.50 EACH.

WANTED

Slick 4216 and harness for VW, new or like new condition. Intake for dual port heads. Lightweight exhaust system. Also need basic flight instruments, Navcomm and Loran. Call or write:

Dale Work
2791 Prince Harold Ct.
Herndon, VA 22071
703-476-9021

FOR SALE

KR-2 boat with tail framing. Seats, spars, control system are in. On fixed gear with tail wheel. Also wing stub skins and tail feathers not attached. Asking \$500.00 for wing skins & tailfeathers and \$1,900.00 for boat assembly. Will sell both together for: \$2,200 or B/O.

Randy Lynn
2552 Jackson Pike
Batavia, OH 45103
513-732-6261

FOR SALE

Revmaster Turbo 2100 about 10 years old. Never been used. Complete engine on KR mount.

Patrick McKenzie
585 Comstock Road
Hoilister, CA 95023
408-637-0459 anytime except Friday night
or Saturday

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 167, APRIL 1991

FOR SALE

KR-2. Requires roll control system and paint to fly. Professionally built and equipped. Serious inquiries, please. For details and price, call:

Ralph Sawyer
45432 Leatherwood
Lancaster, CA 93534
805-948-9642

FOR SALE

KR-2 for sale. 100TT, 2180 VW. Ellison TBI, Nav Comm, strobes, Diehl wings. \$5800.00

Pete Peterson
3832 Cottage Grove Ave.
Des Moines, IA 50311
515-279-1215

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413



KR NEWSLETTER

ISSUE NO. 168

MAY 1991



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



HERB BULL'S KR-2 N86QT

Herb built his 1835cc VW engine. His KR has a Sterba propeller, modified Bill DeFreeze tri-gear conversion. Colors are white, with an orange and gray stripe. The interior features an Avenger Loran, a kit built RST 720 nav/com and a very neat swing over control yoke assembly. Herb's plane has won numerous awards at many fly-ins. Herb's address and phone are: 1450 Northwoods Dr., Deerfield, IL 60015, 312-945-1162.

MORE INFO ON THE SUN 'N FUN

By Steve Bennett

It's been a long time since I contributed anything to the KR News so I thought I would send you the some pictures. I know what a chore it can be some times to do the Newsletter and I remember very well how much I appreciated input from builders, whether it was used or not in the Newsletter.

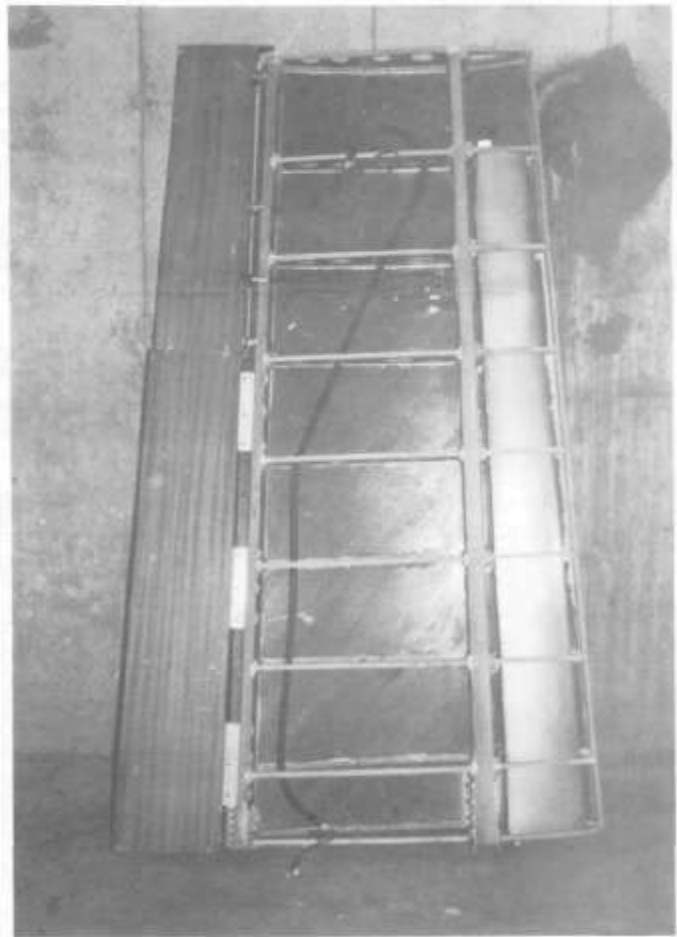


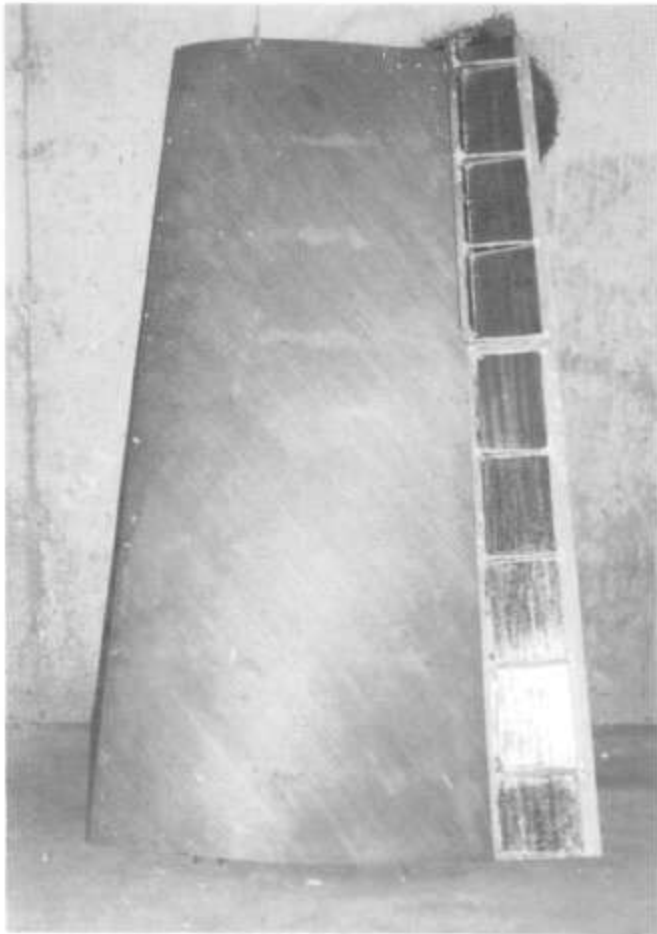
Photo of the KR dinner at Lakeland Holiday Inn South.



The photo shows Jeannette and Virgil Salisbury. Virgil has always done an excellent job promoting the KR's and sponsoring the Lakeland Sun 'N Fun KR dinner. During the week, Virgil worked in the Wicks Aircraft booth. He collects enough door prizes for everyone in attendance at the KR dinner.

Many people have learned over the years that I am building a slightly larger version of the KR. About 2' longer and 6" wider. I chose to make the wings, tail, forward deck and turtle deck all wood. This photo shows the interior of the wings. There are 9 internal wood ribs. Nose rib fuel tank is all aluminum. Capacity is eight gallons. Note size of wing flaps. Elevator has been increased in size to accomodate. Wing is covered with 3/32" 45 degree ply. 90 degree ply would service almost as well. Wing weighs 26 pounds without tank, bottom skin, wing tips and finish. Will be in the 40 to 44 pound range when finished.





This shows the exterior of the wing when covered with 45 degree plywood. Ailerons are activated by pushrods.

Steve Bennett
Great Plains Aircraft Supply Co.
P. O. Box 304
St. Charles, IL 60174
708-464-4178

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN
INDIVIDUAL COPIES \$1.50 EACH.

FOR SALE FOLDING WING ATTACHMENT

The kit sells for \$169.50 and will include the following:

Right and left side of the kit and the second man stand to hold the wing up while the wing is being secured. For the next 30 days or ten kits, the kit will sell for \$149.50.

The computer drawn plans sell for \$49.50 and for the next 30 days or 10 sets of plans will sell for \$39.50.

The plans and kit can very easily be made to fit on 80% of other planes.

The metal to build the kit sells for \$69.50. The computer drawn plans for a rack to carry the wings sell for \$10.00.



WING FOLDED ALONG SIDE OF PLANE

Allow up to 6 weeks for shipment.

Col. R. W. Moore
P. O. Box 622
Toccoa, GA 30577

... FROM BOB MUSE, DULUTH, GEORGIA

I'm in the process of building a KR-2 which I plan to fly this summer, thanks to a lot of help as you might have guessed from my dad, Bob Muse. My KR is a fixed tri-gear. I'm using Dan Diehl's main gear and a free steering nose gear similar to the nose gear in Bill DeFreeze's retractable tri-gear. I have Dan Diehl's wing skins with embedded antennas in both wings. Other features include a Comm/Loran antenna in the vertical stabilizer, removable 21 gallon header fuel tank, brake steering, fiberglass instrument panel and wing walks. I feel the following article will be of interest to other KR builders.

REMOVABLE FORWARD DECK

Anyone that has had to repair a fuel tank or needed access to the back of an instrument panel can appreciate a removable forward deck. This description is how I made my removable forward deck that works extremely well for me. I'm using a fixed instrument panel with the removable forward deck section separating just forward of the canopy. The removable section becomes the top of the fuel tank, which I will detail in a later article.

1. After the installation of firewall and temporary placement of instrument panel, from the firewall to the instrument panel, build-up along top longeron with spruce until it is the level of the top crossover shelf and set back from the edge of the plywood to allow for an overlap of four layers of fiberglass.

NOTE: Using this method, it is very important to keep this top surface very flat because the hinge halves will be set at 90 degrees to each other and alignment is critical for removal of the hinge pin.

2. Using plastic or duct tape (acting as a release agent), tape along the sides of the fuselage (at the longeron), top of firewall and instrument panel where they will eventually contact the forward deck. Add additional tape above the longeron on the outside of the build-up in step #1 to allow clearance for the two layers of fiberglass in step #8.

3. Using 1/4" plywood, cut a form 2" wide with the shape of the top edge of the firewall. Using bolts through the firewall and nutplates on the aft side of the former, attach the former to aft side of the firewall. This will add stiffness while building and becomes part of the attach system of the final product.

4. Place foam between the firewall (former), instrument panel and each top longeron build-up. Sand to your desired shape insuring that the foam ends up at least .5" thick.

5. Glass (at least two layers -- 6.5 oz) over the foam and down to the edge of the fuselage sides plywood at the top longeron.

6. After cure, at a point about 8" forward of the instrument panel or just forward of where the canopy will attach, mark a line (to be cut later) on the forward deck from side to side. NOTE: The forward section will later be removable and rear section will be bonded to the fuselage and instrument panel.

7. Remove the forward deck from the aircraft and sand the inside foam down to 3/8" to 1/2" thick, using a guide to measure thickness.

8. Remove all of the foam within one inch of the line drawn in step #6. Remove foam from above each longeron to allow for the upper hinge half to have full contact with the outer skin. Sand foam to allow for a smooth transition. Glass (at least two layers - 6.5 oz) over the complete underside of the forward deck and cure.

9. Replace forward deck. Drill holes in the hinge until it looks like swiss cheese. Place a piano hinge half (17" long) along the top of each longeron and against the forward deck skin and firewall. Clamp in place. Remove the forward deck and mark the position of the hinge halves. Drill through the firewall where the hinge pin will pass through.

NOTE: While going through the next two steps, continue to insure that the hinge pin can be removed and replaced without any difficulty and use wax and/or tape to protect hinge pin and hinging portion of the hinge from epoxy.

10. Attach (I used screws, flox and glass) the lower hinge half to the top longeron. Clean the hinge with acetone just before applying flox.

11. After cure, insert the hinge pin and attach the upper hinge half to forward deck using flox. The flox will fill the curvature of the forward deck. After the flox has cured, remove forward deck. Remove excess flox and glass over each hinge half.

12. With the forward deck upside down, build a flange (lip) where the forward deck will separate, by taping with duct tape along the forward side of the line drawn in step #6. Use a light on the opposite side to help determine where to place the tape.

13. To provide for a water-tight seal, place a small tube within 1/2" of the forward side of the line and cover with duct tape. Glass over the tube and up on to the rear section about 2" and cure. Later, a rubber seal can be placed in the groove that will be created.

14. From the top and being careful not cut through the flange, cut the forward deck along the line in step #6 from side to side. Again, a light can be used to help determine the line.

15. Permanently install the rear section to the fuselage and instrument panel, ensuring that you have alignment with the forward section.

16. The job is done with the forward deck, except the finish work.

**** ENJOY THE EASE OF ACCESS ****

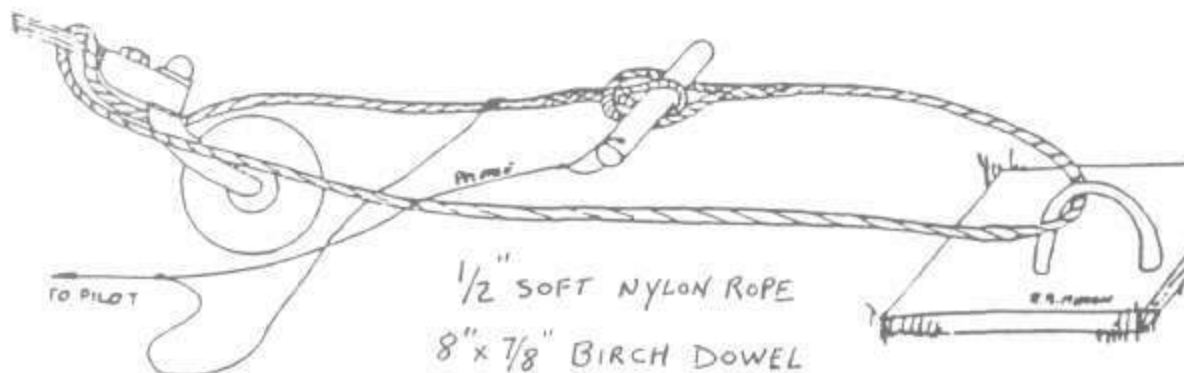
Bobby Muse
2215 Millwood Ct.
Duluth, GA 30136
404-729-8860

TAIL TIE DOWN FOR HAND PROPPERS

The following article and drawing was taken from the EAA Technical Counselor News by Ron Mason, EAA Chapter No. 174 Newsletter, Cincinnati, OH

Some years ago at a large fly-in, I came into contact with a RCMP officer who was interested as to why my aircraft was not tied or supported while being hand propped. I stopped, as requested, and showed him my tail securing device, which he had missed. After checking it out, he wished me a safe flight home (with tongue in cheek). The sketch will show you the details of this safety device. It is simple to set up and all you do is pull the retrieve cord and nothing is left behind. (See Diagram.) Be sure to make the release cord (to the dowel) shorter than the retrieve cord, or it won't work.

TAIL TIE DOWN FOR HAND PROPPERS



BUILDING TIPS

By Gene Darst

I would like to add some information to Monte Miller's article in Issue #164, entitled KR CORROSION CONTROL.

On Cadurn plating or chrome parts, where stress or loads are imposed, the parts should be baked in an oven for an hour or more at 300-350 degrees F. to eliminate Hydrogen imbrittlement immediately. Hydrogen imbrittlement develops from the systems used in cad and chrome process.

On aircraft, they have certified aircraft shops that do this work. They are very rare. Best to talk to FAA people on this (that's if they are old timers, knowledgeable in their field). I would not consider cad or chrome, only from a certified FAA shop.

OTHER BUILDING TIPS

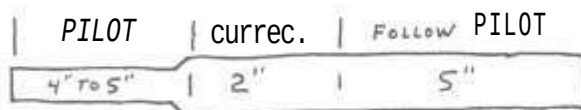
One tip that might help builders on assembly of parts: Tail feathers, wing fittings, axle bolts, a bullet, i.e. Made from bolts.

Various sizes 3/16, 1/4, 5/16, 3/8" whatever needed. These will align the parts, press bolts through, it will align holes and save time on wing straps. I made mine .001 loose to make it easier to align parts.

Do not ever twist or turn a bolt in wing straps or other parts as it will cause "gouging" of parts and ruin fit. An interference fit should be made on critical parts.

An aircraft bolt i.e. 1/4", 5/16", 3/8" and on up are several thousandths smaller. i.e. .250- 1/4" are normally .248" will cause a loose fit. I used micrometers and checked each bolt.

On both my T-40 and KR, I had reamers ground .248, .311, .373, etc.



The front pilot is .010-.015" smaller. The reamers give a line ream in wing straps so no loads are on the bolts from misalignment.

As of 1/30/91 have 24 hours on aircraft. Most testing complete, yet to check cruise.

Gene Darst
585 Iowa Street
Beaumont, TX 77705
409-835-1990

AN OPEN LETTER TO THE KR NEWSLETTER READERSHIP

Last evening (May 13) I had need to telephone KR Newsletter editor Earl Teporten. After taking care of immediate business, we discussed the status of the publication. It came as quite a shock when Earl mentioned there were very few builders submitting info to the Newsletter! As a long-time subscriber, I was beginning to notice some articles repeated from previous years but thought little of it as they are still timely. However, the lack of participation from over 600 subscriber/builders is disturbing.

Folks, the continuing growth in interest in the KR aircraft is due in no small part to an effective communications link. Builders, both new and advanced, have a ready source for help and information. Manufacturers take note of a large potential market for new and existing products for our aircraft. Our sport is richer for these things and more.

Here's what we can do to help ourselves. Each active builder or flyer take thirty minutes to scratch out an item to submit to the Newsletter. Send a good photo, if available, or a sketch. Do it just once in 1991 and there will be enough articles to draw on for many issues to come.

Monte Miller
1900 Parkside Drive
Denton, TX 76201
817-566-5871

VW ENGINE- PARTS, PARTS, PARTS ARE WHERE YOU FIND THEM

Article 2, VW Engine Series

The most economical way to assembly your own Volkswagen aero conversion begins with advance planning. Prior to any purchase, know what your needs are. There's a big difference between needs and wants and a sharp individual will be able to recognize the distinction. Sounds like simple advice but buying parts that will not fit your plan is a waste of money no matter how economically they were purchased. Consider this as an example; you won't know what length pushrods to buy until you have completed the deck height measurement on the assembled longblock. Any engine requiring over .060 in cylinder shims (for setting the compression ratio) will need custom length pushrods. If you bought stock length pushrods early on in the engine development, chances are good that you've just pitched a few bucks down the dumper. Those simple rods must be of a proper length to maintain correct valve train geometry. Know your needs.

Effective engine development plans will require technical research. Purchase two excellent engine assembly manuals: Rex Taylor's and Steve Bennett's. Do not try to economize at this stage by buying only one of the two books. Both compliment each other and offer extensive explanations on engine assembly.

The value of VW parts catalogs should not be underestimated. Begin now to build a resource library of suppliers. The list should first include all the Volks aero converters, but don't overlook auto suppliers. Many high quality VW parts compatible with aircraft use are offered from auto outlets. These same catalogs also provide valuable technical information that can be applied to the aero conversion. Next time you visit the local magazine rack, pick up a rag called VW Trends. Spend a few bucks on the mail order catalogs. If you're really lucky, you might catch the bikini issue. Major distractions, however, we must do this research.

After your individual engine needs have been determined, there are a few other parts sources available to you, but usually only for a brief period. These sources include the classified sections in weekly/monthly aviation publications, builder newsletters, fly markets, and probably others I've missed. Do not underestimate these sources. The major

engine parts and ignition system for my particular aircraft were purchased, unused and new-in-the-box, from individuals who had quit projects. Substantial savings were made. The key being the advanced planning of which particular parts were needed.

The absolute last source for parts would be the local VW dealer. If you believe that the desert bedouins are getting to you for oil prices, I'll promise you the Volkswagen marketing department taught'em all they know.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871

CUTTING ALUMINUM HOLES

After reading Monte Miller's article in Issue #159 on Instrument Panel Cutouts, it reminded me of a hint on cutting nice clean and fast holes in aluminum for small holes (like from about 3/8" to 1-1/2" to be used for fuses, switches, etc. All the local hardware stores in my area carry wood "spade" bits. Look for the kind that has little cutting "ears" on the top edges of the spade. I found the "ears" on sizes 3/8" on up. The bits sell for about \$2.50 each. Try it on some scrap aluminum... I used .050. You will be amazed at how well they work. Admittedly, I cannot take the credit for this idea, as it came from a good friend and Chap 410 designee, Clarence White.

Ed Janssen
601 Heinze Drive
Rock Falls, IL 61071
815-625-4898

FOR SALE AGAIN

Unfortunately after much consideration, I have decided that I must sell my completed KR-2.

KR-2, 155 Hours, 1918cc, Super Posa, stock, empty weight 510 lbs. Dual controls, stock retract landing gear.
\$4,500.00

Earl Teporten
P. O. Box 579
Lakeville, MN 55044
612-435-7275

FOR SALE

KR-2 project approximately 60% complete. Boat rigged with control cables, premolded Diehl tailfeathers installed and painted, outer spars complete with wing attach fittings, Diehl wing skins available, premold R/R forward deck, R/R hydraulic wheel kit and all wood necessary to complete. Complete set of KR Newsletters, construction record complete with pictures, cost record and test coupons of construction. Have \$4,700 in project. Will sell for \$3,000.

Frank Therrell
3303 Shady Cove
Tyler, TX 75707
903-566-2616

WANTED

Flying KR-2. Contact:

Jim Jasper
3732 East Dartmouth
Mesa, AZ 85205
602-830-3445

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 168 MAY 1991

FOR SALE

1700CC VW engine converted Monet intake manifold cast single port heads, 29MM Posa Carb. Slick mag, Model 4016 with Champion Rel 38B thin wire tipped plugs. Revmaster engine mount casting. \$2,500 or offer/trade.

Ken Squires
Box 305
N. Olmsted, OH 44070
216-961-1364

FOR SALE

Premoulded KR-2 turtledeck	\$50.00
Premoulded KR-2 canopy frame	35.00
Clear KR canopy	30.00
KR-2 Alum, retract kit (minus wheels)	60.00

You pick-up or pay shipping.

Lloyd Buckner
1387 Hartman Dr.
El Cajon, CA 92020
619-447-0295

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



JIM PERIS' KR-1 N31097

My KR-1 is now 12 years old and has had many, many up-dates, mentioned in old Newsletters. I have about 550 hours flown in this KR-1 and the latest up-date is the fixed gear.

It is designed from fiberglass, is totally replaceable with the old mount system and was a very easy conversion. The mechanical brakes are the same. The conversion cost me one pound and I didn't see any cost on speed. The gear is one foot wider, four inches higher and three inches forward from old gear position.

Continued page 2

Streamlined fairings and wheel pants dressed design up to a racey look.

I designed and tested my own 52 x 48 prop with great success.

The ground handling is excellent... handles like a heavier aircraft.

I cut holes in flap connector on bottom of fuselage. The nose pitches down very well and has a very good sink rate.

I installed canopy latches that can be opened from outside, just in case!

The gear is a conversion from original KR-1 mounts.



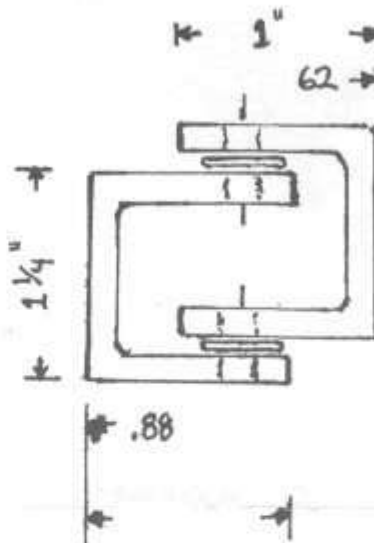
The plane has a 1835 VW installed and weighs 482 pounds. Also has a profile tank installed and holds 14 gallons.

That's all for now.

Jim Peris
149 S. Eastland Dr.
Lancaster, PA 17602
717-393-5928

TAIL SECTION HINGES

I don't know what other builders have experienced with the Tail Section Hinges (drawing #46) in the KR-2 plans but I have found the aluminum "C" channels quickly begin to gouge and bind. I built my hinges a little differently starting with 1-1/4 x 1-1/4 x .125 6061-T6 "C" Channel (from Wicks) and adding thin steel washers to act as a bearing between the aluminum halves, see drawing.



The design works well but the hinges are wider and a little less cosmetic. It can also be tricky to keep washers in place while inserting bolts. I used "Never-Seez", a graphite-copper paste lubricant to hold washers in place. There is probably an even better hinge solution out there. I have heard of builders using steel hinges of small dimensions and a long steel rod to make disassembly quick and easy. If someone has built such a set-up, I would like your ideas in the Newsletter.

Robert Pearson
7552 1/2 11th St.
Buena Park, CA 96021
714-522-6974

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN
INDIVIDUAL COPIES \$1.50 EACH.

WANTED

Revmaster engine mount and cowl for KR-2.

C. J. Moorhead
1068 Smith Ave.
Campbell, CA 95008
408-378-9467

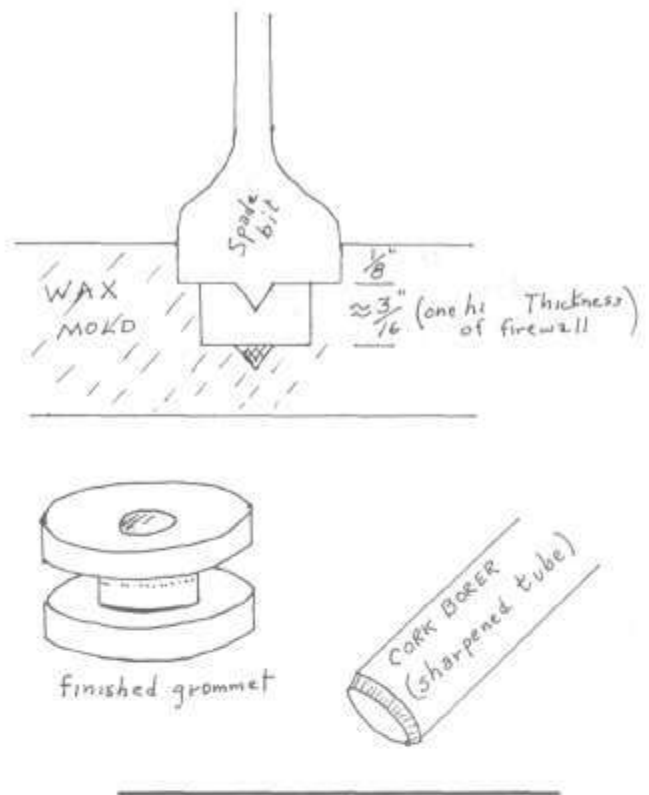
TIP ON ENGINE BAFFLING MATERIAL

I have been working on my KR-2 since 1980, first with a partner and then I bought him out when his interest waned and now I am at the stage where I am beginning to wonder whether I am using this as a retirement project or whether I am going to fly it. I AM GOING TO FLY IT!! Part of the problem is trying to incorporate all the good ideas I have gotten from your Newsletter. I just have to learn to restrict what goes in and get the project finished.

I am very impressed with an inexpensive baffling material as described in the Great Lakes publication, "Engine Baffling Manual for VW's". I laid a strip of wax paper on the bench, cut a yard of 6 oz. cloth into 3 strips and proceeded to lay up a sandwich of cloth with GE Silicone caulking which, incidentally, comes in a variety of colors. You just squeegee the silicone into the cloth, put the next layer on and squeegee and then the last layer with more silicone. I put another layer of wax paper over the sandwich and turned the whole thing over and removed the first wax paper and made sure that the bottom of the first layer had been covered. This makes plenty of baffling with scraps left over for gasket material for other uses; it's easy to cut, flexible and, according to the tube, guaranteed for 30 years!

There was enough material left in the caulking tube to experiment around with making some rubber grommets through which to pass control cables and wiring through the firewall. A block of candle wax or canning wax or, as I used, a stub of a large decorative candle works nicely for a mold. I ended up making two half-molds. I used a 7/8 spade bit for the flange and a 5/8 spade bit for the body and then filled the pilot hole with wax scraps. When filled with rubber and struck off level, it will take about three days to cure in the mold. After removing the two halves, a little rubber smeared on the end and held with a little pressure will complete a very satisfactory grommet. I used a cork borer and a leather punch to cut the central holes. These are nothing more than a sharpened tube of the size you need.

Bob Offord
5110 Harmony Lane
La Mesa, CA 91941
619-465-6083



PROFOUND ADVICE

Model Builder magazine recently featured some profound advice for model airplane builders which seems to be equally fitting to building big airplanes. (I believe MB's source was a homebuilding publication.)

Never believe dimensions given in the plans. They may be accurate but is your piece accurate? **Always** check the fit of your part, then use your measurements.

Never work on your project when you are tired, hungry, angry, depressed or about to do your income taxes.

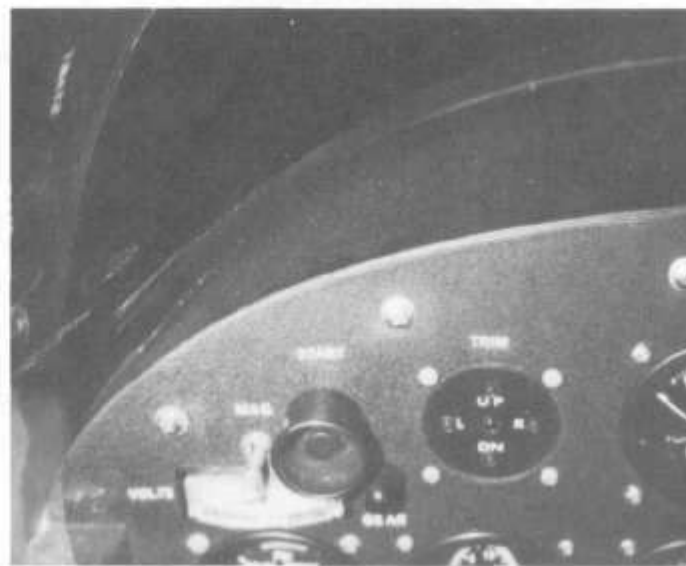
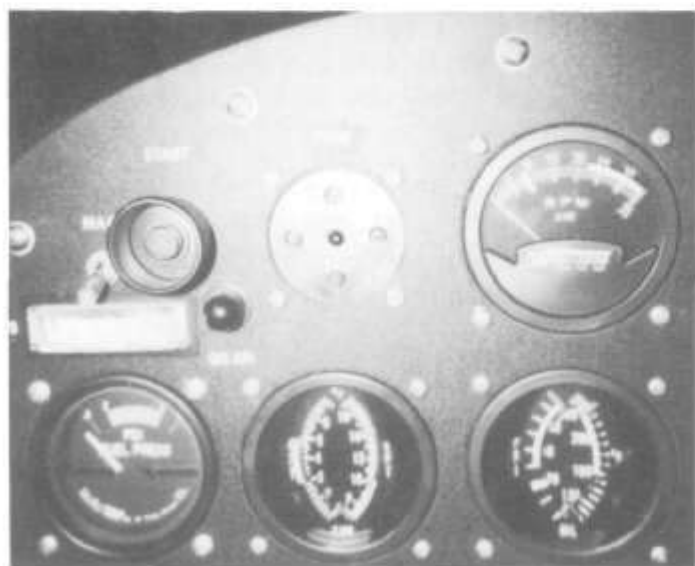
Never answer the question "when do you think it will be ready to fly?" In fact, **never** answer any question that begins with "when". Your answers will **never** be right!

Ed Gossert
6227 N. Litchfield Rd., #40
Litchfield Park, AZ 85340

TRIM SYSTEM SCHEMATIC

This aircraft is a true 90% finished and has solid foam cores, glass covered. Shape of cowl and fuselage above top longeron has been changed. Trim system has been installed. Project is for sale to the right individual. Not cheap.

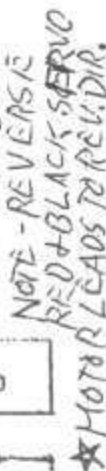
Ralph Sawyer
45432 Leatherwood
Lancaster, CA 93534
805-948-9642



PANEL
CONTROL UNIT
DISCONNECT

CABLE
SPICES
UNDER W/H
SEAT

"GYPSY" TRIM SYSTEM
DESIGNED BY:
RALPH V. SAWYER 4/20/81



VW CRANKS AND CUBICS

Article 3, VW Engine Series

For the dollar value, the Volkswagen 1835 is, in my opinion, hard to beat; witness the great numbers of this size aero conversion. Larger displacements based on the Type I, II and III blocks are available but the power returned is in a much smaller proportion to the expense involved. In as much as we are attempting to build an economical engine, the 1835 is an excellent value. Should your particular aircraft be a bit overweight or perhaps you just want a larger displacement engine, you'll have to bite a larger bullet.

The economical route to a displacement increase over the standard 1600cc is through the use of larger piston/cylinder assemblies in conjunction with the stock 69mm Volks crankshaft. A 69mm crank with 92mm cylinders will yield 1835cc. The engine case and heads will require some minor machine work before accepting the bigger jugs, however many engine parts suppliers offer this service at time of purchase for a very fair price. This knowledge should permit better planning of purchases and will save some unnecessary freight charges, machine shop expense, and that most valuable commodity: time.

Volkswagen no longer manufactures the forged 69mm crankshaft that is the heart of our aero conversion. That's the bad news. The good news is that about a zillion were made and they are still plentiful. It doesn't take much effort to locate an unground crank that is within operational tolerances. These are frequently offered with a magnaflux inspection. Get one. Avoid any cast crankshaft as they are inherently brittle.

There's a simple test that you can do to determine if a crankshaft is cast or forged. Just suspend the shaft with a length of wire and tape the crank on a non-machined surface with a ball-peen hammer. The forged unit will ring like a bell. A cast crank (or a cracked, forged part) will emit a dull "thud". I usually recommend next using the hammer to tap the individual attempting to sell you the boat anchor.

Another point regarding crankshafts, although it has nothing to do with displacement, is the prop hub. A builder may choose from several prop hub manufacturers. The important point to remember is that the crank and hub will most often require a matching taper fit for installation. As cranks and hubs are not mix'n match between manufacturers, it's best to purchase these items from the same source. Occasionally, suppliers will offer the crank taper job for free if you buy their crank and hub together. Ask, worst that could happen is they'll say no.

Try to avoid shipping the crankshaft back and forth across country for the simple reason that these things are heavy and UPS charges will be a part of your engine's cost.

To break through the 1835cc barrier and gain some additional cubics, it will be necessary to utilize a stroker crankshaft and do some extra machine operations on the case. More torque and ponies are nice but costs will begin to go off the scale. The easiest way to build an economical Volkswagen aero conversation is to keep it simple.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871

ENGINE DISPLACEMENT CHART

FORMULA IS: BORE X BORE X STROKE X .0031416 = DISPLACEMENT

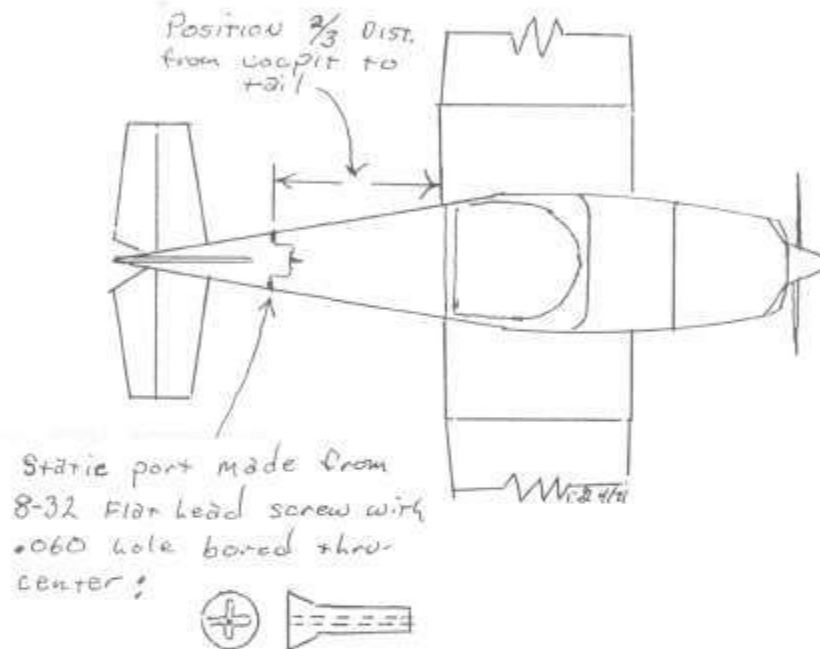
BORE					
STROKE	88	90	90.5	92	94
69	1679	1756	1775	1835	1915
74	1800	1883	1904	1968	2054
78	1897	1985	2007	2047	2165
82	1955	2087	2110	2180	2276

PITOT-STATIC SYSTEM

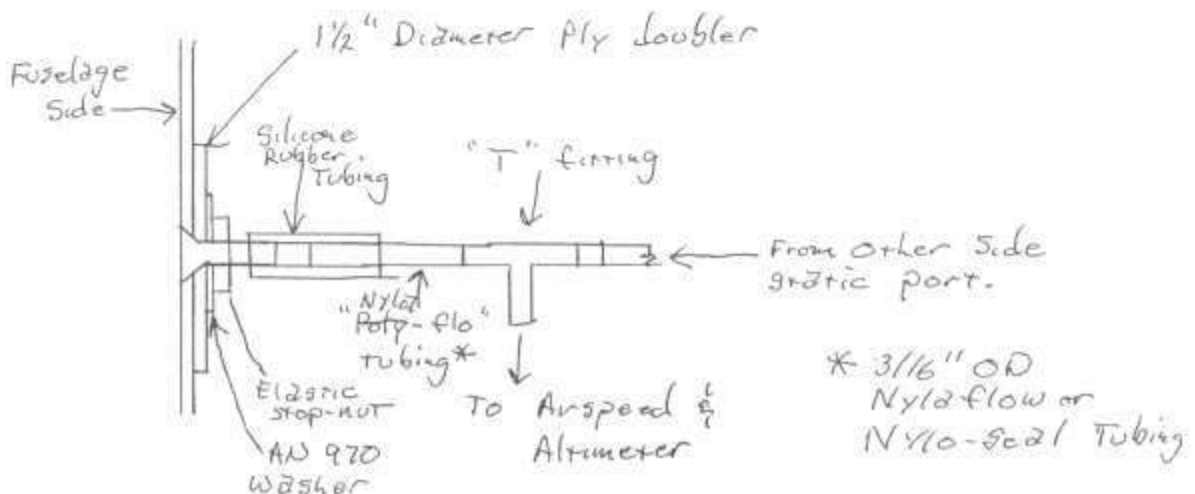
There was a request in issue #166 for any information on pitot-static systems. I was able to study a KR in Lancaster, CA which had a static system based on the one used in the RV series of aircraft. The owner of the KR-2 was quite pleased with it, so I've sent along a drawing of the details.

Ed Gossert
6229 N. Litchfield Rd., #40
Litchfield Park, AZ 85340

Static system in *as observed on a KR-2 in*
California:



Mount one such port on each side of fuselage, flush with surface, $\frac{2}{3}$ Distance from Trailing edge of wing to tail p r.



FOR SALE

KR-2 80% complete. All avionics and instruments included. 1835cc Volkswagon (running). Fixed gear taildragger. Moving must sell. \$5,500.00 OBO.

Tony C. Crawford
9680 W. Olive, #93
Peoria, AZ 85345
602-979-6525 After 5 p.m./anytime weekends

FOR SALE

Unfinished KR-2 project. Boat completed, spars built, tailfeathers partially built, includes spring bar, landing gear kit (struts, wheels, tires, tail wheel), engine mount, bubble and brand new set of construction plans dated 1987. Take it away for \$450.00.

Jim Evans
P. O. Box 345
Lewiston, CA 96052
916-778-3774

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 169 JUNE 1991

FOR SALE

KR-2, flown for ten years, 1918cc VW, Super Posa Carb, stock empty weight 510 lbs. Alum, header tank, dual controls, stock retract landing gear.
\$4,500.00

KR-2 (lengthen and widened) woodwork completed. Hydraulic brakes. All building materials, plus too many instruments and equipment to list.
\$500.00

Earl Teporten
P. O. Box 579
Lakeville, MN 55044
612-435-7275

WANTED

Premoulded turtledeck, canopy frame, canopy forward deck and cowling.

Mike Rice
17228 E. 34-H
Newalla, OK 74857
405-391-4535 after 6 p.m.

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



DAN HEATH'S KR-2 N886KR "LITTLE BEAST"

I purchased this unfinished project over six years ago. In hindsight, it was not the kind of project a person would want to take on. There were many things wrong with it. Some of them I could see and some of them I could not. The gear collapsed on it three times. Once when trying to pull it on a trailer, once during taxi tests when it became unintentionally airborne, and once when I was forcing a landing that should have been a go-around.

Continued Page 2

It now has been converted to a Rand fixed gear which I like much better and it has received its certification. One note on the fixed gear. I ran it off the runway quite a few times while learning to fly it. This caused the threads on 6 of the 12 3/16 bolts to strip. I have replaced the bolts and have seen no sign of this occurring from normal operations. I also converted to 5 x 500 tires after tearing up the wheel rims due to the small 5 x 400 Lamb tires which I was using. I had a small (roller skate type) tail wheel and a weak tail spring which was causing bad things to happen when the tail came back to Earth. I have since replaced those and have had no more problems with this.

I have a 1835 VW of my own making set to a compression ratio of about 9.8 to 1. I use only AV gas. I have a Sterba 54 x 44 prop and it will turn 2900 static and 3200 wide open, for a maximum indicated speed of 145 MPH. I have no wheel pants and it weighs just over 600 pounds empty. I have discarded the Posa for a Bendix. The 32mm Posa was too big and I think that the 28mm Bendix is too small. I want to try an Ellison. If anyone wants to sell one cheap, let me know. This carb has no variable mixture control, so the temperatures that I run vary depending on the mixture that is going to the engine. Temperature and altitude have a noticeable affect on this. I try to run 350 on the CRT and 1100 on the EGT and could control this if I had a mixture control in the cockpit.

The KR flies great and I love it. The rate of climb is about 800 fpm at 90 mph. I always land it in a wheel configuration at 80 to 90 mph because I can't see the runway in the three point position. I found that the thing that gave the most problems on take off was that I wasn't getting the tail up high enough and keeping it up long enough. I need about 80 mph for a solid take off.

My wife will be coming with me to the KR Gathering this year. She likes to play tennis and if anyone is interested in a good match while at the Gathering, bring their racket and togs. I probably will not have much time for tennis as I expect to bring the "Little Beast" to the Gathering this year.

See you in September!

Dan Heath
128 Lake Harbor Dr.
Lexington, SC 29072
803-359-1008

WITH GREAT SADNESS....

I have been told of the death of Jim Peris whose plane was featured on the cover of last month's Newsletter. Jim passed away June 23, at the age of 66 from a massive coronary while in a local hospital. We all extend our heartfelt condolences to his wife, Nancy and the rest of his family. Cards can be sent to:

The Peris Family
149 S. Eastland Drive
Lancaster, PA 17602

FOR SALE

Jim Peris' KR-1. 1835 VW, 60 hp, 482 lbs, fixed landing gear, 12 year old, 550 hours. \$5,000.00. If interested contact:

Mike Rieker
973 Green Terrace
Lancaster, PA 17601
717-299-0491



THE KR NEWSLETTER IS PUBLISHED MONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$15.00 PER YEAR- U.S., \$20.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN INDIVIDUAL COPIES \$1.50 EACH.

FIBERGLASS INSTRUMENT PANEL

Why, fiberglass, panel? Well, my reasoning was because it was going to be easy to design, shape and make and repair and it was and is.

The fwd/aft location, size and shape of the KR instrument panel is not detailed in the plans but is mandated by several considerations. First, sit in the cockpit and feel comfortable with the location with regard to arms reach, knee room, etc. You should be able to see over the instrument panel and see just a piece of the cowling (sometimes imagination helps). Consider the instruments, avionics and radios you plan to use.

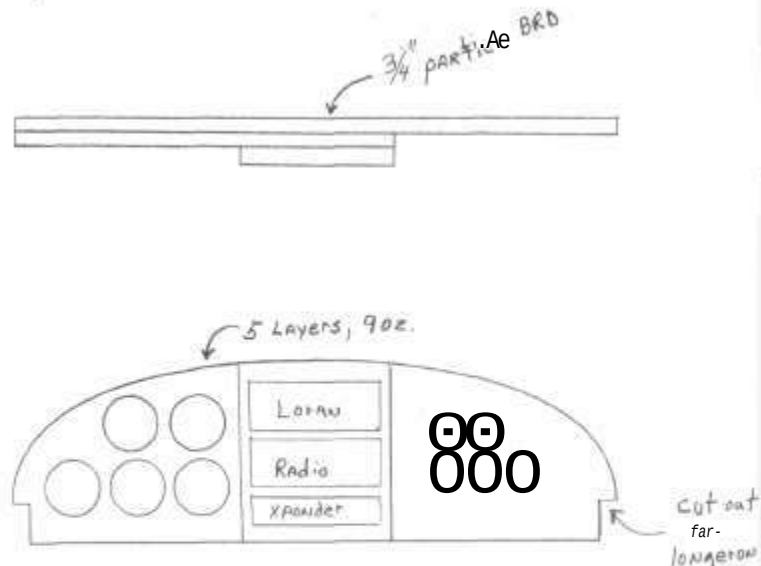
Make a pattern out of 3/4" particle board and trial fit to insure it meets your requirements. Don't forget to allow for the thickness of the fiberglass at the longerons for instrument panel and forward deck. In order to allow extra room for a larger header tank, I added an additional 3/4" piece where the radio stack is located (see drawing). A third piece on the left side could be used to allow extra space for flight instruments, if needed.

Radius all inside and outside corners. The pattern is now a mold. Cover the mold with plastic or duct tape. Try not to overlap the tape because the overlap will show in the top surface. Apply wax (used Johnson's floor wax) to mold and rub it in.

I used 5 layers of 9 oz. fiberglass. The overall stiffness is aided by arranging each layer with a slightly different weave orientation. The fiberglass should roll over the edge and extend the full 3/4" to form a stiffening lip around the perimeter.

After cure, remove from mold and trim as needed. Additional stiffness is gained by locating the 5/8" crossover member just fwd of the instrument panel location and bonding together. The instrument panel is also attached to the forward deck and fuselage sides. (Note: My fwd-fwd deck is removable and rear-fwd deck is fixed. This allows access to the back of the instrument panel and removable tank. See KR Newsletter issue #168.)

When installing instruments, switches etc., freehand the holes, hole saw or use a standard type hole punch. The hole punch I used had a 5/8" center arbor bolt with a matched die plate that fits in the front and back, normally used for aluminum but it works great for fiberglass.



A cone-shaped multiple diameter drill bit (Unibit) is excellent for smaller holes.

If you make a mistake, the best news of all is that the panel is fiberglass and you can repair it or modify it, however or whenever you wish.

Bobby Muse
2215 Millwood Ct.
Duluth, GA 30136
404-729-8860

1991 OSHKOSH KR FORUM AND DINNER

The KR Forum at Oshkosh will be held on Saturday, July 27, from 2:30-3:45 p.m. in Tent #3.

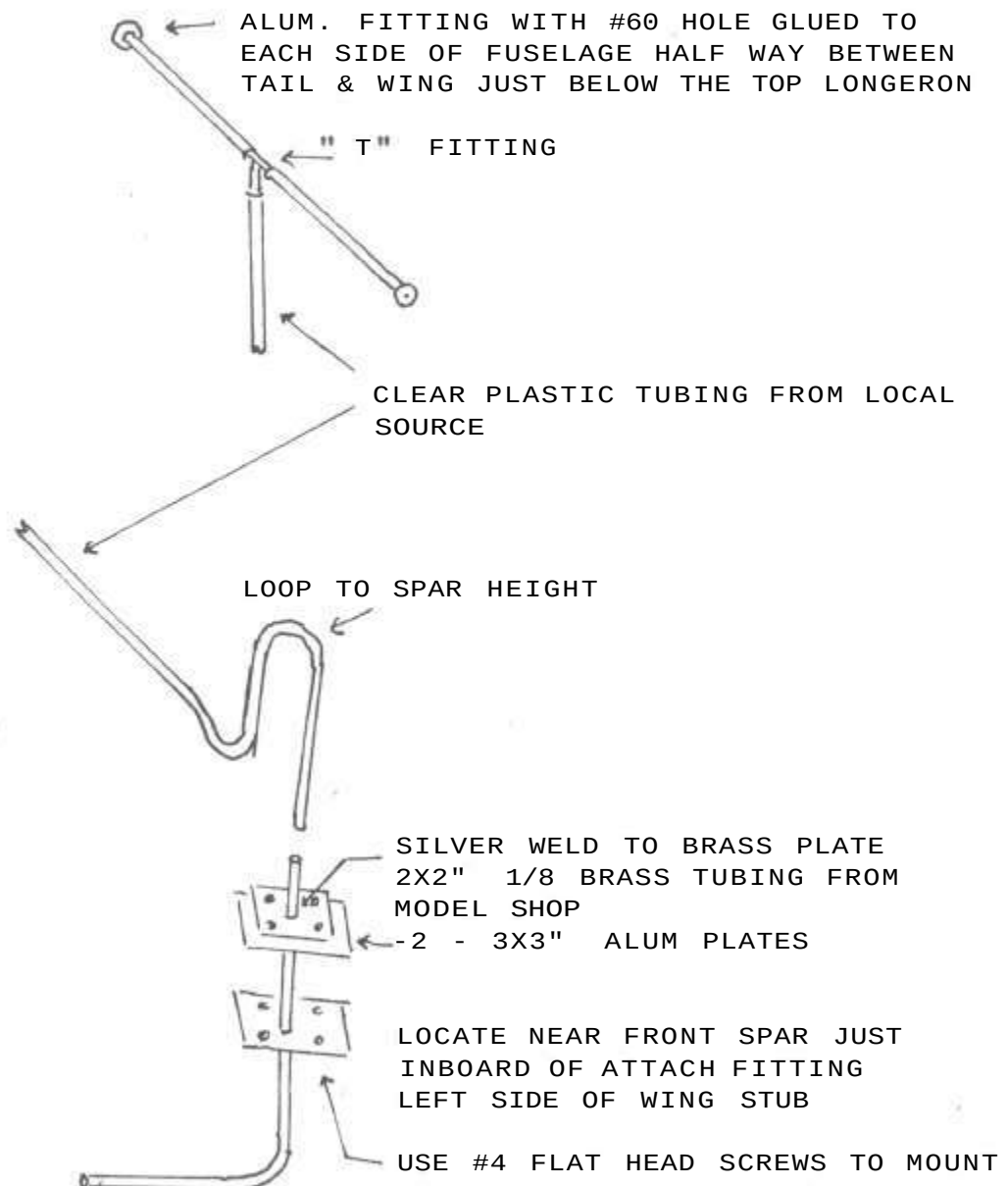
The KR Dinner will be Sunday night, July 28, 6:00 p.m. at Butch's Anchor Inn, Lower Deck. Format will be a family style dinner. Cost is in the \$10.00 range for adults and about \$6.00 for children. Sign up at the Great Plains Aircraft Booth. You must prepay for this dinner. We need to have a head count no later than 12:00 noon on Sunday July 28.

Great Plains Aircraft Supply Co.
P. O. Box 1481
Palatine, IL 60078
312-359-6558

STATIC SYSTEM SUGGESTION

MY CONTRIBUTION TO YOUR STATIC SYSTEM REQUEST,
SIMILAR TO YANKEE AND ALSO SOME MOONEY MODELS,

NOT TO SCALE



MADE SEVERAL SPEED CHECKS AND CAME VERY CLOSE TO OTHERS

James Takemoto
4633 E. Colfax Ave.
Denver, CO 80220
303-388-0407

GOOD. GOODER AND GOODEST PIECES PARTS
Article 4, VW Engine Series

To describe "best performance" in regards to the VW aero conversion is a rather subjective area. For the purpose of this series the "Best" will refer to economy of construction and operation, along with reliability as it relates to one particular KR project and builder. These best ideas may be something different to the next person. My granddaddy use to say that if everyone liked just what he did, then every man in the world would want to be married to grandma.

ROCKER ARMS: At times you may hear someone advise the use of 1.25:1 ratio rockers in an attempt to increase performance of the Volks engine by way of greater valve lift. Considering that all the available aero conversion camshafts researched are designed specifically for use with 1.0/1.1 stock rocker arms, it doesn't make a lot of sense to use the after market parts. If utilized, the ratio rockers could reduce valve train life due to the valves being forced to accelerate their opening and closing beyond the capabilities of stock VW springs. The standard rocker arms will prove to be the most reliable. Yes, ratio rockers will run but keep them on the boulevard sprinter, not your airplanes.

If you build up the Volkswagen rocker arm assemblies from parts rather than purchasing complete assemblies, be use to using the thin, wavy washers that are located throughout the component. Some engine problems have been traced to builders leaving out these simple yet critical parts.

VALVE SPRINGS: Only the mildest performance cams can get by with using the single Volks heavy-duty valve spring. Fortunately for us, the VW aero conversion, using a mild, torque-grind cam, will perform well with a single spring set up. Remember, the lifter must follow the cam profile in order to pick up and, through spring pressure, set down the valve on its seat. An overly aggressive cam grind with extended duration that is run without dual inner/outer spring sets could cause the cam follower to leave the cam. Worst case senario could include loss of valve retainers, loose valve seats, bent push rod, or a dropped valve. These problems rarely occur as you taxi across the ramp.

CAMSHAFT: It's necessary to use caution when selecting an aftermarket cam for the VW engine. The easiest way, though not necessarily the most economical, is to purchase the stick from one of the available aero suppliers. Each offering has a trick name or number attached to it but unless you lay down your dollars, you won't know what the cam specifications are. If you elect this particular route, follow the manufacturers installation instructions and allied parts suggestions exactly.

For builders interested in knowing more about cam selection, the trail will lead in many different directions before the final choice is made. There is a definite connection between the Volks aero camshaft and the propeller and it's not all mechanical.

The Volks 1835 engine usually turns a 52 inch diameter prop. Granted, there is someone out there utilizing a different stick, but in order to prevent the prop tips from going supersonic at the commonly accepted VW redline of 3600 RPM, the 52-incher is quite common. Knowing this, and factoring in the usual operating range of the engine along with all the related valve train components, a cam selection starts getting easier.

For maximum torque down in the lower RPM range, the engine will require a cam with relatively short duration and moderately high lift; a "low end" cam that will allow the engine to develop its maximum torque and horsepower where the aircraft needs it. My particular engine utilizes an Engle W-100 cam with a grind providing .420 lift and 270 degrees duration. Strong torque, smooth power band and it is compatible with VW heads mounting the stock valve train and the single H.D. valve spring.

There are dozens of VW cams available from equally numerous manufacturers. Most are totally unsuited for aircraft use. Part of the building experience is the knowledge gained by sifting through the voodoo. Be aware that lift and duration figures will vary between manufacturers due to various ways measurements are taken. Keep the cam on the mild side and you won't get in trouble. Nor is the stock VW cam a bad choice as many aircraft are flying quite satisfactorily with it.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871

BUILDER'S UPDATE

Vroom Vroom someday this thing will really fly. I started my KR-2 June, 1985 and I hope to have a first flight this July, 1991. It all started when I quit a 20 year smoking habit and wanted to do something crazy, behold N685RH (my KR-2).

I'm using a Great Plains 1835cc bug engine. I made up my own exhaust and intake systems. My intake system begins with connecting both intake ports together with one 1.5 inch pipe and then from the center point of that pipe I ran a single pipe to a 3 x 4 x 6 inch metal box which is attached to the firewall. Sitting on the box (intake manifold) is a rebuilt Chrysler two barrel carburetor. The engine does run well on gravity feed which will be my back-up system. My primary feed is a Facet fuel pump with 3/8 fuel lines.



I'll have more details on this set-up after my first flight. Right now all I can say is that the engine runs and sounds good.

To those of you that have flying KR's... how about letting the rest of us know what to expect from the FAA inspection. Were there really 3 men with clip boards spending six hours dissecting your plane? When you finished the 40 hours, did you have to have the plane reinspected? Why? Speaking of the 40 hours... could you outline the things that you did with your plane during that time and was this sufficient to develop the flying envelope?

I'm curious as to how many KR's currently have transponders with Mode C (anyone know where I can get one cheap? I live under the Cleveland TCA).

I painted my plane with Acrylic Enamel, GM white. Nothing unusual except that I left out the poisonous hardener and I sprayed the entire plane using a Wagner airless sprayer from Builders Square. There were virtually NO fumes (I did wear a mask anyhow). I had plenty of control over the mist action and the paint only took two weeks to dry before sanding the few runs (I'm a beginner at painting). Actually, I painted my plane last fall and let it set-up all winter. This method does take longer but I didn't have to rent a compressor to vaporize deadly cyanide (hardener). I could tell you horror stories about my painting skills.

Bob Hawk
821 Jamestown Ave.
Elyria, OH 44035
216-365-6867

WANTED

Looking for a partially completed KR-2 or KR-1 in Florida, Georgia or South Carolina area. Contact:

Albert Raschiatore
8480 NW 14th St.
Coral Springs, FL 33065
305-753-3188

WANTED

Prop for VW/GPASC conversion. New or like new, 52 x 48. Contact:

Monte Miller
1900 Parkside Drive
Denton, TX 76201
817-566-5871 evenings



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD. OSHKOSH. WI 54903-3086
PHONE 414/426-4800

FUEL DELIVERY SYSTEM

I've included a sketch of the fuel delivery system for my project.

This system utilizes both gravity feed from a header tank and pressure feed from auxiliary (wing) tanks. All tanks are of fiberglass and Safe-T-Poxy construction each with finger screens and electric level senders. The header tank is 10 gallons and is removable for access to the forward cockpit and instrument panel. The wing tanks are 6 gallons each and are built along the back side of the outboard main spar. The tank is as high as the spar and 6 inches deep. This long skinny tank is right on the center of the CG range. Fuel added or withdrawn from these tanks does not significantly change the loaded CG.

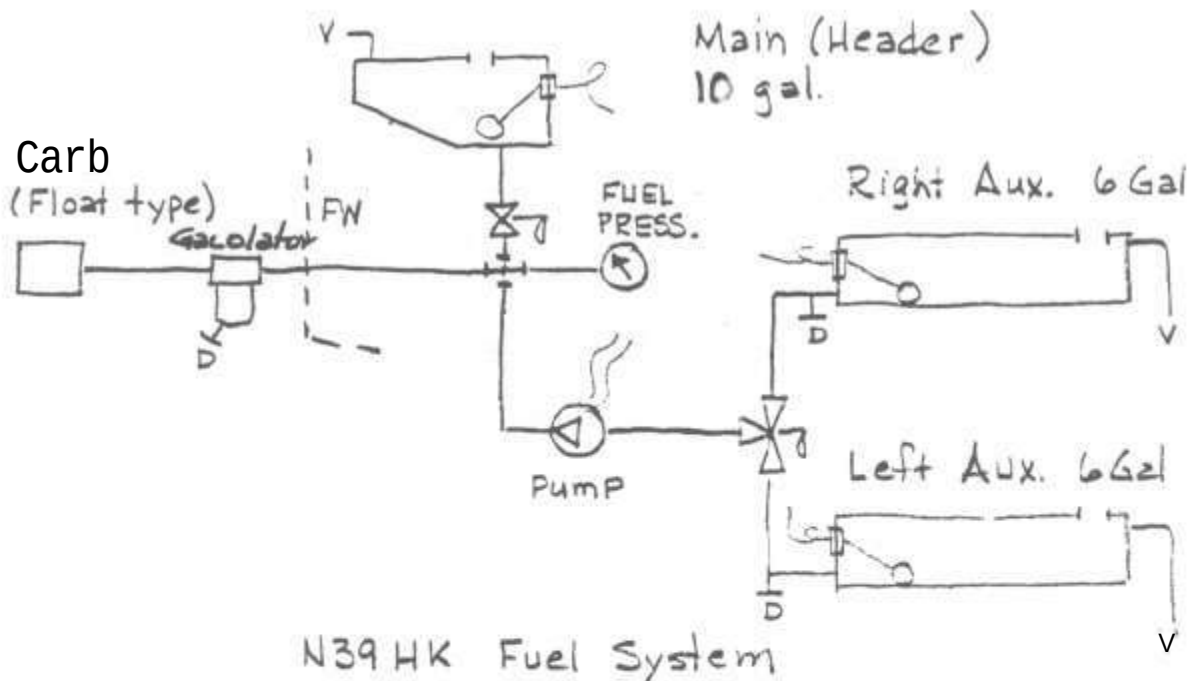
A Facet pump and aux tank selector valve mount on the front face of the main spar at the center of the cockpit. I can send pressurized fuel from the wings directly to the carb by keeping the header tank valve closed or I can draw from the header tank only by keeping the pump off and the header valve open.

The one drawback to this system is it requires the use of a float type or pressure regulated carb. I don't think that a Posa carb would deliver consistent mixture as pressures in the fuel system change.

This system holds 22 useable gallons. At a normal average fuel burn of 3.5 gph plus reserves, I have fuel endurance of almost 6 hours. This far exceeds my personal endurance so there is little point in building in more capacity. I always try to keep one of the aux tanks at least half full. I can use this pressurized fuel to overcome a vapor lock or partial blockage downstream of the pump.

Food for thought... happy building.

Howard Kaiser N39HK
1339 E. Carmen St.
Tempe, AZ 85283
602-839-6387



FOR SALE

KR-2, flown for ten years, 1918cc VW,
Super Posa Garb, stock empty weight 510
lbs. Alum, header tank, dual controls,
stock retract landing gear.
\$4,500.00

Earl Teporten
P. O. Box 579
Lakeville, MN 55044
612-435-7275

FOR SALE

KR-2 80% complete. All avionics and
instruments included. 1835cc Volkswagen
(running). Fixed gear taildragger. Moving
must sell. \$5,500.00 OBO.

Tony C. Crawford
9680 W. Olive, #93
Peoria, AZ 85345
602-979-6525 After 5 p.m./anytime weekends

FOR SALE

720 Channel NavCom. ARC RT-328 transceiver
with tray, cable and IN-14R omnihead in
operating condition. \$800.00.

Narco NAV-12 self-contained navigation
(Omni only) receiver w/glide slope
indicator. Fits in 3 1/8" dia instrument
hole. Requires about 10 inches behind
panel \$350.00.

Edo Aire RT-557 transponder with ACK A-30
encoder with cables and antenna.
Transponder fits in 3 1/8" dia instrument
hole. Requires 11 inches behind panel.
\$800.00.

Al Ross
P. O. Box 474
Rimrock, AZ 86335
602-567-5527

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 170 JULY 1991

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413



KR NEWSLETTER

ISSUE NO. 171

AUGUST 1991



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



RICHARD LINO'S N8575C "BEST KR-2" OSHKOSH 1991

Richard Lind from Santa Margarita, California received "Best KR-2" award at this year's Oshkosh event. Richard's plane was completed one year ago and is powered by a Revmaster 2100, 80 HP, turning an Ed Sterba 54 x 50 prop. Empty weight 688 lbs., gross 1122 lbs. Cruise 129 knots, landing 60 knots. Carburetor is a Revflow, paint is Sterling. Richard's KR has a full IFR panel with a Fly Buddy Loran. Landing gear is Rand Robinson fixed one piece. Richard said the flight to Oshkosh was uneventful except for a plane that cut in front of him while taxiing at Oshkosh causing him to nose-over and lose a prop. Richard had to wire back to California for his other prop in order to return home. If you would like more information on Richard's plane, you can contact him at:
33 Calle Malinda, Santa Margarita, CA 92688 Phone 714-858-9275

FROM THE EDITOR....

Oshkosh 1991 was another big success for not only the EAA but also the KR group.

Twelve KRs flew into Oshkosh and numerous individuals attended the Forum as well as the KR Dinner.

Steve Bennett of Great Plains Aircraft, and his wife, Linda, once again hosted the dinner. Jeannette Rand presented Steve with an award for his many years of coordinating the Oshkosh KR dinners.

We would also like to extend our appreciation to Steve and Linda for their many years of support to KR community.

Judy and I had a great time at Oshkosh meeting so many of you who have been a part of the Newsletter.

We would like to take this opportunity to thank all of you who have submitted articles to the Newsletter! Your support is greatly appreciated.

Love Judy



JEANNETTE RAND AND STEVE BENNETT



**JEANNETTE RAND PRESENTING AWARDS TO
RICHARD LIND "BEST KR-2" (LEFT)
JIM EVANS "BEST KR-1 AND LONGEST DISTANCE"**



**JIM EVAN'S N8020B "BONDO BOMBER"
LEWISTON, CA**



RICHARD RING'S N25RR, PRATT, KS



CLYDE WETHERBEE'S N817CW, WAUPACA, WI



GALE DEROSIER'S N4263Q, CRYSTAL LAKE, IL
(SOLD HIS PLANE AT OSHKOSH TO A 727
CAPTAIN FROM GREECE)



TODD UNRUH'S N81BP, PORT ORANGE, FL



INSTRUMENT PANEL OF GALE DEROSIER'S N4263Q



ROGER BULLA'S, N4207Z, GRAND JUNCTION, CO



N88PS UNKNOWN

RESPONSE TO "MAY DAY" ARTICLE

This letter is written in response to Joe Manning's "May Day May Day KR-2 Builders" letter in March, 1991 KR Newsletter #166. He voiced concern over the handling characteristics of the KR and wanted comment on his proposed mods to correct this.

Relax Joe, you did well to ask. I hope other builders and readers of this Newsletter will respond to your questions. My response is just one opinion.

I read every back issue available during construction of my KR project. The numerous tips and flight reports offered great insight into the strengths and weaknesses of this design. A clear message emerged after reading over 100 back issues several times over: This airplane is SMALL and it is a HANDFUL both in the air and on the ground.

My first suggestion is to forget about flying with two full grown men on a regular basis. This plane really should be renamed KR-1.5. It is NOT a freight hauler. You and your son may enjoy each others' company but I assure you that the father-son bond will be stressed in this airplane. Better that you alternate trips upstairs so that each may enjoy the true spirit of this machine. If you positively must be joined in the sky, better think about another design before you get too much invested in the KR.

I am concerned when I read about people who want to radically modify the airframe. The proposed changes mean extra weight. Attention to CG may guarantee static balance but there are several additional factors to consider such as airframe loading and aerodynamic stability. Increased gross weight means decreased load limits if the existing wing structure is retained. The original design load limits of +/-7G may actually be less than normal capacity (3.8G) in the modified design. You really won't know what the structural effects of these changes are until you perform detailed calculations ahead of time or until you fly into some turbulence in which case it is too late! You also can't be sure of the affects of fuselage stretch and stab enlargement on the static and dynamic stability. In short: This design ain't broke, so don't fix it!

The sensitive nature of the controls is not necessarily a problem if the pilot has properly prepared himself to cope. This means that low-time Cessna drivers are going to be SURPRISED. Get some dual in a taildragger, preferably a small one like a Pitts S2. Learn the idiosyncracies of conventionally geared, short coupled airplanes, then spend more time than you can stand doing low and high speed taxi tests in your airplane. And for heavens sake, buy a copy of the FAA's MOST EXCELLENT circular #AC-90-89 "Amateur-Built Aircraft Flight Testing Handbook". It's available for a couple of bucks from:

U. S. Gov't Printing Office
Washington, D. C. 20402

If you have done a good job building your project, this handbook will help you to keep it in one piece.

Howard Kaiser N39HK
1339 E. Carmen St.
Tempe, AZ 85283
602-839-6387



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD OSHKOSH WI 54903 3086
PHONE 414/426-4800

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN
INDIVIDUAL COPIES \$1.50 EACH.

MORE GOOD PIECES
Article 5, VW Engine Series

Last time I went out on a limb and suggested a particular camshaft for use in the Volks aero conversion. I hope this has stirred some activity within the Newsletter. Keep in mind the reminder that it's only me out here doing the writing and I'd like to learn what other builders have had success with using. If any of these articles stir you up enough to respond, then the whole effort has been a success. Now let's get back to the shop...

LIFTERS: A new camshaft will require a new set of lifters. The stock iron VW lifter is more than adequate for aircraft use. The wide base lifters occasionally offered do nothing for the engine but, due to their additional weight, could require more valve spring to keep them tracking the cam lobes. This just wastes precious horsepower that won't get turned into thrust. Keep your engine light just as you do your airframe.

By the way, reground lifter sets are no bargain as the surface hardness required for camshaft compatibility is lost during the grinding process.

Hydraulic lifters are available as options for some VW conversions. Outside of not having to check and adjust the valves every twenty-five hours, the hydraulic system does nothing except offer a slightly quieter running engine. I personally would rather know what was going on under those valve covers and simply keep the big bucks required in my pocket.

PUSHRODS: Put off buying the pushrods until after the critical deck height measurements have been made on the assembled longblock. After selecting a compression ratio for your engine and calculating cylinder shim needs, you may or may not be able to use the stock length VW pushrod. Engines set up for reliable lower ratios and/or those using over .060 in shim thickness will usually need custom length pushrods to maintain valve train geometry. Keep your fingers crossed as custom cut rods are usually about triple the cost of factory replacements.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871

DIGITAL OAT AND CARB TEMP

The \$14.95 Radio Shack No. 63-842 digital indoor/outdoor thermometer is a natural for homebuilt aircraft, and many are in use. Small size (2x2 1/4 x 1/2") and good accuracy, lend it to many aircraft uses such as checking the temp of your magneto or accessory case. The original thermistor, intended for outdoor readings, is on the end of a rather long wire, while the other is inside the case for indoor readings. The usefulness of the unit can be enhanced by putting the inner thermistor on a wire so it also can read a remote temperature, such as carb temp.

Open the case by removing three small screws and carefully remove the back. If the digital readout comes loose, be very careful not to touch the contact areas. Use solder wick to remove ALL solder from around the leads of the indoor thermistor and CAREFULLY remove it. Use two conductor wire, preferably teflon for heat resistance, to remote the sensor to the carburetor. Use shrink sleeving on each thermocouple lead, plus over both leads to insulate the wire, both electrically and thermally. Drill a small hole in the case to put the wire through. Since thermistors, not thermocouples are used, the sensor wires may be shortened or lengthened as required.

To read carb temp, locate a position behind (downstream of) the butterfly or slide of the carb and drill a hole just large enough to accept the shrink sleeving. Insert the thermistor about 1/8 inch into the airstream and secure with wet micro or floc. A connector may be installed at a convenient point if desired.

If you do not want to perform the necessary surgery to make this mod, send \$30.00 with the required lengths of the two wires, along with your name and address and I will send you a modified unit ready to install, postpaid within the continental U. S.

Al Ross
P. O. Box 474
Rimrock, AZ 86335
602-567-5527

1991 KR GATHERING

The 11th KR Gathering with a special invitation to all Sonera Aircraft will be September 13-15 at Kentucky Dam Village State Park, Gilbertsville, Kentucky. It is located 25 air miles S. E. of Paducah, Kentucky in the area call "Land between the Lakes". It is also approximately 100 miles North of Memphis, Tennessee. The runway is 4,000 feet long by 100 feet wide and hard surfaced. There is night lighting and fuel on site. Bring your own tie downs.

I have reserved 40 rooms and 10 cabins. Rates are:

40 rooms in lodge	\$43.19 single
	52.38 double

10 cabins (5) 1 bdrm	\$65.25
(5) 2 bdrm	74.44

(cabins are fully stocked)

For reservations call:

1-800-325-0146
Kentucky Dam Village State Park
P. O. Box 69
Gilbertsville, KY 42044

Be sure and state that you are with the KR Gathering, otherwise you will find out the place is booked solid. There are places around the park, to mention a few: Fox-Fire Motel, KOA Campground, Ramada Resort, Belair Motel.

Tentative schedule:

Friday: Arrivals, fun flying, technical meeting & assistance after dinner

Saturday: Morning-judging of aircraft
afternoon- spot landing contest
evening- awards dinner at lodge

Sunday: Fun flying and departure

Program chairman:

Keith James
1328 E. 45 Place
Tulsa, OK 74105
918-749-8085

N1055A FOR SALE

KR-2, built in 1973, 1918cc VW 70 hp, Super Posa Carb, empty weight 510 lbs Alum, header tank, dual controls, stock retract landing gear. Burns 3.36 gallons per hour at 75%, 140 TAS, 900 FPM climb. With extra bubble canopy.
\$5,500.00

Earl Teporten
P. O. Box 579
Lakeville, MN 55044
612-435-7275



1992 EAA OSHKOSH ROOM RESERVATION REQUEST FORM

PERSONNAL NOTE FROM: Gladys Muse
219/4- Freydale Road
Marietta, Georgia. 30067
Tel. (404) 973-3150

So that I may send the collective reservations to Gruenhagen Conference Center by the required date of Nov. 1, 1991» your reservation must be received on or before October 15, 1991- Any reservation request received after that date will be forwarded to Gruenhagen and hopefully included in our group. I am requesting 30 rooms be held for the KR Group, these will be on a first come basis.

The balance payment is due by July 1, 199² and will be the responsibility of each person making reservations.

Please make your check payable to: Gruenhagen Conference Center

See you in Oshkosh hopefully,

Gladys Muse
Gladys Muse

1992 EAA RESERVATION REQUEST FORM

Last Name ; _____ First Name _____ MI. _____

Street Address _____

City _____ State _____ Zip code _____

DAYTIME Telephone Number _____

Please circle and write your desires ARRIVAL AND DEPARTURE dates

Before	Wed.	Thr	Fri	Sat	Sun	Mon	Tues	Wed	Thr	Fri	after
29th	29	30	31	1		3 ^ 5		6 7			7th

Desired arrival Date; . _____ Desired Departure date _____

Number of rooms: Cost per room per night
_____ Double(s) \$27.00
_____ Single(s) Amt. enclosed ip _____

A deposit of \$27.00 is due for each room reserved. If full payment is not enclosed balance is due on or before July 1, 1992.

For medical reasons I wish
to be:
on the first floor
in a hall w/elevator
special Request: _____

KR PROJECT FOR SALE

Approximately 60% complete. On gear. RR premoulded components. Revmaster 2100D Turbo., starter, alternator, oil filter, oil cooler and more. KX 145 Nav/Com 720 Channel. Loran. Basic flight instruments. Just about to finish except fiberglass, epoxy and some foam. Get a head start for less than the price of the engine alone. \$4,750.00

Martin Luker
5819 Rue Burgundy
San Antonio, TX 78240-2342
512-697-9683

FOR SALE

Retractable gear for KR-2. Complete with wheels, mechanical brakes and tires. \$320.00 OBO Call:

Andre Stephani
6114 France Ave. So.
Edina, MN 55410
612-920-7828

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 171 AUGUST 1991

FOR SALE

KR-2 in boat stage. Have MAPI cowling and gas tank, spars completed and done as per Diehl wing skins specifications. Also have other materials. \$1,200.00 for everything. Contact:

Jim Evans
1191 South 2nd
Lander, WY 82520
307-332-7583 after 5 p.m.

WANTED

Complete, unused aluminum extrusion kit including all castings for retract. Canopy, unused. Must be reasonably priced and on the East Coast. Contact:

Ken Jordan
328 Green Ave.
Carney's Point, NJ 08069
609-299-0498

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



FRANCIS NEFF'S N20FN, KR-1 1/2, MONROE, IOWA

The following is Francis Neffs "Adventure In Homebuilding - The KR 1-1/2", as told by Francis Neff. Note: Builder is 6'3" and weighs 250 pounds.

In the March, 1974 issue of "Air Progress" there was an article on Ken Rand's KR-1 plane. At that time we (myself and my family) were living in El Cajon, California. From information in the article, I noted Ken Rand was in the Los Angeles area. Being a Service Representative for a heavy equipment manufacturer, I was servicing California, Nevada and Hawaii. On a business trip to Los Angeles in June, 1974 I met Ken Rand and discussed his plane. At the end of our meeting, I bought my set of plans for the KR-1... the 1422nd set Ken had sold as of that date! Then I ordered the Sitka Spruce Kit from Aircraft Spruce in Fullerton, CA. A couple of weeks later, I started cutting wood to requirements. Thus, my KR 1-1/2 was started

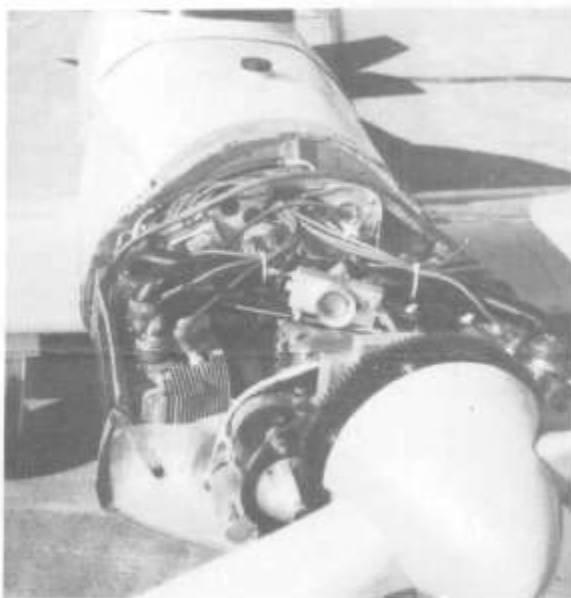
When I ordered the wood kit, I ordered the outer wing spars one foot longer. I worked at building my plane an average of one day a week until September of 1976. My plane was trailered over the next six years from CA to TX to KY. I lost a lot of building time during this period.

The original design I had in mind was to use a 110 HP Corvair engine with a direct drive prop and no electrical system. The original plan was to use a magneto ignition system. As building and time progressed, I found out about a gear box reduction for the prop (designed by Bud Rinker in CA). A friend of mine had a set of plans he wasn't planning to use, so he gave them to me. The plans called for a rear wheel gear box from an old V.W. bus. I finally found one with 1.4 to 1 reduction. I changed plans by using Timken bearings on the prop shaft (original bus axle shaft) instead of ball bearings (better thrust characteristics). Also lubed front bearings from engine oil. A brake drum is cut down to make prop hub. About the time I went with the reduction box, I decided on an electrical system, as hand propping an engine with the prop out of time with engine is tough. Additional weight of the starter and alternator moved the CG ahead. I installed a battery in back of the seat to get the correct CG. The one reason for a Corvair engine was more HP than a VW plus more weight. I figured I needed both to carry a larger pilot to get CG right.

With addition of electrical system, I decided to use standard distributor ignition system. I figured in order to get drive hook up for magneto, I would build in more problems than the distributor would ever give. Equipped engine with Super Posa Carb. (in flight mixture control) and 40 amp alt., starter, etc. Has belt driven vacuum pump for vacuum gauges.

The engine is equipped with standard mechanical fuel pump, pulls fuel from top fuselage tank - also gravity with top tank 1/4 full. In-line filter, pressure regulator (for Posa Carb) and vacuum fuel shut-off in front of carburetor. Regulator set to 1 P.S.I. Sediment bowl is located in left engine cowl tear drop, back of fire wall. Drains through tube at bottom. (Cessna 170)

Three fuel tanks, one 8 gal. top front of fuselage and two 6 gal. tanks located inner wing section each side. All tanks have mechanical fuel gauges. Top tank gauge visible in instrument panel and



**MISTAKES
N18GKR "THE DREAM MACHINE"**

Inner wing tanks visible looking out through canopy bubble. Electric solid state fuel pump, pumps fuel into top fuselage tank.

Vacuum instrument gauges are: Turn and bank, artificial horizon (3-1/8) and directional guidance (vertical card).

Electric gauges are: Cylinder head temperature tachometer, oil pressure, oil temperature, hour meter, volt meter and clock. A maintenance-free battery, vented to outside -- automotive 390 amp. hr.

I added approximately 13" to each wing, making wing span 19'4". I covered both sides of main spar versus one side. Made wing ribs out of 1/8" plywood versus foam ribs. Leading edge of wing has three (3) layers of dyne! and rest of wing one (1) layer. Dynel and epoxy resins were used as composite throughout plane, except for wood portions. Elevator has trim tab. The retractable landing gear has automatic covers. The brakes are standard KR, with expanding shoe, mechanical, heel operated.

I widened fuselage of pilot compartment four (4) inches at top and two (2) inches at bottom for more room. The seat used in my plane is a swivel boat seat with swivel removed. Every part of the plane I hand made with exception of machine work done on gear reduction box and prop hub. Mr. Bud Neat, Practical Mechanics, Inc., machined parts for the reduction box and the prop hub (very expertise). Bud built and owns a "Baby Great Lakes".

Specs:	KR-1 Design modified (KR-1 1/2) S/N 1422
Length:	14'6"
Span:	19'4" Now mod to droop tip 20'10"
Empty Weight:	655 Ibs.
Gross Weight:	1055 Ibs.
Engine:	110 HP Corvair
Carburetor:	Super Posa
Fuel Capacity:	20 gallons
Top Speed:	200 mph
Cruise Speed:	180 mph
Stall Speed:	70 mph
Prop:	Warnke 52 x 70

Francis Neff
R. R. 1, Box 214A
Monroe, IA 50170
515-259-3088

Mistakes! I feel that with the vast numbers of them made by me, I am experienced in all forms of mistakes. From the start with my size I should have built a KR-2, instead I decided on the KR-1 and made my next mistake. They tell you not to make changes, for this one I feel a national disaster coming on.

I planned to have my dream machine well under way by the time anyone found out. Wives are funny about these things. Figured she would up the insurance to cover the cost of planting me, until she saw the "nice" (what she called it) coffin I made for myself. As time and interest increased, I found many new ways to waste both. Like the hand made canopy. I still have Lexan plastic stuck to the floor that, like epoxy, will outlive any attempt to remove it...except where we want it to be. The building of my KR has netted lots of new friends and all are, to be sure, the best of the best. But every once in a while you can find that one person that can, with the best of intentions, lead you down the Prim Rose Path to mistakeland. Needless to say, after producing some of the finest "junk" made by man, finding it unnecessary to my needs and worse yet... unreturnable! Anyone want to buy a used Prim Rose Path? A friend described his KR a 102% complete. I add on depending on what you find wrong today. Take the case of the throttle quadrant purchase by me to increase the "fighter feel". Only feel I got after frustration of days of work to get it to work, was panic when on the first tryout, it stuck open, not part way but all the way with Federal boy watching. Good for the heart my wife tells me. The reason for sticking, too much me...not enough cockpit!

Another wonderful builder of pucker power, came on a bright winter day as I sat with my new engine running. What the heck... might as well untie and get a little taxi time without wings..no danger of take off. I can run down this hanger row with no problem. Near as we can figure, I almost broke the Wright Brothers first flight record. I did brake a prop, a crank shaft, a world record for hand towing an aircraft backwards on ice with slippery boots and embarrassment. What I did not brake was my track record for mistakes. (Cont'd next page)

I continued unabated in my quest and produced some of the finest flexible cowling known to man. So flexible in fact that some is still in use as sling shot bands. To-date, I still have not mastered the perfect cowl.

Onward and upward to still more wonders (Bo/Bo's)! I am now on the fourth canopy glass in line of succession. First try, hand made rails. Completed they looked and worked like the wreck of the old 97. Lets try back tilt, part of this plan, after no lock could be found to hold it down are still in place on the front porch swing (works fine). Well so everyone has a side hinge, "so I guess so will I"! For a period of time not to exceed the first hot day you open it to get ventilation, you know maybe KR's were meant to be open cockpit aircraft! Fourth attempt get some pro help! So far the war surplus draw hinges are holding fine on the slider canopy.

Did you know that paint doesn't match from one batch to the next? Well, we were asked, to make up and submit items to our Newsletter. I hereby add this list of advice to all. Mistakes are out there waiting to happen. Try to make the best of them and look for some good in them. **After all even doing nothing can be a mistake sometimes.**

Dick Dougan
2317 Hedge
Waterford, MI 48327
313-666-1185

POSTSCRIPT TO DICK'S ARTICLE:

I wish I could say everything turned out okay on Dick's KR. He called me last night with the final installment.

He had been sharing a hanger with a guy who owned a C-172. Dick didn't know it but the guy had worked himself into a bad financial situation. Dick found out how bad when he went to the hanger one day (after returning from vacation) and found it and everything in it, including his KR, had been sold! His KR was sold to a school that cut it up for use as a flight simulator. The school was very apologetic and offered to at least give him his engine back (that is listed for sale in this issue).

Dick's wife said she's afraid he might take up bungee jumping as a hobby...with his luck, I don't think that would be a good idea!

FOR SALE

KR engine IS00cc 65hp
Porsche type 4
Great Plains conv.
Single mag, 52 x 58 prop
12" spinner, KR motor mounts
Starter. \$2,500.00 OBO

Contact: Dick Dougan

BUILDING TIP FROM KEVIN LAYDEN, CANADA...

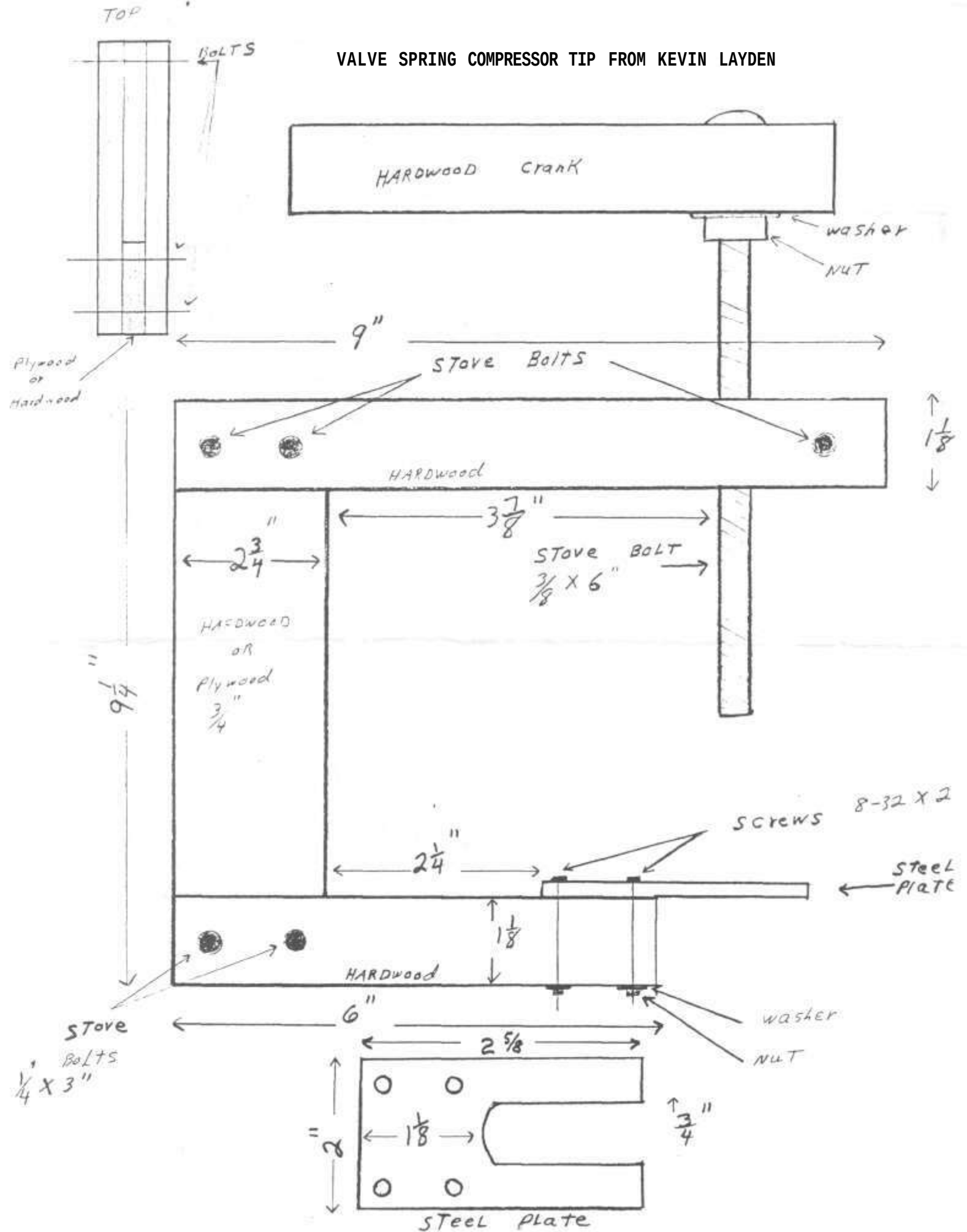
I have finished building a KR-2 (C-FKEV) and have put 70 hours on it in the past year. It took five years to build and I have enjoyed every minute of it. I will be submitting a complete story and pictures in the future. I have all the back issues of the newsletter and find them a great reference. I used many of the ideas and some of the modifications in the construction of my aircraft. It is time now for me to add a little something to the many great ideas builders have submitted over the years.

I am in the process of having my valve guides reamed out. The engine shop didn't have the proper reamer, so I had to order one for \$90.00, plus the cost of the reaming job. To save shop time I wanted to remove the valves but the valve spring compressor cost \$40.00. I thought I could save some money on the compressor by making one. It cost me about \$4.00 for the screws, I already had the wood and glue. It took about one hour to make. It works great. (See sketch next page.)

I used hardwood but I think plywood should work all around. The hole for the crank can be drilled small and tapped with the stove bolt. If you drill the holes in the wood for attaching the steel plate before you assemble everything you may find it easier than doing it after it's all together.

Kevin Layden
25 Pondicherry Cres.
Dartmouth, Nova Scotia
CANADA B2W 5C4

VALVE SPRING COMPRESSOR TIP FROM KEVIN LAYDEN



CONVERSION TO FIXED TRICYCLE GEAR

I researched all the available conversions and settled on the Diehl gear because it was complete with a nose gear unit and seemed to be the easiest to install in my nearly completed fuselage.

First I removed the Rand retracts and patched all the bolt holes with epoxy covered dowel rods. My next move was to enlarge the existing holes in the bottom wing skins and make a trial fit of the main gear castings. Next, I assembled the mains following Dan's instructions, which are adequate but were somewhat confusing to a dummy like me. For some reason I could not grasp the instructions on setting the toe-in and wheel alignment. I finally did get it all figured out and the gear legs, castings and axles went together beautifully. (I suggested a possible plans update or rewrite to Dan for the hardheaded like myself.)

At this point, I was really cooking, or so I thought! MM. Drilling the holes in the bottom of the spar was a snap, however, I could not get a drill to the top holes because of the top wing skins. I tried everything including a close fit 90 degree drill attachment, no luck. You have a choice here, either chop a hole aft of the main spar or chop out the leading edge. I chose the former.

After gritting my teeth and sawing out an access hole in the top skins, the drilling went smoothly and I installed both mains. They are beautiful and well worth the effort. The nose gear installation was so simple that even I didn't get confused. Just follow Diehl's instructions and you can't go wrong.

If you intend to use the Diehl gear, here are a few things which might simplify things for you.

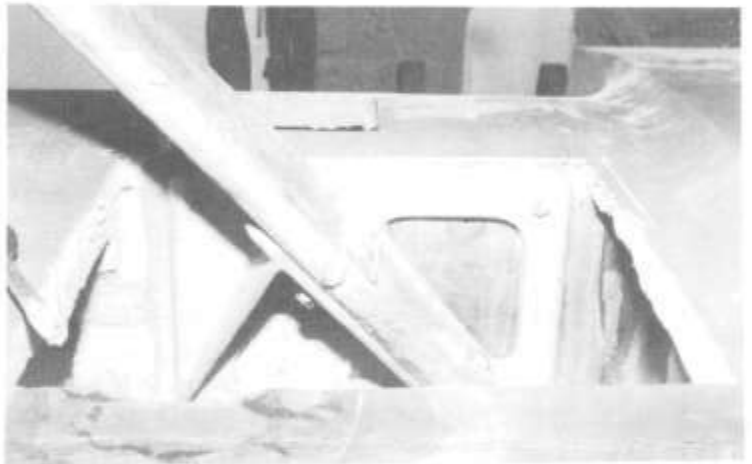
1. Unless Dan knows something that I don't, count on putting an access hole in your top stub wing skins to facilitate the spar drilling process.

2. Unless your spars are perfectly square to your fuselage centerline, be very careful about setting the wheel alignment with a square as shown in the plans. If your spars are slightly off, your alignment will suffer. I would recommend using Tony Bingelis' method (look in his book).

3. Be sure to patch all existing bolt holes and skin holes using approved methods.



TOP SKIN HOLE



BOTTOM ACCESS HOLE



COMPLETED

4. Don't be afraid to call Dan or one of the several fine folks who are always around his shop. They helped me on several occasions and even arranged to meet me on Saturday when I drove up to purchase my wingskins.

If any readers would like more info on the Diehl tri-gear conversion, please feel free to call or write.

Reece Daniel
5576 Squires
The Colony, TX 75056
214-625-7619

CON ROD CONNECTED TO THE CRANK BONE. . .
Article 6, VW Engine Series

No matter what final configuration your Volkswagen aero conversion takes, it will have the same basic interior components, be it a simple, hand prop non-electric or a full "bells'n whistles" turbo hot rod. Everything begins with a good, solid longblock assembly.

BEARINGS; Use only German manufacture bearings throughout the engine. The small price differential between the Teutonic components and their Brazilian counterparts is minimal. This is no place for low-ball purchases.

The latest camshaft bearing sets are offered with a double shoulder bearing for installation at the timing gear end of the shaft. The twin shoulder effectively doubles the bearing surface in this critical area of end play movement. Very cheap insurance.

CON RODS: Stock Volkswagen connecting rods are entirely adequate for the 1835 aero conversion. A brand new set of factory rods costs about ninety dollars. The box will say that the set is matched and balanced, but be careful. The last set of supposedly balanced VW rods that I took to be checked at the machine shop required quite a bit of metal to be ground off before they were exactly in balance. Add about fifteen dollars to the price of the rods for the balancing act.

Rebuilt rod sets stir up all sorts of emotions in folks. Some builders don't like them while others simply install new bearings and fly. One VW race shop I visited uses rebuilt rod sets in expensive engines that are regularly turned at 10,000 RPM without failures, yet these rebuilt rod sets are about half the cost of new parts.

Curiosity got the best of me so I spent time finding out what is involved in a good quality rebuild. In a nutshell, the rod is first stripped of its old main bearing and the wrist pin bushing is pressed out and discarded. After cleaning, the rod is magnafluxed and only the strong survive. Any rod that shows evidence of having a spun bearing is also thrown out. Rods then get the big end lightly honed, a new wrist pin bushing pressed into place and reamed to size, a bead blasting for stress relief, and new rod cap bolts. You'll still want to have them professionally balanced but the total costs will be about half the price of factory new. Lots of flying VW engines

using both style rods. An interesting choice of options.

HEADS: Go with the VW dual port heads. The two-holers will flow an additional 30 cubic feet of air over the single port variety, thus increasing the engine's potential output. This is bargain basement price horsepower. Volkswagen also produces a dual port head referred to as "041". These high performance heads have valves about 15% larger than the standard dual port head. Again, this increase in flow capability will produce additional power... up to a point, as a heavily ported big breather on an aero V can actual end up slowing down the airflow within our RPM range. This is not good.

Think of your engine as a big air pump. Any restrictions from intake to exhaust will slow down the air flow.

Fortunately, the VW aero engine is not saddled with a lot of plumbing. A tubular intake manifold supplies the "air pump" through a fuel metering device of some sort and another tubular system dumps the spent gases out. Very efficient. If it ain't broke, don't fix it.

VALVE COVERS: Two styles of rocker arm covers are available for the VW. Both can be made of aluminum for faster heat dissipation and a bit of improved cooling, however one type bolts on while the other is secured with a wire clip, or bail. I like the clip-on style because they seal well and rarely, if ever, leak oil. Should you elect to go with the bolt-ons, please be sure to drill the bolts, both under the cover and the exposed outer heads, for safety wire.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN
INDIVIDUAL COPIES \$1.50 EACH.

WANTED

Complete, unused aluminum extrusion kit including all castings for retract. Must be reasonably priced and on the East Coast. Contact:

Ken Jordan
328 Green Ave.
Carney's Point, NJ 08069
609-299-0498

FOR SALE

1 Set of brakes \$45.00 (Drums and brake assembly)
1 Bosch (#0001 160 002) starter \$65.00
Send \$5.00 for shipping

All of these parts have never been used, however laying around, they have some scratches. I took the brakes off to install a hydraulic brake kit. The plane has never flown.

R. W. Moore
P. O. Box 622
Toccoa, GA 30577-0622

FOR SALE

KR-2 in boat stage (except stabilizer framework). Spars built to Diehl specs. Includes Diehl wing skins and vert. stab. skins, firewall material, log, plans and more. Built like my life depended on it. \$1,200.00 for all.

Mike Rice
17228 E. 34-H
Newalla, OK 74857
405-391-4535

N1055A FOR SALE

KR-2, built in 1978, 1918cc VW 70 hp, Super Posa Carb, empty weight 510 lbs Alum, header tank, dual controls, stock retract landing gear. Burns 3.36 gallons per hour at 75%, 140 TAS, 900 FPM climb. With extra bubble canopy.
\$5,500.00

Earl Teporten
P. O. Box 579
Lakeville, MN 55044
612-435-7275

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 172 SEPTEMBER 1991

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO. 413

500 •
MONTE **MILLER**
1900 PARKSIDE DR.
DENTON, TX 76201



KR NEWSLETTER

ISSUE NO. 173

OCTOBER 1991



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



JERRY VANATTA'S KR-2, N85JV, NASHVILLE, TN

After spending five years building my KR-2, I finally got it to the airport. With the FAA inspection complete, the ground taxi process started. After about three hours, the engine quit. As it turned out, the mag drive that was bolted to the crankshaft came off and, to my surprise, I found that only one bolt held it on. This drive also drove the V-belt to the alternator and was clearly not adequate. A new part was machined that bolts to the flywheel and taxi testing resumed.

Cont'd 2

A few weeks later, I was doing a high speed taxi down an 8000 ft. runway when the plane lifted off the ground. In an attempt to put it back on the runway, I collapsed the gear, broke the prop and the tail broke off just behind the longeron double. I really was not happy with the ground handling of the airplane, so I took the opportunity to modify my KR. Based on information from other builders, I rebuilt it with a 24" tail extension, 9" wing extension and a fixed tri-gear. I used the Glasair I windshield and door glass in a canopy of my own design. Three years after the initial flight tests, I took it back to the airport.

Initial taxi tests with the modified KR were going well, the airplane tracking straight and smooth. With the 8000 ft. strip, I have plenty of room to fly down the runway and land. (By the way, my CG came out just right.) During high speed taxi tests, I lifted off at about 45 mph and flew approximately 2500 ft. at 5 ft. above the runway. The airplane did not have the pitch sensitivity that I had noted in the old configuration and roll response was great. My airplane empty weight is 680 lbs. At this point, I am really pleased with the airplane.

Now the bad news.

I mentioned before the problem with the mag drive. Well, that was the least of my engine problems. Engine temps were on the high side but static RPM was 3000 with a Sterba 54 x 52 prop which is good. However, I had problems with the carburation, which is one reason I chose not to climb out during taxi tests. I also noticed the exhaust on the right side of the engine was not as strong as on the left side. Therefore, I decided I had better do a compression check. Using a cranking compression check, I was shocked to discover more than 100 lbs. difference between the two left cylinders and the two right cylinders. After doing an initial check to see if the pistons were coming to the top dead center on all four cylinders, I found the two right pistons came further to the top. Suspecting the compression ratio was different on each cylinder, I pulled the heads. I was sickened to find the two right pistons were hitting the heads. As a result, both cylinders were cracked, rings were broken and the head had a hole burned through it where the front cylinder was cracked. This engine

only had a few hours on TT, mostly taxiing and run-in. It was built totally wrong- none of the cylinders matched in



compression ratio as a result of the deck height not being set. The engine was self destructing and may not have lasted the first flight. This complete engine was purchased from Custom Aircraft Engines, Sanford, NC at a cost of \$3,000.00 and all I have is a piece of S—. Had I not known something about how an engine should sound and took the time to tear it down, I may not be here to relate this problem. Custom Aircraft Engines is no longer in business in Sanford, NC.

If anyone has one of these engines, I highly recommend you not fly it until it can be torn down and thoroughly inspected. I know of one man in Chicago whose engine quit after about six hours, due to the mag drive coming off and another builder in Kentucky whose engine quit on takeoff. The airplane crashed and burned and the builder was seriously injured. He also had above six hours on the same make of engine. If anyone knows how to get in touch with Gilbert Duty of Custom Aircraft Engines, please let me know.

I am now in the process of getting new parts to rebuild the engine the correct way. The engine is a 2180 cc with dual mags and full electric. It will have a compression ratio of 8:1.

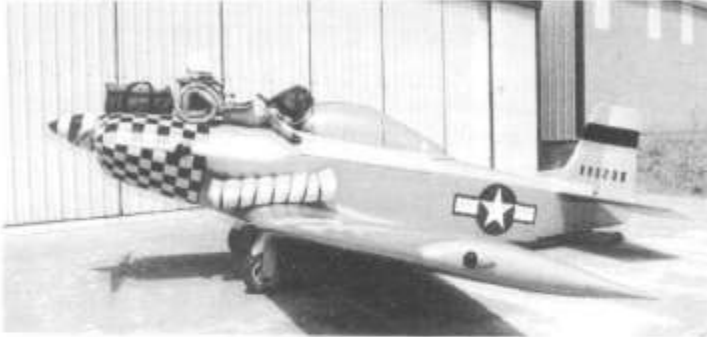
As soon as I get the engine going, I will keep you posted on the flying characteristics of my modified KR-2.

You may call or write:

Jerry Vanatta
3730 Clarksville Highway
Nashville, TN 37218
615-242-7716

BONDO BOMBER MAKES IT HOME

This is to report I made it home from Oshkosh and didn't break my bird. The photo was taken just after I landed at Weaverville. The purpose is to show just how much gear you can carry in a KR-1 and still fly. It does not include a roll of tools (maybe 10 pounds) that I carried strapped to the engine mount.



INTERESTING IDEA FOR BAGGAGE STORAGE

With a fuel load of up to 30 gals, I had an aft CG problem which I couldn't trim out but it was manageable. I flew two six hour legs, Weaverville to Rock Springs and return.

The Oshkosh experience as a participant was an eminently satisfying payoff for all the gluing, sanding, patching, painting and poverty I went through since I started my project in 1978. That includes the suppurating sores from epoxy rash. I enjoyed every minute of Oshkosh '91 except maybe the rainstorm. I highly recommend it to those who may be afraid to tackle flying into Oshkosh in a KR.

Some numbers: I flew at least 3,720 miles in 28.5 hours (13.5 going - 15.0 coming home). This figures out to an average ground speed of 130.5. The winds didn't help at all because my TAS was right at 150 mph (24 "hg and 2700 RPM). I used no oil, but 112.4 gals of 100LL (priced from a low of \$2.00/gal to a high of \$2.15/gal. This gave me a burn rate of 3.94 gph and a gas mileage of 33.1 mpg.

Discretion prompted me to ship my two trophies and my glass mug home by UPS (Jim's plane won "Best KR-1" and "Longest Distance Flown" to this year's Oshkosh event). No use overloading the airplane. Right?

It was great seeing everyone at the banquet.

James Evans
P. O. Box 345
Lewiston, CA 96052
916-778-3774

BUILDER WITH ANOTHER VIEWPOINT

I am Jim Gogniat from Watauga, Texas, a new KR-2 builder with another viewpoint.

On July 10, I was invited by Martin Roberts of Tulsa, Oklahoma to fly his Sun 100 Speedster (featured in Issue #167, April 1991). On this day, it was about 100 degrees outside and with the two of us in the KR, it was going to have to perform... and that it did! We used about 500' of runway and climbed out at a solid 750" per minute. This rate of climb was held to 3000' AGL, where we leveled off so I could get the feel of the plane in the rough summer air. It flew great! Martin's plane has the 2180 cc engine and he has adjusted the C.G. of the plane the proper way, with the motor mount, rather than lengthening the fuselage. With a 2" extension on the motor mount, the plane flew like a T-tail Piper Arrow to me. My experience is 8,000 plus hours with 4,500 hours of C-172 time flying traffic reports for three years and two type ratings. I am 5'10" tall, pant legs 31" and I had to stretch to reach Martin's rudder pedals. So there is plenty of room up front for your legs.

It seems to me that even a modest stretch of the fuselage would be unnecessary, even if you build the aircraft heavy, with modern day equipment necessary for safe flight.

I am working on the side frames of my plane at this time and am finding the work very enjoyable. I often wondered what a KR looked like getting to the boat stage.

I have found folks that build aircraft to be very helpful and to a first time builder, this is very important. Thanks everybody! Special thanks to Martin Roberts for the ride, Monte Miller for the sander and supplies... and boy, talk about builder support! Thanks Jeannette for leading me to these builders!

James Gogniat
6212 Blossom Dr.
Watauga, TX 76148
817-498-0116

WANTED

Diehl wing skins. Contact:

Ray Dean
Rt. 1, Box 59
Melvin, IA 51350

GUIDE AND CLAMPING BLOCKS

When I first started by KR-2, I found the instructions on how to layout the fuselage sides to be a little lacking. The idea of using finish nails along the top longeron and bottom longerons to hold things together while the glue set didn't seem too precise. Luckily I had all the old newsletters going back to issue #1 and found the answer I sought in issue #18 (submitted by Bill Gidden). I have drawn a representation (see page 5) for those who may not have access to all the issues. I made the guide blocks and clamping blocks out of scrap oak. The type of wood is not critical but it should be hard enough so it will hold the threads under clamping pressure. The clamping blocks are drilled and tapped for a 1/4-20 screw and some pilot holes are drilled to allow easy nailing and more importantly the subsequent removal of the nails from the worktable. The guide blocks are also drilled in a like manner. The guide blocks are nailed along the layout line for the top longeron, one at the intersection of each vertical and two at the firewall vertical to hold its position. As the verticals are fitted, the clamping blocks are progressively installed, leaving a small space between the clamping block and the longeron for a small scrap of wood (to prevent damage to the longeron). After the fitting is complete, the clamps are loosened and glue is applied to the verticals and they are refitted and the clamping screw is tightened enough to squeeze out excess glue (don't forget your wax paper under the joints).

The original article suggested using the clamps and blocks for the diagonals I have also drawn a sketch of how this could be done. I chose to install all the verticals first (carefully wiping off the excess glue) and let them dry before installing the diagonals. After the verticals had dried I installed all the diagonals and gusset blocks (after applying glue) and used rubber bands to apply clamping pressure (not much is required). After both sides are made and the blocks are removed, save them for putting the fuselage sides together (more on that in the next installment).

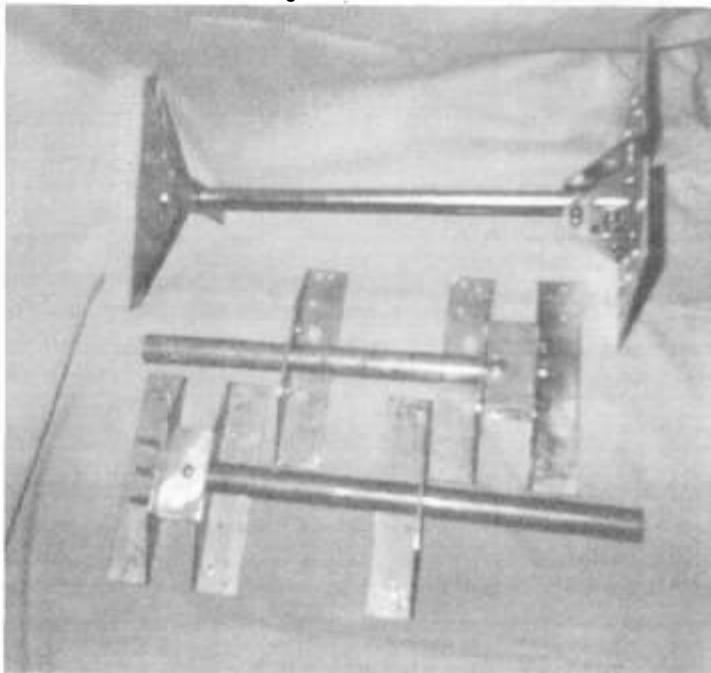
Any builders that wish to contact me are welcome; I'm not always home because I fly for a living but I will return all calls if name and number are left.

Jerry Pryce
549 Tipperary Dr.
Vacaville, CA 95688-9374
707-447-4349

FOLDING WING KIT AND PLANS

I have developed a folding wing kit and computer drawn plans for high and low wing airplanes. This kit was originally designed for KR airplanes, however, the design is so universal I can adapt the kit to most high and low wing planes.

By folding the wings one can put more planes in the hanger, or carry the plane home to save hanger rent or work on it.



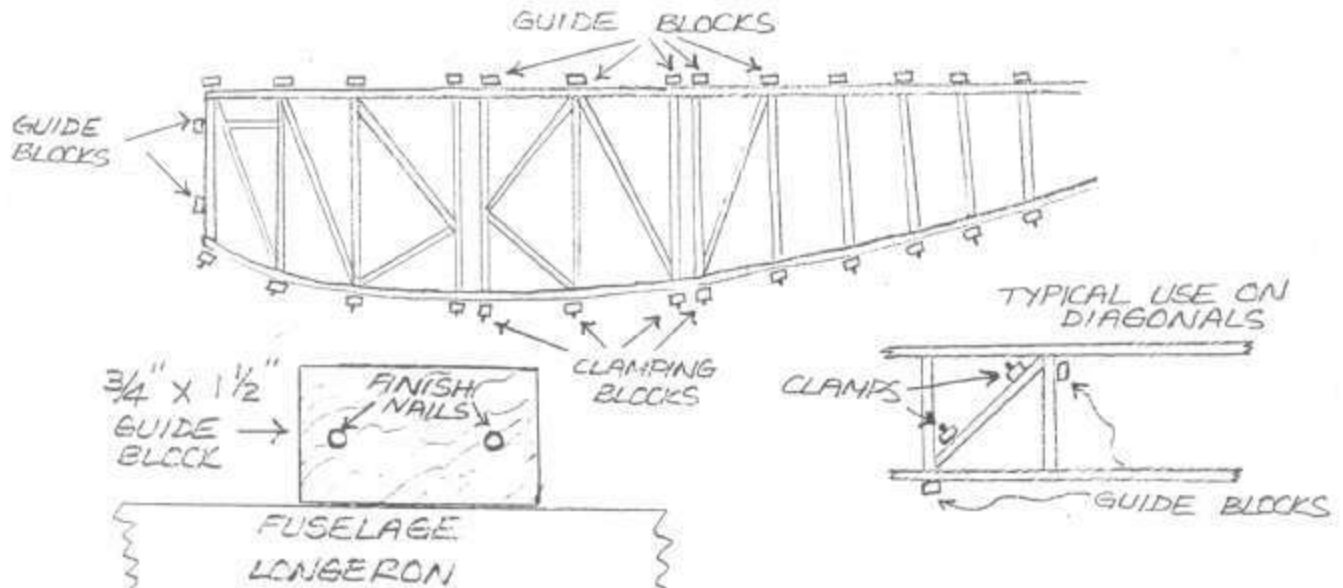
The kit will include both folding wing attachments and "The Second Man Stand" to hold up the wing so one man can hook up control linkage and the wing attach fittings etc.

The folding wing kit lists for \$169.50 and the computer drawn plans (10-11 x 17 sheets) list for \$49.50. The material kit to build the kit includes all bolts, angles and pipe. All the parts to build the kit sell for \$ 89.50 + \$10.00 S/H.

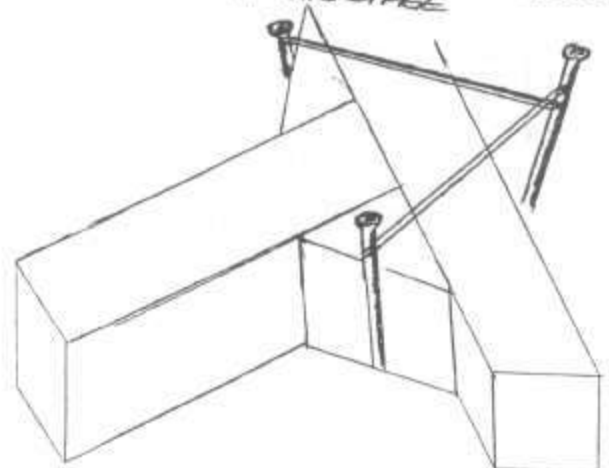
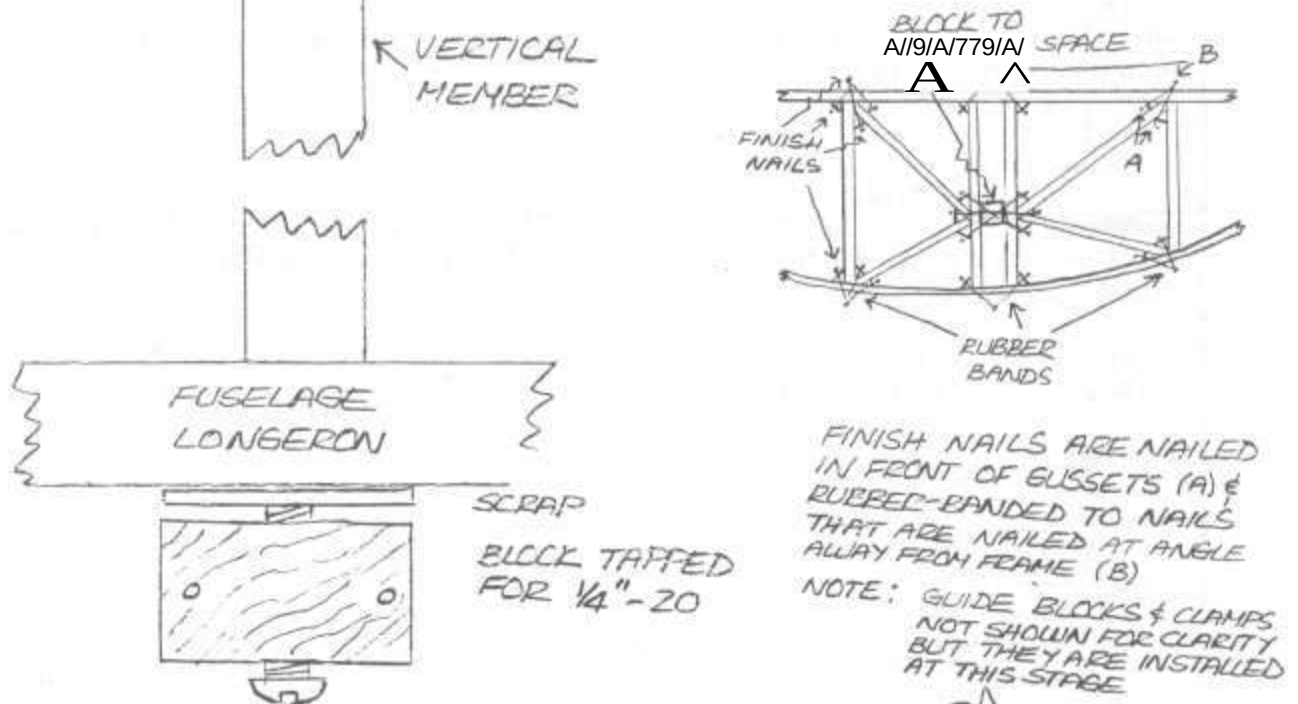
I pay UPS on the kit or \$10.00 S/H and the postage on the plans. Allow up to six weeks for shipment.

R. W. Moore
P. O. Box 622
Toccoa, GA 30577-0622

GUIDE AND CLAMPING BLOCK IDEA FROM JERRY PRYCE



OR.



MARK YOUR CALENDARS . , STAY TUNED FOR MORE INFO

October 13, 1991

Mr. Tom Poberezny
President, EAA
3000 Poberezny Rd.
Oshkosh, WI 54903-3086

Dear Mr. Poberezny:

I am writing on behalf of the 20th year KR Anniversary Committee. Twenty years ago, Ken Rand designed and began production on the first KR homebuilt aircraft. The KR is one of the oldest, successful homebuilt companies in the country.

In memory of Ken Rand and the contribution that he has made to the homebuilt aircraft industry, our committee is requesting permission for a special commemorative fly by of the KR's present on either Saturday or Sunday during the air show. In addition, we would like to fly a "missing man" formation at the conclusion of the fly-by. We could expect 30-40 KR's to be present, should you grant our request. Our committee feels that this would be appropriate and in keeping with the philosophy of the EAA, in addition, we feel that it would be an added attraction that all homebuilders in the audience would enjoy. If possible, we would like a decision by December 1, 1991 so our committee can begin planning the event.

I would be happy to provide any further information. Thank you for your help and consideration regarding this request.

Sincerely,

VXrv, -For Your Info

Jim Faughn
Committee Member
5615 Botanical
St. Louis, MO 63110

Additional Committee Members

Steve Bennett
Great Plains Aircraft
PO Box 304
St. Charles, IL 60174

Herb Bull
1450 Northwoods Dr.
Deerfield, IL 60015

Dan Diehl
Diehl Aeronautical
1855 North Elm
Jenks, OK 74037

Earl Teporten
Editor - KR Newsletter
P.O. BOX 579
Lakeville, MN 55044

EZE CEECEE
Article 7, VW Engine Series

Building your own Volkswagen aero conversion engine is a relatively easy experience. A buddy once said that he thought he could accomplish the task with little more than a flat blade screwdriver and a ballpeen hammer. I believe he was really referring to his Harley, but...

As the engine's top end begins to come together, it will be necessary to determine the displacement of each individual combustion chamber within the cylinder head. This information will be plugged into a formula that will ultimately give you the engine's compression ratio. Compression ratios are extremely important to the life of a Volkswagen engine and should never be taken lightly.

The actual procedure is very simple and quick but you'll need to gather two oddball items beforehand. The first is a disc of eighth-inch clear plexiglas that will fit the head to cylinder sealing surface. It will need to have a one-quarter inch hole drilled into its center. Fortunately, a simple flycutter will make quick work of this item. Check the local glass or hardware store for some scrap plex.

The second item is a syringe with at least a 60 cc capacity. Don't panic, the local farm and ranch store will have a big plastic one. No needle required.

Proceed as follows to determine the displacement of your particular cylinder head combustion chamber. Note that most VW chambers will cc out at 50 to 55 cc.

1. Install an old spark plug and place the head (with valves installed) upright on the workbench.
2. Lightly grease the machined sealing surface and press the plexiglas disc into place.
3. Using the syringe, fill the head with cooking oil and note the volume required.
4. Repeat the procedure for each chamber, remembering to write down the measured volume.
5. A 1 to 2cc difference in volume does not warrant the machining of each head for a perfect match.

Here's some formulas you will need during the construction of your engine along with an example for each:

Displacement formula

Bore X Bore X Stroke X .0031416 =
Displacement

Example:

92 X 92 X 69 X .0031416 = 1835cc

Deck Volume formula

Bore X Bore X Deck Height (center of
piston at TDC to top of cylinder)
X .01996

Example:

92 X 92 X .050 X .01996 = 8.45cc

Compression Ratio formula

One (1) Cyl Disp + Deck Volume + Head
Volume

Deck Volume + Head Volume

Example:

459 + 8.45 + 50 = 517

8.45 + 50 " - 58.45 = 8.8:1

(Compress. Ratio)

Using cylinder shims, the deck height can be adjusted to attain the compression ratio of choice. For reliability and all around performance, a compression ratio of 8.0:1 is a good choice.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN
INDIVIDUAL COPIES \$1.50 EACH.

FOR SALE

KR-2 in boat stage (except stabilizer framework). Spars built to Diehl specs. Includes Diehl wing skins and vert. stab. skins, firewall material, log, plans and more. Built like my life depended on it. \$1,200.00 for all.

Mike Rice
17228 E. 34-H
Newalla, OK 74857
405-386-2051

FOR SALE

Handmade, laminated "Prop Clocks". These are practice props we made learning how to use a prop machine to make props for some of our KR-2 planes here in Arizona. Fine quality, stylish only \$175.00 or will trade for KR parts. Also need a spring bar (used may be ok).

Roscoe Hardy KR64591
HC 64, Box 210
Rimrock, AZ 86335
602-567-4935

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 173 OCTOBER 1991

FOR SALE

KR-2 Fuselage on gear. Controls in, horiz. stab glassed, wing spars completed. Reasonable offer. Too many projects. Contact:

Kerry Cartier
108 Creekview Dr. W.
Red Oak, TX 75154
214-617-3901 evenings 214-372-7084 work

KR-2 FOR SALE

KR-2, built in 1978, 1918cc VW 70 hp, Super Posa Carb, empty weight 510 lbs Alum, header tank, dual controls, stock retract landing gear. Burns 3.36 gallons per hoi/P*Qit 75%, 140 TAS, 900 FPM climb. With extra bubble canopy, transponder and misc. equipment. \$5,500.00 or best offer.

Earl Teporten
P. O. Box 579
Lakeville, MN 55044
612-435-7275

FIRST CLASS
U.S. POSTAGE
PAID
LAKEVILLE
PERMIT NO: 413

500
MONTE MILLER
1900 PARKSIDE DR.
DENTDM, TX 76201



KR NEWSLETTER

ISSUE NO. 174

NOVEMBER 1991



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



MIKE LATIGO. OKLAHOMA, N1977M. WON "PEOPLE'S CHOICE" AND "BEST ENGINE INSTALLATION" AWARDS AT THE 1991 KR GATHERING

Some thoughts on the KR Gathering this year in Kentucky. It was fun and really hot. From September 13-15 was a gathering of KR builders, pilots and enthusiasts in Gilbertsville, Kentucky. Martin Roberts spent eight hours Saturday giving rides in his KR-2.

Saturday was judging and the Spot Landing Contest, plus a lot of fun flying. The spot landing contest was won by landing within six feet of the mark. Others floated for 200-300 feet before touchdown. Other awards given were: Mac McConnell-Wood from England and John Sheaffer from Hawaii for "Longest Distance Traveled", Norm Leonard from Wyoming won the award for "Longest Distance Flown in a KR". Willy Wilson from England for "Best Photo Album". Ed Sterba Propellers donated the prop mounted award shown above for "People's Choice" award. We decided to go back to Covington, TN for next year's gathering. I'll prepare an announcement at a later date. Special thanks to everyone who worked on putting this event together. Photos with awards on next two pages.

Keith James, Program Chairman
1328 E. 45th Place
Tulsa, OK 74105
918-745-8085



DAN DIEHL RECEIVING "BEST KR-2" AWARD
FROM JEANNETTE RAND



DAN DIEHL, OK N4DD, OL¹ BLUE "BEST KR-2"



NORM LEONARD'S N5826A,
"LONGEST DISTANCE FLOWN" (WYOMING)



DON BETCHEM'S N250KB,
"MOST INNOVATIVE UTILIZATION OF A KR"



OVERALL VIEW



TOMMY WAYMACK, AR N995BG



KEN COTTLE, MO N335KC, "BEST KR-1"



JIM HILL, AL N58DR, "BEST SPOT LANDING"



AL CAMPBELL, TX N651AC, "BEST INTERIOR"



MARTIN ROBERTS, OK NT91MR
"1990 SHORT OF FIELD"



STEVE BENNETT OF GREAT PLAINS AIRCRAFT
WORKING ON A KR DURING THE EVENT
(NOW THAT'S SERVICE)



ROBERT LESTER, FL N41FM

For several years now I have been getting the KR-2 Newsletter and for some time I have been trying to put together something that I could pass on to other builders. I started on my project in January '88 and have about 400+ hours into it at this time. The neighbors no longer ask me if I am building a boat, which should give everyone a general idea of how far the project is.

MATCO BRAKE/WHEEL INSTALLATION

This submission is in payment to Monte Miller's "KR-2 Cart" which has been the home of my boat up until this problem was solved. My thanks to Monte and the other KR-2 Newsletter authors that helped me get this far in my project.

If you have chosen to stick with the retractable gear as I have, you may decide to go with the mechanical brakes as shown in the plans, they certainly help the pocketbook. I was torn between the \$170 and \$400 price tags and the time it would take to save the money when I learned that a local KR-2 with mechanical brakes had run off the runway and lost a prop. Mechanical brakes were out for me. I thought about scrounging some go-kart brakes (A friend's used Cleveland brakes were too wide) but thought it would be a mess to machine them to fit the wheel forks for the calipers etc. Best to stick with the brakes that are shown as "for KR" in the catalogs, since once they arrive the assembly will become "obvious".

Eventually the brakes arrived and I had misjudged the assembly part. There were three problems. First, Matco recommends that the brake caliper be mounted aft. Some hacksaw work needed to be done on my second hand \$400 untouched castings (UGH!). Second, the caliper mounting plate needed to be fixed to the wheel fork to prevent caliper from rotating. Third, clearance of the wheel/brake assembly is critical to insure that the caliper is centered on the brake disc and the disc mounting screws did not scratch the inside of the wheel fork. I still needed room for the tire to clear as well.

The drawing (on next page) should show all the critical spacers etc. and how I managed to get this all to work. You will need 4 ea. AN4 bolts to mount the caliper to the fork (2 per wheel assy). This seemed appropriate since the caliper used two AN4 bolts in its assembly. Even if these bolts were to shear, the caliper



will stop against the wheel fork. In addition to the AN4 bolts you will need about 1 ft. of steel tubing to make spacers for the caliper mounting plate. The spacers for the wheel itself were cut from the spacers stock in the KR-2 axle kit obtainable from Wicks Aircraft. I used an inexpensive plastic dial caliper to measure all the spacings several times before cutting. Even then, I used most of my material.

Ross Youngblood
1115 N. Stanley Pl.
Chandler, AZ 85226
602-897-1023

WANTED

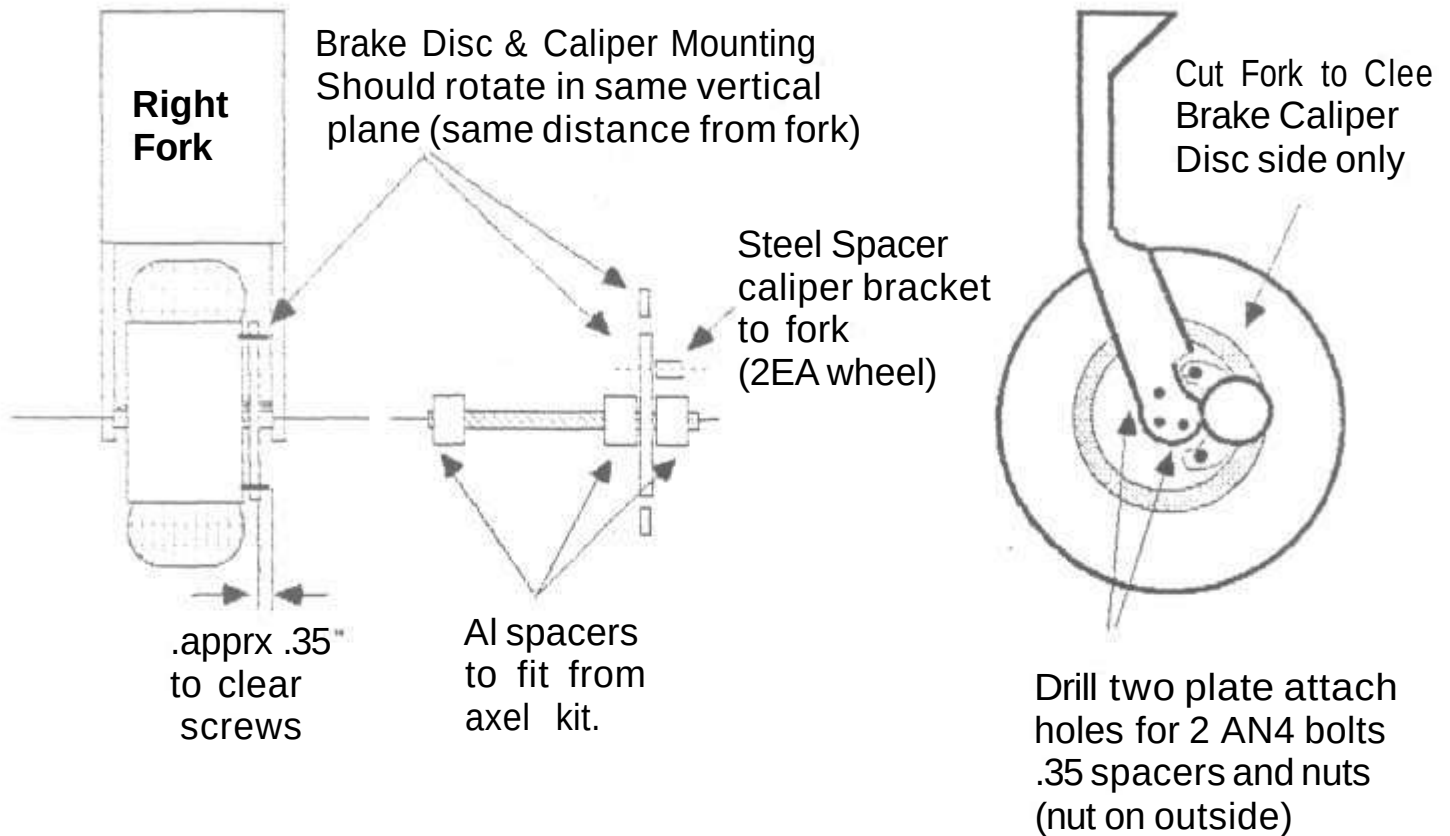
We have been getting numerous requests for information on the installation of a Subaru Engine in a KR. If you have information regarding this, please submit it to the KR Newsletter for publication.

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN
INDIVIDUAL COPIES \$1.50 EACH.

WHEEL ASSY FRONT VIEW

AXEL DETAIL

WHEEL ASSY SIDE VIEW



- 1) Install axel and wheel assembly on fork.
- 2) Use brake caliper and caliper mounting plate to determine cutout in fork for aft mounting.
- 3) Remove material from fork.
- 4) Fabricate two .035 1/4 ID spacers for caliper mounting plate assy.
- 5) Locate and **drill** two holes through fork and mounting plate, check fit after **drilling** first hole.
- 6) Install disk on wheel and verify correct spacer length. If correct fabricate three aluminum axel spacers, one on each side of disk mounting plate and other side of wheel.

NOTE: (disk and mounting plate should be centered between caliper pads adjust shims and wheel position if necessary to achieve this).

GOOD LUCK !

Ross Youngblood
1115N Stanley PI
Chandler, Az, 85226
(602)897-1023

*Regards
Ross*

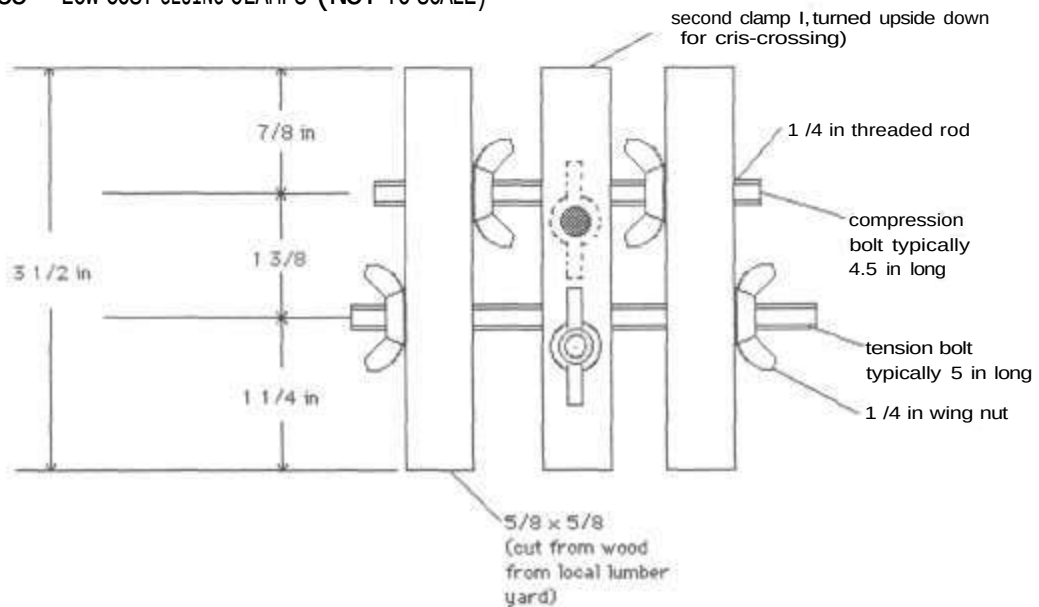
INEXPENSIVE GLUING CLAMPS

Below are two sketches of some gluing clamps that I made for gluing the gusset blocks onto my fuselage side frame. The dimensions shown were used because they allow the clamps to be criss-crossed (for clamping two gusset blocks at a time) when one clamp is inverted (and the wing nuts are switched from inside to outside and vice versa). Wood useage was minimized with three dimensions as well. I was able to build 20 of these clamps for under \$20.00 (which is a big savings from purchased clamps).

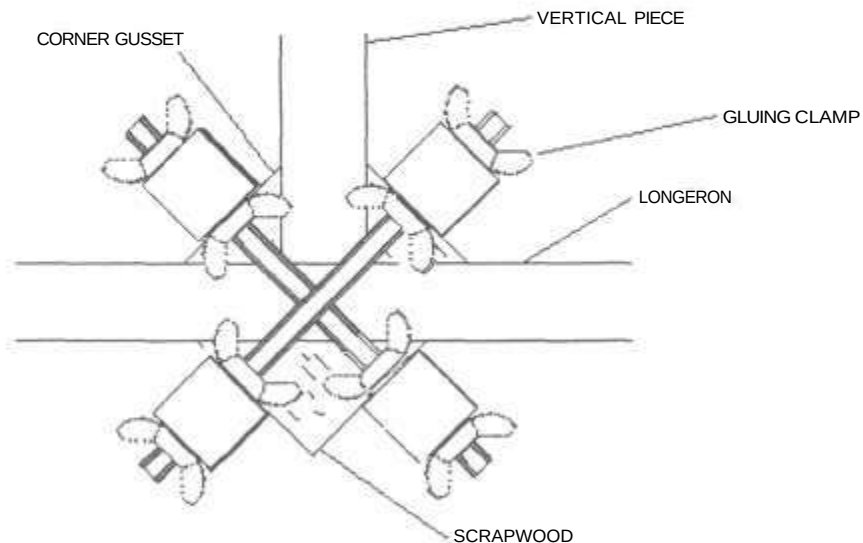
Although the dimensions shown are for gusset clamps, I have also built 10 more much larger clamps that basically use the same principles (2 wood jaws with 2 threaded rods and 4 wing nuts). I just wanted to share this idea as these clamps are simple to make, cost very little for materials and can be tailored to fit just about any clamping job. (The end of the clamp with the nuts on the inside could actually be used for expansion as well!)

Kerwyn Stoll
16839 W. Aptakistic
Prairie, 60069
708-913-8539

LOW COST GLUING CLAMPS (NOT TO SCALE)



TOP VIEW OF CLAMPS IN ACTION



A BAFFLING SUBJECT

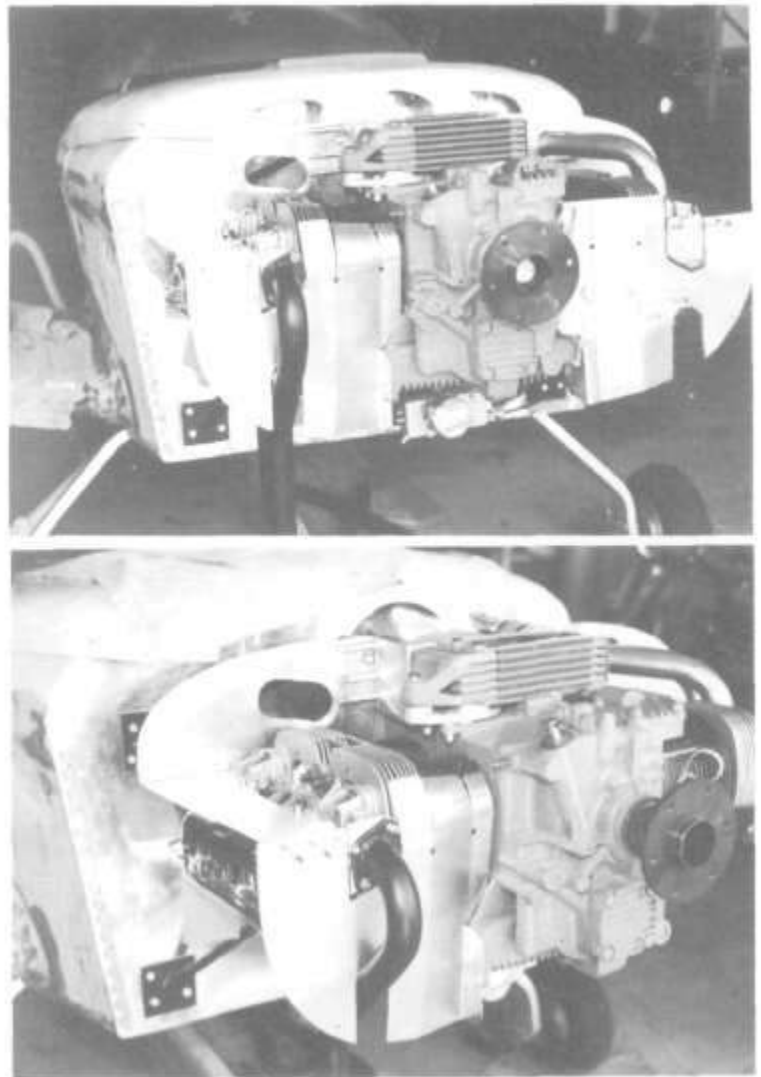
Confession time. I don't know about other KR builders, but when I visit a homebuilder working in metal, I get envious of those neat cleco fasteners holding the various aluminum pieces in position while patiently waiting for a few strokes from the rivet gun. The porcupine look has a way of saying, "work in progress".

So, needless to say, when it came time to install the baffle system under the cowl of my KR-2, I immediately went out and bought a couple of dozen clecos and a pair of those funky pliers. If you're anywhere close to cutting aluminum, you'd better do the same because you're gonna need them.

I'm using .032 aluminum for the baffle building. 2024 or 6061 will work. The 6061 forms well and doesn't crack as easily as the 2024. A slightly lighter gauge, like .025, would work but the added stiffness of the .032 helps keep everything firmed up. The various pieces can be easily cut from the aluminum sheet stock using a saber saw with a metal cutting blade. Final shaping requires aviation snips, a nibbling tool (found mine in a hardware store), a hand drill and your file assortment. The required bends can be accomplished using some scrap hardwood, C-clamps and a mallet. A bending brake is a luxury, if you have access.

Patterns are best cut from manila file folder stock and test fitted prior to cutting metal. It's easy to tape additional cardstock to a too small pattern or move a hole to fit a manifold but I've found it next to impossible to stretch aluminum after cutting it a half-inch too short. Go slow here and you won't disturb the neighbors at 1:00 a.m. with your yelling. Fine tune the pattern, build the metal part and proceed to the adjacent part. Work for a tight fit against the engine thereby avoiding excessive cooling air loss.

The cylinder "trays" are the easiest parts to form and the best to begin construction with as they help to anchor most of the other baffle components. Use the clecos to temporarily hold each successive baffle panel to the next as you work through the cut and fit. Ultimately, rivets, screws with Tinnerman nuts, or nutplates will be installed. Remember, the baffles have to be removable.



The outer perimeter of the baffle system must seal against the cowl in order for the unit to function as designed. Aircraft baffle fabric is attached to the edge and left long enough to form a rolled seal against the cowl interior. Air pressure generated during flight will aid in sealing the baffle fabric to the cowl. Avoid any metal to cowl contact as the engine's normal movements during operation will eventually cause premature wear and damage.

My particular engine is a basic Volks 1835 with Diehl case and the aircraft utilizes the Rand premolded cowling. The most trying part of the baffle construction is the development of the patterns. If any builder would like copies of my baffle templates with instructions, check out the classified ad section of the newsletter. You'll save time, aluminum and some bloody knuckles.

Monte Miller
1900 Parkside Drive
Denton, TX 76201
817-566-5871

FOR SALE

KR-2, built in 1988-91, 2100cc Great Plains, Super Posa Carb, fixed gear, has 1991 airworthiness certificate, wing tanks, transponder w/encoder, full panel, upholstery, wheel pants, Sterba prop plus many extras. Physical forces sale. \$8,500.00 Call:

Thomas L Endicott
10111 W. Colter
Glendale, AZ 85307
602-872-8581

KR-2 FOR SALE

KR-2, built in 1978, 1918cc VW 70 hp, Super Posa Carb, empty weight 510 lbs Alum, header tank, dual controls, stock retract landing gear. Burns 3.36 gallons per hour at 75%, 140 TAS, 900 FPM climb. With extra bubble canopy, transponder and misc. equipment. \$4,500.00

Earl Teporten
P. O. Box 579
Lakeville, MN 55044
612-435-7275

WANTED

Engine cowl mold for KR-2. Will use it and return. I'll pay postage both ways. Standard VW engine with assembly case. Write or call:

John D. Cromwell
3824 W. Orangewood Dr.
Tucson, AZ 85741
602-744-3303

FOR SALE

Revmaster Turbo 2100. Complete engine never been run. About 10 years old on KR mount. \$2,500.00 Call Sun. to Thur.:

Patrick McKenzie
585 Comstock Rd.
Holistier, CA 95023
408-637-0459

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 174 NOVEMBER 1991



KR NEWSLETTER

ISSUE NO. 175
DECEMBER 1991



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



GEORGE DOBBS¹ C-FGFJ, ONTARIO. CANADA

After five years construction C-FGFJ is flying just super. I am 61 years old, 6'3", 200 lbs. and had to enlarge the KR to fit. One 14" additional bay was added aft of the spar and one 5" bay forward. The Cont. 85 HP without electrics is mounted 10" forward of the firewall. This puts the most forward C of G with a 125 lb. pilot and full eight gallon header tank at the most forward position of the flight envelope. Even with a 200 lb. passenger and full fuel in the two five gallon wing tanks, the aft C of G is 1" behind the rear face of the front spar. This KR flies just as well with this load condition. An engine driven fuel pump transfers fuel from wing tanks to header, gravity from header to engine.

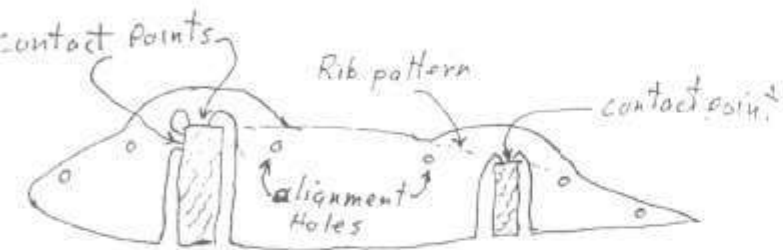
This KR is equally "very" sensitive in all three axis; I am just now becoming comfortable with the controls. Some dual time in a KR is certainly recommended BEFORE SOLO. My 200 or so hours in a C-150, Cub, Coot "A" in no way prepared me for a KR solo.

All controls are very effective right into the stall at 40 indicated. Low or high speed control is fantastic! My own design tri gear is scrapped. Dan Diehl's fixed tri gear works great and is well worth the price. There is very little change in performance (speed, climb, take off) at full gross with the Cont. 85. Empty weight 700; top speed 160; stall 40, prop wood 59 x 60. I hope every KR builder is as pleased with their project.

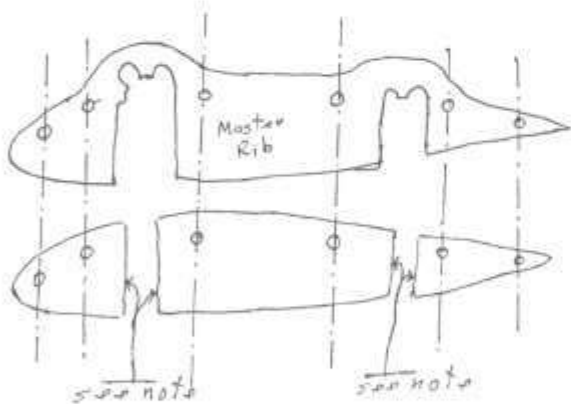
CENTERWING RIBS

The question arises; "How do I locate the three segments of each rib to be sure all four ribs are aligned with each other? Here's how I did it.

When you cut out the four ribs according to plans, cut out a fifth for a master rib. The master rib should be one piece and can be made of scrap 1/8" plywood. I made mine of scrap wall paneling. Leave approximately 3" humpback over the spars. Cut out this master so as to have clearance with the spars except for three contact points which mate with the spars (see sketch).



Align and clamp "all" the rib segments on top of the master. Drill two holes (1/8") for alignment in each section (a drill press is preferred) see sketch.



Installing the Ribs:

With one rib (three sections) indexed (use extra 1/8" drill bits) to the master and the master's three points making contact with the spars, the rib sections can be installed with the 3/8" block per plans. One rib at a time.

Note: You may have to cut clearance so the master contact points have positive contact with the spars.

Bob Muse
2194 Freydale Rd.
Marietta, GA 30067
404-973-3150

* NOW AVAILABLE*

The 11th Annual 1991 KR Gathering video featuring 2 KR1s and 14 KR2s. with close-up high-speed flybys, spot landing contest, and awards. This 1 hour 30 minute video is edited and titled in VMS only.

To order mail check or money order for \$29.95 to:

Donald F. Morin

P.O. Box 681

Cocoa, FL 32923

FOR SALE

KR-2, 2275 dual port, dual mags, Diehl wings, fixed gear, approximately 85%, hundreds of hours of free cabinetmaker. Quality workmanship, \$5650 FIRM. Possible interest in trade on Cessna aerobat. Contact:

Ken Miller

20 Keyridge, Rt. 1

Leesburg, GA 31763

912-434-5210 Office

912-888-6344 Home



EXPERIMENTAL AIRCRAFT ASSOCIATION

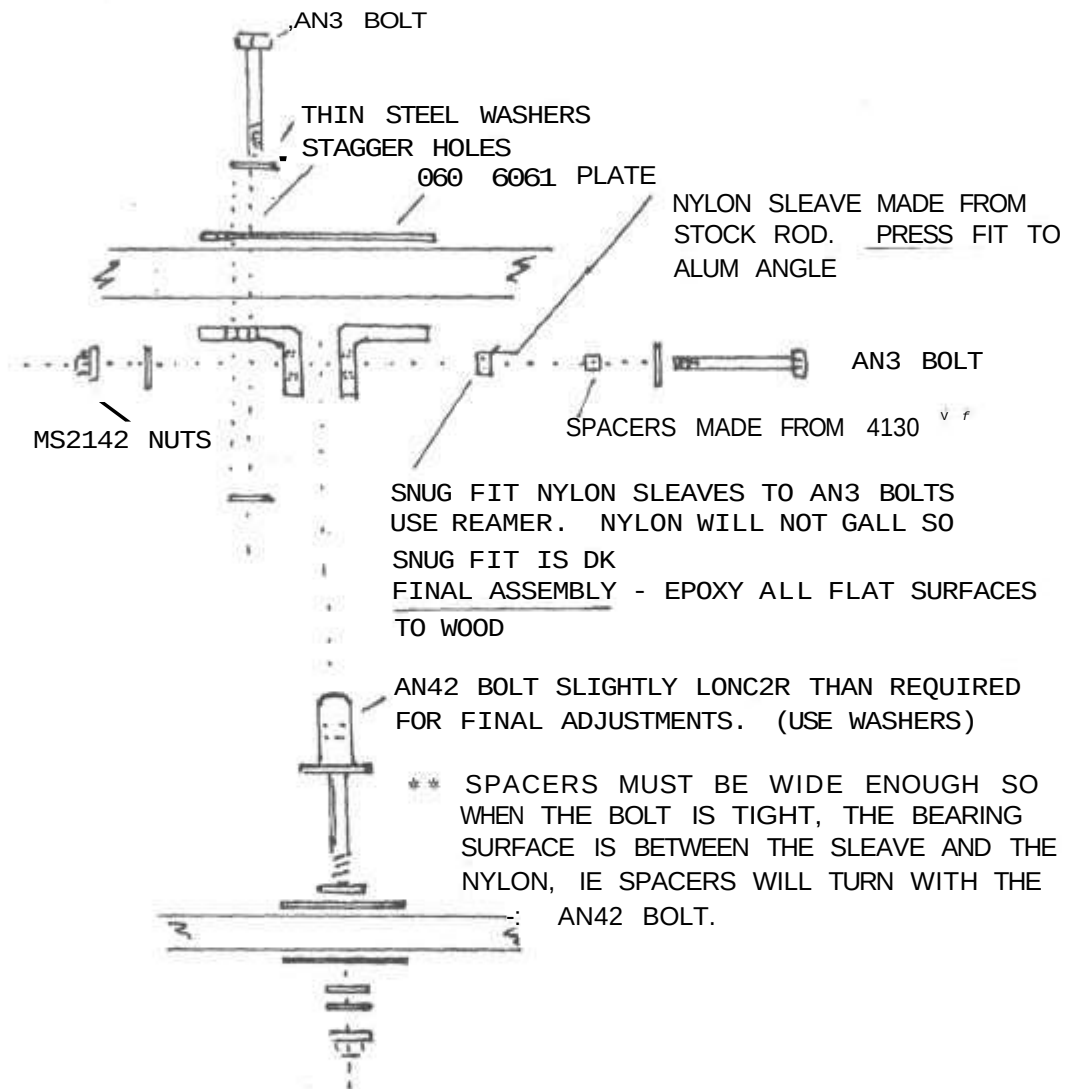
VITTMAN AIR/LLD OSHKOSH WI 54903 JOH6
PHONE 414/426-4800

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$15.00 PER YEAR- U.S., \$20.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN INDIVIDUAL COPIES \$1.50 EACH.

SUGGESTION FOR TAIL SECTION HINGES

SUGGESTED HINGE PER ROBERT PEARSON REQUEST
 EASY TO MAKE, NO 'WEAR' AND EASY TO ADJUST.
 JAMES TAKEMOTO EAA 135365
 4633 E. COLFAX AVE, DENVER 80220-1201
 (303 388-0407)



MATE TO THE AN42 EYE BOLTS ARE USED BY
 ULTRALIGHTS LIKE QUIKSILVER. BEARING
 SURFACE WILL THEN BE STEEL TO STEEL BUT
 LOOKS VERY SUBSTANTIAL AND SMALL.

COMPRESSION RATIOS AND THE VOLKS ENGINE

Let's first understand one thing; the selected compression ratio of your engine will be critical to its overall operation, performance and lifespan. Go back and reread that first sentence. The compression ratio will determine to a degree far greater than any other factor the operating temperature of the engine. The engine temperature will drive the oil temperature which in turn will effect oil pressure. Remember, oil pressure is really the only thing keeping those metal engine bits from thrashing themselves and sending you into an emergency procedures drill.

In its automotive incarnation, the stock Volks 1600 engine derived its long, reliable life by way of mild cam timing and a low 6.6:1 compression ratio. It's low on horsepower in that configuration and these basic elements of low stress combined to make the bug engine almost bulletproof. Witness the great numbers of clapped-out looking Bugs that still start every morning.

The aero conversion that will propel our aircraft has been pumped up in displacement to 1835cc or more, often runs a healthier cam grind, has a powerful gyroscopic plate (the prop) imposing side loads on the crankshaft and bearings, higher compression and horsepower yet we'd still like it to remain as reliable as its automotive cousin. It's not surprising then that some Volks-powered aircraft might experience engine reliability problems. In many instances, these problems manifest themselves due to one particular element; the engine's excessive compression. Cases have been documented where engines have been totally destroyed due to the builder's failure to simply do the math required during engine assembly and determine the engine's compression ratio. Very foolish and dangerous.

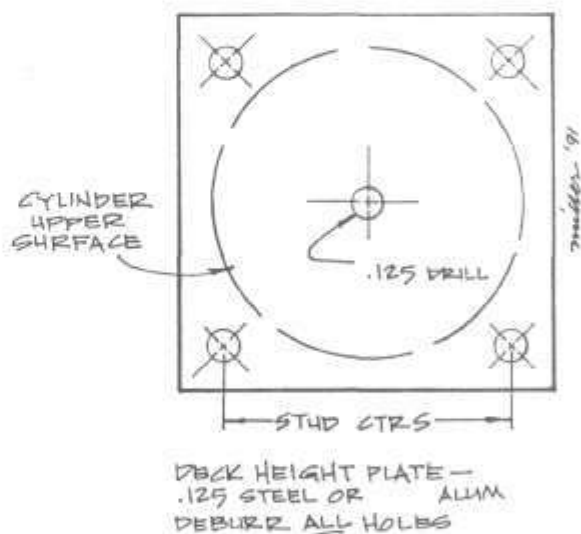
I'll crawl out on another limb here and offer, in my opinion, that any compression ratio over 8:1 is excessive. The primary consideration is the availability of fuels with octane ratings to match and perform with a higher compression ratio. Detonation due to high CR and incorrect fuel can and will destroy an engine before you even get a clue that anything is wrong.

Every effort should be made to determine what your engine's compression ratio is going to be. The process is relatively simple but will require some

time and patience during the engine assembly process. A previous article explained the simple method of CC'ing the Volks head. You'll need those numbers and formulas to plug into the following procedure.

Deck height of the engine can be adjusted and will be the prime factor in the compression ratio game. Measure deck height as follows:

1. Position long block with con rods vertical and cylinder hold-down studs installed.
2. Stuff clean rags in all crankcase openings or you could spend a lot of time "fishing".
3. Install one piston and cylinder assembly, wristpin clips not needed at this time.
4. Using the studs, snug down the deck height measurement plate (see sketch) being sure that the cylinder is seated against the engine case. Do not overtighten the deck plate as you might deform it and throw off your measurements.



5. Bring piston to TDC and take a height measurement using a dial equipped vernier caliper capable of reading to .001. Reposition the piston and take this same reading several times to be sure that you are accurate. I personally made six separate measurements of each cylinder, bringing the piston to TDC each time, just to be sure I had not misread the instrument.

6. Repeat step five for each piston/cylinder assembly. Keep the piston/jug components marked as to which rod they were attached, write down all your measurements, and work in an orderly fashion. The box that the cylinders came

BUILDING TIP

in is a good way to keep from mixing up the pieces.

7. Using the CR formula, plug in the head volume and deck height numbers and check your math. Don't forget to factor in the thickness of the deck height plate.

8. Deck height can be adjusted by using cylinder shims. These thin metal stampings should be checked with the caliper to confirm the package markings. They are installed between the engine block and the bottom of the cylinder.

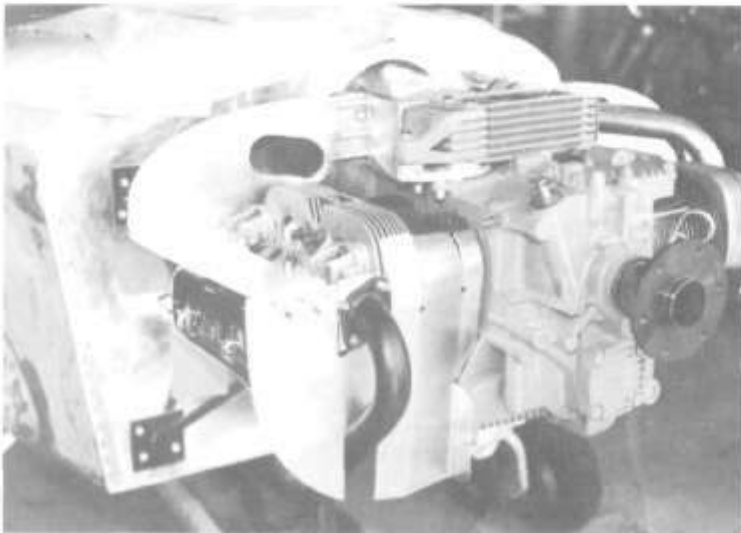
That's all there is to it. Simple measurements for a critically important assembly.

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871

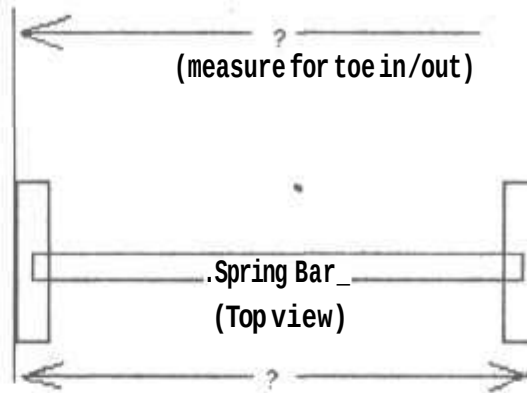
FOR SALE

Engine baffle patterns and instructions for KR-2/Volks. Easily adapted to other Volks designs. \$8.50

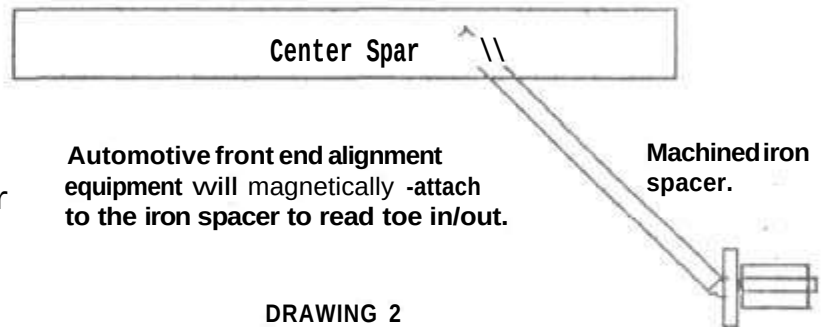
Monte Miller
1900 Parkside
Denton, TX 76201



I am installing Dan Diehl's fixed main landing gear on my KR-2 and was looking for a way to make sure the wheels would be tracking straight forward when installed. On the stock retractable gear, I used two angle irons clamped to the disk brake



DRAWING 1



DRAWING 2

rotors and measured at both ends for "toe in or out" (see drawing 1) only to find out later that the rotors had a run out of .018 inch. This was done in the shop clamped to the drill press table with a lot of stand up walking room around it before being installed in the airplane.

When installing Dan's fixed gear, I turned an iron spacer on the metal lathe that would fit over the 5/8" spindles in place of the wheels and tightened the spindle nut. With a true machined surface to work with, I used my automotive front end alignment equipment to set 0 deg. toe in (see drawing 2).

Jim Morehead
1068 Smith Ave.
Campbell, CA 95008
408-378-9467



OSH K OSH '92

The World of Sport Aviation

EAA Aviation Center
P.O. Box 3086
Oshkosh, WI 54903-3086
414-426-4800
FAX 414-426-4828

JULY 31 - AUGUST 6

October 29, 1991

Mr. Jim Faughn
Committee Member
5615 Botanical
St. Louis, MO 63110

Dear Jim:

It was good talking with you today concerning the proposed recognition by the 20 Year KR Anniversary Committee. We would be happy to work with you on this program at EAA Oshkosh '92.

You had indicated that we could expect approximately 30 KRs to be present. Based on our conversation, we will proceed ahead with program planning based upon the following:

1. The KRs will be parked together in the Homebuilt/ Custombuilt area. Your Committee will provide manpower to assist Parking Chairman, Ken Whyte. Please have your Committee representative contact Ken at the following address:

16230 W Burleigh Place
Brookfield, WI 53005

2. A special fly-by will be planned on Saturday, August 1st, as a part of the Showcase flying prior to the Air Show. There will not be any formation flying except for the missing man, which will be practiced and choreographed in advance. Please have the person responsible for the fly-by contact Air Operations Director, Verne Jobst, at the following address:

2921 Sterling Drive
McHenry, IL 60050

Let Verne know who will be participating in the missing man.

40TH ANNUAL EAA INTERNATIONAL FLY-IN CONVENTION AND SPORT AVIATION® EXHIBITION

Co-Sponsored By: EAA Aviation Foundation Inc., Experimental Aircraft Association, Inc.



KR Anniversary Committee

Oshkosh '92, July 31 August 6, 1992

Jim Faughn • Steve Bennett • Dan Diehl * Herb Bull * Earl Teporten

Earl Teporten
Editor - KR Newsletter
P.O. Box 579
Lackeville, MN 55044

Dear Earl:

Enclosed please find the letter from Tom Poberezny. Please publish this in the next KR Newsletter. As you can see, Mr. Poberezny would like volunteers to help with parking. Also, it is critical that all persons flying a KR into the show contact me so we have an idea of the numbers to expect. I would like for you to put a mail - in portion into the newsletter as outlined below, so I may get written confirmations. I will follow those up with a letter stating the specifics of the fly-in.

_____ **I am planning to fly my KR to Oshkosh, 1992.**

_____ **I would like to help with parking KR's at the Fly In.**

Name: _____

Address: _____

I appreciate your help! Call me at work 314-371-0233 or home 314-647-4012 if you have any questions.

Jim Faughn 5615 Botanical St. Louis, MO 63110

KR-2 PRE-MOLDED COMPOSITES FOR SALE

Cowl, front deck and tank, canopy and canopy frame, rear turtle deck, wing tips. All for . . . \$750.00,
F. O. B. San Antonio, TX

Martin Luker
5819 Rue Burgundy
San Antonio, TX 78240
512-614-6020

FOR SALE

KR-2, built per plans except for a removable turtle deck, wing tanks and toe brakes. 585 lbs. empty. Beautiful craftsmanship. Revmaster 2100D, Electric start, dual mags, Narco Mk21 720 Ch Nav/Com, Mode C Transponder, ELT, digital tach, flaps, 20 hours TT, receipts for nearly \$12,000. Asking \$10,500.

James Jasper
3732 E. Dartmouth
Mesa, AZ 85205
602-830-3445

FOR SALE

Experimental Aircraft Association (EAA) inspected KR-2 with "high quality" workmanship. The air frame (boat) and both inner and outer spars are constructed with aircraft quality mahogany and birch. Included with this kit are many misc. parts including retractable landing gear, pulleys, wing attachment fittings, a roll of fiberglass cloth, a fiberglass resin mixing machine, a hobby saw (\$200 value) along with a full set of plans and records. Will sell for \$1,200.

Michael Simpson
675 W. Peakview
Littleton, CO 80120
303-730-7002

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 175 DECEMBER 1991

Season's Greetings



KR NEWSLETTER

ISSUE NO. 176

JANUARY 1992



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



**GEORGE TOTH'S KR-2 N28GT, TOMBALL, TEXAS
LAST FEATURED IN ISSUE 1156**

Since I finished my KR-2, March of 1990, a lot of things have happened both good and bad. After receiving the final airworthiness certificate in May, 1990, I flew from Houston to Hershey, PA. The trip was very enjoyable even though I was a little nervous at the beginning. When I arrived at Hershey, I realized that I had to make a decision to either land on a narrow, short runway at Riegle Field or go to Harrisburg. I decided to give it a try at Riegle where the runway is 40 ft. wide and 1900 ft. long. I had to make a couple of low passes in order to line to the centerline but finally the landing was successful without seeing the runway in front of me. The flight back to Houston was uneventful after some delay due to 0 0 IFR weather in the morning.

Cont'd page 2

I took off after noon and the flight progressed into nighttime. I left Nashville at sunset so the remaining portion of the trip was at night. The haze forced me up to 10,500' but I enjoyed the crispness of engine and airplane performance. The wind was 0 at that altitude. This gave me the opportunity to get an accurate figure of speed. The total flight time was just a hair over 7.5 hours that gave me an average ground and true airspeed of 170 MPH and the fuel consumption was 3.5 GPH. This was the good part, unfortunately I had some bad ones too. First, I had problems with the Rosenhan Hydraulic Brake System. One day in July of '90 as I was taxiing for a flight, I noticed that the plane was pulling to the left and it became more and more difficult to maintain direction by holding very significant right brake. Finally the plane just stopped and even with full power it wouldn't move. I called the tower to let them know that I was having mechanical difficulty and I had to shut it down to investigate the nature of the problem. Without making a short story long, the left brake was locked-up so hard that I couldn't even drag the plane...the wheel was not turning. I took a wrench, opened the bleed screw and the hydraulic line depressurized, but I couldn't figure out why the line held pressure. I took the brake cylinders, the calipers, the lines apart...everything that I could think of but there was no sign of any mechanical discrepancies. So I put everything back together and was hoping this would never happen again. I was wrong! It happened again and, of course, as you guessed, it was during landing this time. Same brake same side. My son and I just came back from another enjoyable flight before Christmas (1990). Upon touchdown, I noticed the plane started to drift to the left. I had to hold hard right, brake and rudder to get back to the center line but as we reached it and took my foot off the right brake, the KR spun around, skidded off the runway onto the grass and when we reached the soft surface, both gear legs were torn off.

This was the first time that I had to use the emergency evacuation procedure without reading it. I quickly shut all electrical equipment off (master switch, ignition) turned off fuel shut off valve, unlatched canopy and quickly evacuated. Once out and quickly checking there was no fuel or fire, I turned the radio on

again and told the tower we were OK but I needed help to get the plane back to the hanger.

After all this, I was very frustrated but decided to redesign and rebuild it to a trigear version. The only damage other than the gear legs and the venturi tube were some minor scratches on the belly skin. It took me several months just to design a suitable gear system that I felt was strong enough and relatively easy to build. I think I have everything done that I wanted to including stress test, refining landing gears, adjusting hydraulic brakes, replacing and testing propeller, etc. I have flown a few hours with the new gears and seeing forward after landing makes a tremendous difference. Unfortunately, the new prop is not exactly right for my engine and plane, so I decided to carve my own now. The pictures show a few things I've done. The sand bags weighed a total of 4400 lbs. and the surface that I distributed over equaled 4.5 G loading which was on the wings for 1.5 hrs. (with the wings drooping down more than 4 inches at both wing tips). This was just to verify that the strength was not significantly affected by the extra holes needed to secure the main gear plates to the spars.



The Rosenhan brakes have to go! I have talked to a few KR owners who have had problems with these brakes and I will replace them with Clevelands.

That's all for now, please feel free to contact me with any questions.

George Toth
920 Lawrence St. #304
Tomball, TX 77375
713-351-9132

EDITOR'S NOTE: If anyone has experienced similar problems with Rosenhan brakes, or has a solution, let me know.

FITTING THE KR-2 COWLING

First thing, forget everything you've heard about the canopy being the toughest part of the KR project. With the cowl, we have a new contender and there's no way that simple bubble top will ever unseat this champion.

To successfully install the Rand premolded cowl will require patience, effort and considerable time. It won't go together like a Glasair, but then it's not priced like one either.

The most serious problem on my box-stock project was the mismatch of the factory cowl to the plans-design firewall; it simply didn't fit when using the now commonly accepted GPASC (or similar) motormount, Diehl case and the VW aero conversion.

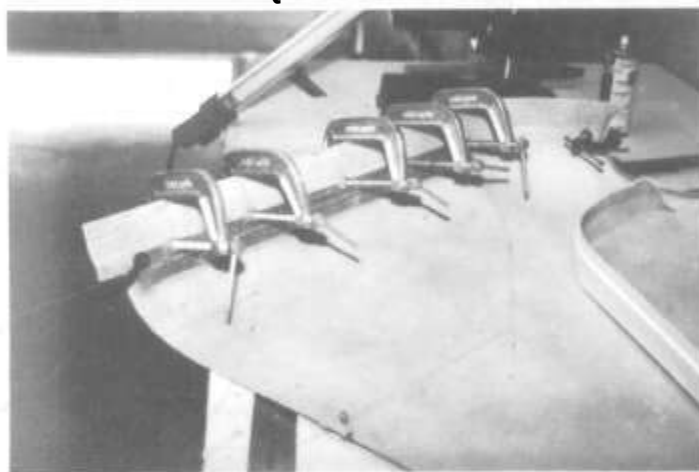
After projecting the cowl's required measurements from the prop hub to the firewall and an initial trial fitting, it became obvious that the lower cowl section lacked about one inch from being deep enough to meet the bottom of the firewall. For me, this one inch proved to be a construction problem which ultimately required that the bottom cowl be cut into three sections, have some additional material carefully grafted into place and then be reassembled. All this before beginning the actual installation of the cowl to the airframe.

On the positive side, the work isn't all that difficult and the hinge strips, which hold my cowl together and attach it to the airframe, were a bit easier to install due to the greater access provided by the sectioned cowl. Although the entire cowling job took me over two months of part-time effort, the front end now fits quite well. The secret to getting a good fit involved taking the time to do it right the first time. The results are worth it.

Aluminum hinge strips are used to attach the upper cowl section to the bottom section. This same technique is then utilized to hold the cowling to the sides of the firewall. Hinge strips permit accurate alignment without the ripples and bulges so often associated with fiberglass and CAMLOC installations. It will still be necessary to use the CAMLOC fasteners along the top of the curved firewall/cowl junction and at the crankshaft opening.



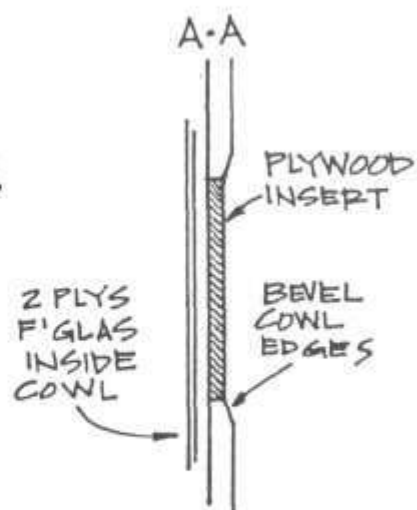
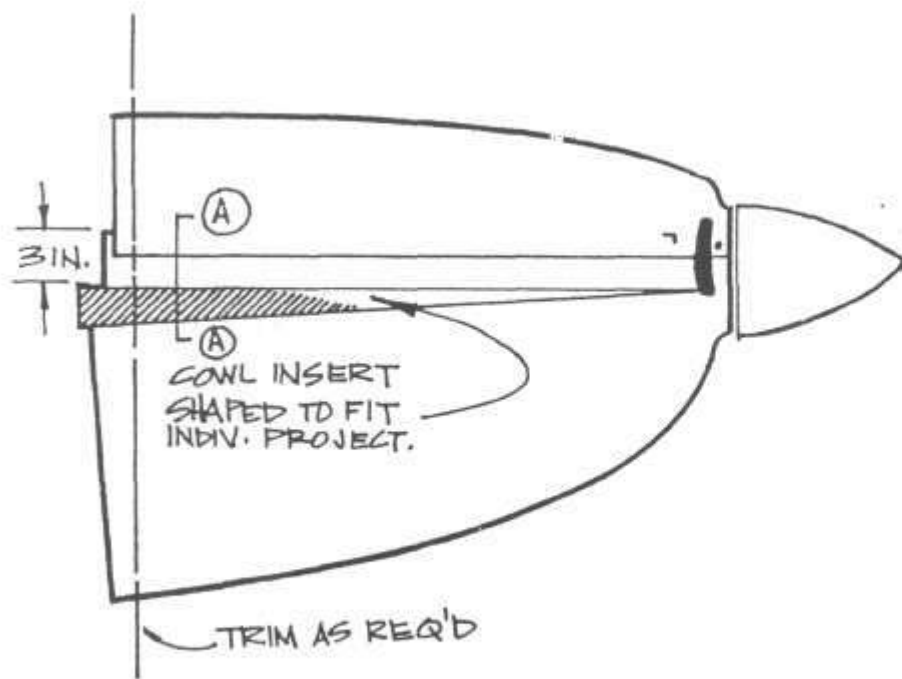
SINGLE FIBERGLAS OVERLAY ON EXTERIOR. COWL REQUIRED BEVEL SANDING TO BLEND IN FIBERGLAS PRIOR TO OVERLAY. LOWER HINGE STRIP VISIBLE. NOTE AMOUNT OF COWL DEPTH EXTENSION REQUIRED & ITS TAPER CUT.



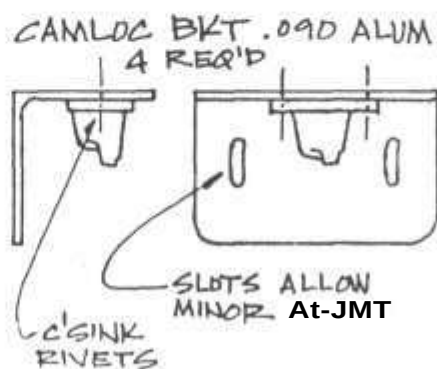
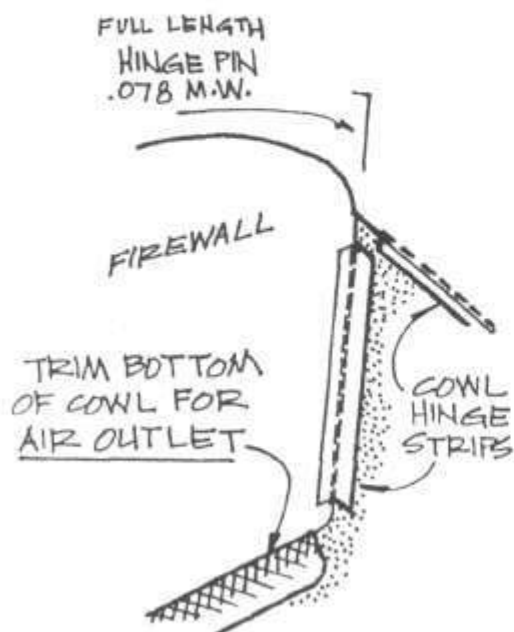
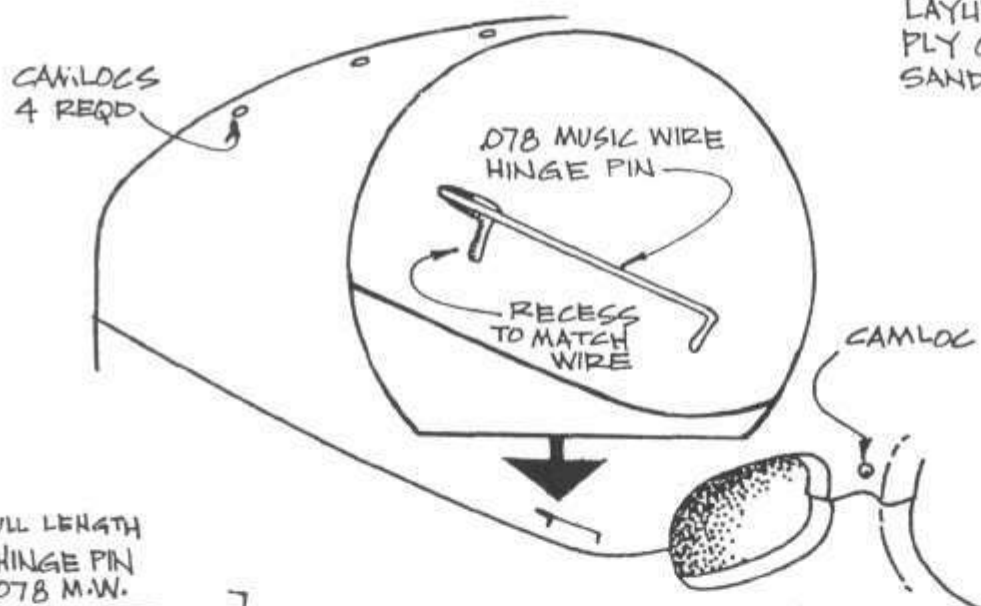
ATTACHING HINGE STRIPS. EPOXY, THEN FIBERGLAS OVERLAY. STRIP PIECES ARE SECTIONS CUT FROM LOWER COWL.



TWO (2) PLYS OVER PLYWOOD "INSERT". NOTE HINGE STRIP.



COWL INSERT
CROSS SECTION
LAYUP ONE GLAS
PLY ON EXTERIOR,
SAND & FINISH.

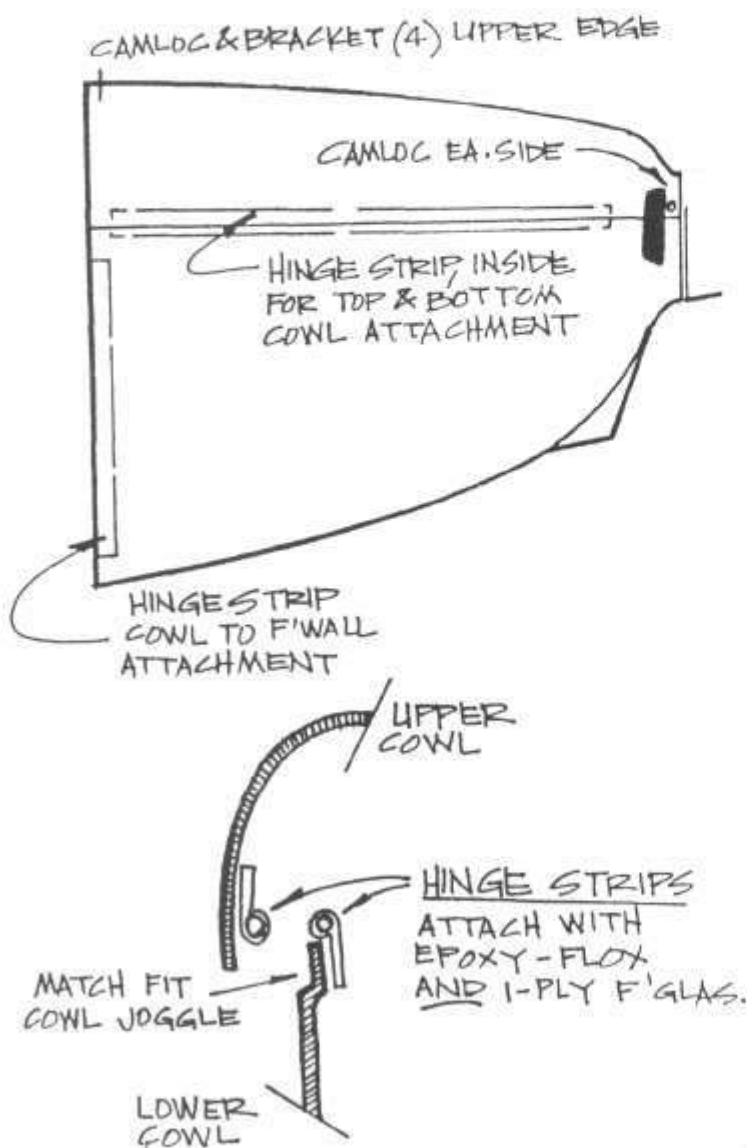




TOP COWL WITH HINGE STRIPS IN PLACE.
LOWER COWL BEING BLOCKED INTO PLACE PRIOR
TO AFT SKIRT TRIM.



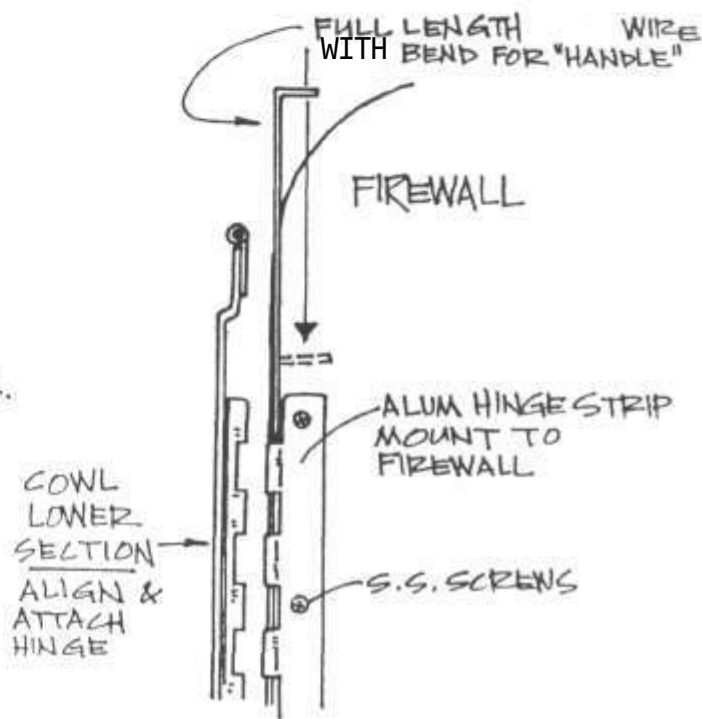
COWL ON. FIT & FILL IS MOSTLY COMPLETE
EXCEPT FOR A CAMLOC ON COWL AT SPINNER
LOCATION. NOTE THE OIL COOLER BUMP.



CAMLOC brackets and hinge strips can be attached to the firewall using stainless steel screws and a dab of epoxy as insurance.

The lower cowl air outlet will need a couple of layers of fiberglass laid up on the inside to stiffen the area and prevent it from flexing too much during flight. If the ripples caused by the top cowl CAMLOCS bother you, the same fiberglass reinforcement can be applied.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871

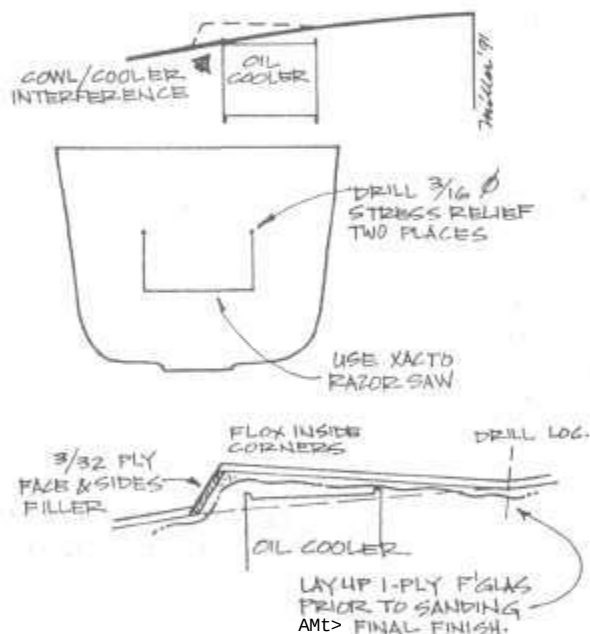


COWLING BUMP FOR OIL COOLER

Show of hands...who remembers Rosanna Dana from the old Saturday Night Live? As she would say, "It's always something".

After cowlng the engine, I discovered that the top of the cowl was contacting the engine's top-mounted oil cooler body. Since shock-mounted engines tend to move around under a cowl, it was only a matter of time before a hole would wear through the cowl, or worse, the oil cooler.

Procrastination can be a blessing. Delaying the fix allowed me the time to peek around a hangar full of KR-2s. One looked like it had had the same problem so I stole the basic idea and adapted the simple fix to my Rand cowlng.



The sketch is pretty self-explanatory. After locating the cut lines to fit your particular project, use an Xacto razor saw for the cuts. I taped a steel ruler alongside the line as a guide.

The stress holes are important as they will help prevent any future cracking in the area of the bend. Fill them during the final finish.



OIL COOLER BUMP. HINGE STRIPS & COWL SPLIT & VERTICALS. CAMLOCKS @ TOP EDGE

Block up the flap as needed, add the plywood face and sides and allow the epoxy to cure. After trimming and sanding the interior pieces, reinforce all joints with epoxy/flox and lay up one ply of fiberglass over the entire interior area. After cure, the exterior can be blended to its final shape.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871

FOR SALE

Engine baffle patterns and instructions for KR-2/Volks. Easily adapted to other Volks designs. \$8.50

Monte Miller
1900 Parkside
Denton, TX 76201

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN
INDIVIDUAL COPIES \$1.50 EACH.

WITH GREAT SADNESS _____

I have learned of the crash of KR-2, N165AC that claimed the life of Al Campbell and a passenger/pilot, Brendan Sandiford, both from San Antonio, Texas.

The crash occurred 1/4/92 at approximately 4:50 p.m., shortly after departing Braunfels Municipal Airport. According to witnesses, the plane appeared to be spinning before impact without any visible signs of damage or fire. I talked with Dan Diehl who was a close friend of Als and helped with the accident investigation. According to Dan, upon examination of the airframe and engine, which had approximately 400 hours on them, there seems to be no indication of any malfunction or problem that would cause the accident. The only indication of trouble were pieces of canopy that were found scattered one-half mile before impact. The canopy was latched and the frame was intact, leading to two theories for the crash: First, that there could have been a bird strike, that rendered Al unconscious and the singled-control KR unmaneuverable. Second, that a sudden downdraft may have caused the occupants to hit their heads on the canopy causing them to lose consciousness.

Dari said that contributions can be sent to:

EAA Chapter 35, Inc.
c/o Al Campbell Memorial Fund
15464 FM 471 West, Box 35
San Antonio, TX 78253.

EAA Chapter 35 plans to purchase a memorial brick to be displayed at Oshkosh 1992. Our sincere condolences to his wife, Linda, along with his twin brother, Calvin and the rest of his family. We will miss Al very much.

FOR SALE

New HAPI KR-2 engine mount for use with HAPI accessory case. It would also fit the 0-75 and 0-200 cases. \$170.00
I'll pay shipping anywhere in the U. S.

Richard Roush
RD #3, Box 107
Middleburg, PA 17842
717-837-3645

FOR SALE

KR-2 boat stage, spars built. Have fiberglass gear and mounts. Also have foam, dynel fabric, canopy, wing attach fittings, new plans and wood to finish.

Lee LaFarlett
228 Ada Dr.
Trumann, AR 72472
501-932-1201 Business
501-483-2795 Home

INFO REQUEST

How to tap the magneto harness and add a secondary ignition system using the same plugs. Any info would be greatly appreciated.

John Savelli
12 Via De Luna
Pensacola Beach, FL 32561

1991 KR Gathering Video

The 11th Annual 1991 KR Gathering video featuring 2 KR1s and 14 KR2s, with close-up high-speed flybys, spot landing contest, and awards. This 1 hour 30 minute video is edited and titled in VMS only.

To order mail check or money order for \$29.95

to:

Donald F. Morin
P.O. Box 681
Cocoa, FL 32923



FOR SALE

KR-2, 2100 D Revmaster, 70 HP, mod. for high compression, 4 cylinder CHT & EGT, fixed gear, Sterba Prop, new wheels, brakes. Mode C, Posa Carb, Loran. 320 Hours total time on AF/engine \$8,000.00.

Jim Tennison
3290 San Helena Dr.
Oceanside, CA 92056
619-757-5335

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 176 JANUARY 1992



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD, OSHKOSH, WI 54903 3086
PHONE 414/426-4800

NOW IT CAN BE TOLD!

Never adjust your VW valves again... set them once and forget them! No machining, just drop them in! Use your camshaft! Moore power, run cooler, quieter... Moore lift on your cam.

Send SASE & \$10.00 for complete information and prices to:

Hydraulic Lifters
P. O. Box 622, Dept. KR
Toccoa, GA 30577-0622



KR NEWSLETTER

ISSUE NO. 177

FEBRUARY 1992



P.O. Box 579

Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



MAX CALKIN AND TOM BENTON'S KR-2, N13706

Here Is an update on my second KR-2... I should say "our" KR-2 (Tom Benton and I are partners in both a Cherokee 180 and this KR-2). I flew my first KR-2 (N28AK) for 240 hours before ferrying it to a new owner on the east coast. Soon thereafter I realized that is was a mistake to be without a KR-2, so enter KR-2 number two. This KR-2 was a restoration project. It had originally been finished and flown in Arizona in 1982. After restoration, I flew it for about 20 hours in the last part of 1990.

Cont'd page 2

After this, I decided to convert it to a fixed tri-gear. This took me about eight months to complete. I'm sure someone else could do it faster. I used Dan Diehl's complete tri-gear set. One thing that I would recommend with the free swiveling nose wheel is a good set of true caliper type brakes. I ended up using the Matco 5" wheel and brake assembly (Wickes MT-W50 BW/MC) which are doing a good job.

Besides the obvious advantages of better taxing visibility and superb ground handling, there are other changes. First and foremost, it looks like a much larger airplane than the tail-dragger version. Several people have called it a Glasair (from a distance, of course). I call it a "poor man's Glasair". The cockpit is quieter and less drafty since the springbar holes can be sealed up. Your propeller has more protection. You can brake as hard as you want. The fiber-glass gear legs give you much less bounce. My landings have improved greatly. N13706 weighs 634 lbs. without a starter (we are adding a starter soon). Like my first KR-2, this one has a Revmaster 2100cc engine. Prop is an Ed Sterba 52 x 50. At 5000' and 3000 rpm, I get a true ground speed of 125 mph per the Loran. 3300 rpm will give 140 mph I.A.S. confirmed by two factory airplanes. These speed figures are very close to what I was getting with the retract gear. On my conversion to tri-gear, I ended up being three pounds heavier. The total cost of the tri-gear conversion, including the new wheels, brakes and pants was \$1,700. Expensive, yes, but it made a whole new airplane out of this KR-2 and we are pleased with the results.

Max Calkin
Rt. 1, Box 149A
Omaha, AR 72662
501-426-5307

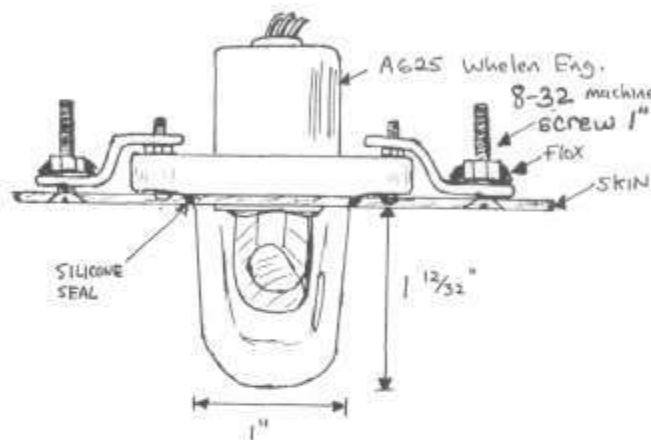
THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN
INDIVIDUAL COPIES \$1.50 EACH.

AERODYNAMIC STROBE

If you are looking for a good aerodynamic strobe set-up for belly/turtledeck in your KR, I found that Whelen Model A625 is a good choice. I left all hardware inside so only the oval glass dome protrudes. Angle brackets and 8-32 screws hold everything in place.

Robert Peterson
7552 1/2 list St.
Burena Park, CA 90621
714-522-6974



AIRCRAFT BRAKE QUESTION???

I have Rosenhahn brakes on my KR-2 with a little over 100 hours on them. I use the brakes a lot for steering during take-off and landings (rollout) and haven't had any problems yet. I had a flat on one landing without any problem keeping the plane straight down the runway, using the brakes to help steer.

If adjusted down too far at the peddle, auto hydraulic master cylinders will not release and will build-up pressure each time peddle is operated until it locks up solid.

Maybe someone could tell us if aircraft brakes do the same?

Don Cornwell
Rt. 13, Box 93
Morgantown, WV 26505
304-599-5519

SPARK PLUG REPAIR

Here is a useful tip for repairing spark plug threads without removing the heads.

I have a HAPI split head engine with 10mm x 1mm dual spark plugs, the threads stripped out and I could not find a Helicoil for this size so I made an insert by using an old spark plug of 14mm x 1.25mm (standard small size auto plug) the gasket type and medium thread length. Cut off per drawing and break out the

porcelaine and tap with a 10mm x 1mm tap (the size plugs that are in my engine). You cannot use the 18mm spark plugs, as there is not enough room for this big of a plug insert. You can put an air hose in

the other plug hole with low air flow and this will blow out the chips while you are tapping. If no air is available, you can use grease on the drill and on the tap which will pick up the cuttings. Be sure to back out often and clean up. You will also need to make a tapping holder to hold the insert while tapping. Just use a scrap piece of metal 1/4" - 1/2" thick and tap for the 14mm spark plug. You can get the insert out by putting a plug in the back side and screwing it out far enough to get a hold of the insert and screwing it off the plug.

Don Cornwell
Rt. 13, Box 93
Morgantown, WV 26505
304-599-5519

ADAPTOR FOR STRIPPED THREADS SPLIT HEADS, VW'S/ 10MM X 1M SPARK PLUGS WITHOUT REMOVING THE HEADS.

Use medium length thread spark plug with small radii, gasket type (a gasket is not used under the adaptor).



- (1) Saw off, leave about 1/16 to 3/32" above the flange; keep cutting around the metal, as the porcelaine will take the cutting edge off of your saw.
- (2) Cut off the ground and punch out the porcelaine.
- (3) Tap inside thread 10mm x 1mm, tap can be bought at Sears, P/N 9HT52897.

To hold the insert, use a piece of scrap metal about 1/4" - 1/2" thick, drill and tap for 14mm spark plug, tap can also be bought at Sears, P/N 9HT52984 (14mm x 1.25mm).

Place air hose in other plug hole with small amount of air blowing out the hole to be drilled and tapped, which will blow out the cuttings.

When you install the adaptor, screw a spark plug into the adaptor and put Loctite on the threads that mate to the head, torque in and let set till the Loctite sets. Then screw out the plug (use a gasket on the spark plug, but **not** under the adaptor).

We recently received these photos from Jerry Johnson who won "People's Choice" (reserve) award for his KR-2, N86CT at last year's KR Gathering in Kentucky. Jerry had to leave before the awards photos were taken. Congratulations Jerry!



The Honda Alternator Revealed!

By Richard Kunc

MOSLER MOTORS

140 Ashwood Road

Hendersonville, NC 28739

704-692-7713

Those who've been flying KRs for more than a decade remember the original plans calling for an alternator from a Honda motorcycle. Nothing wrong with them, but the schematic was never too clear. If you wired it EXACTLY as shown, you were usually all right. On the other hand, if you tried to get fancy with some form of voltage regulation, you could screw up very easily.

The confusion comes in defining the word *alternator*. Normally, you expect an alternator to have a main winding plus *afield* winding. The field winding acts in conjunction with a voltage regulator to control the voltage of the main winding.

When you look at the schematic in the old Rand Robinson plans, the alternator is shown with two windings, one smaller than the other. So guess what the natural assumption is. That's right, boys and girls. But we're all wrong.

That two windings are not main and *field*, but *daytime* and *nighttime*. This simple, logical, somewhat startling fact was

brought home to me by a very alert customer, Gary Iverson of Nampa, Idaho. He researched it and sent me a page from an original Honda service manual explaining just how the alternator works.

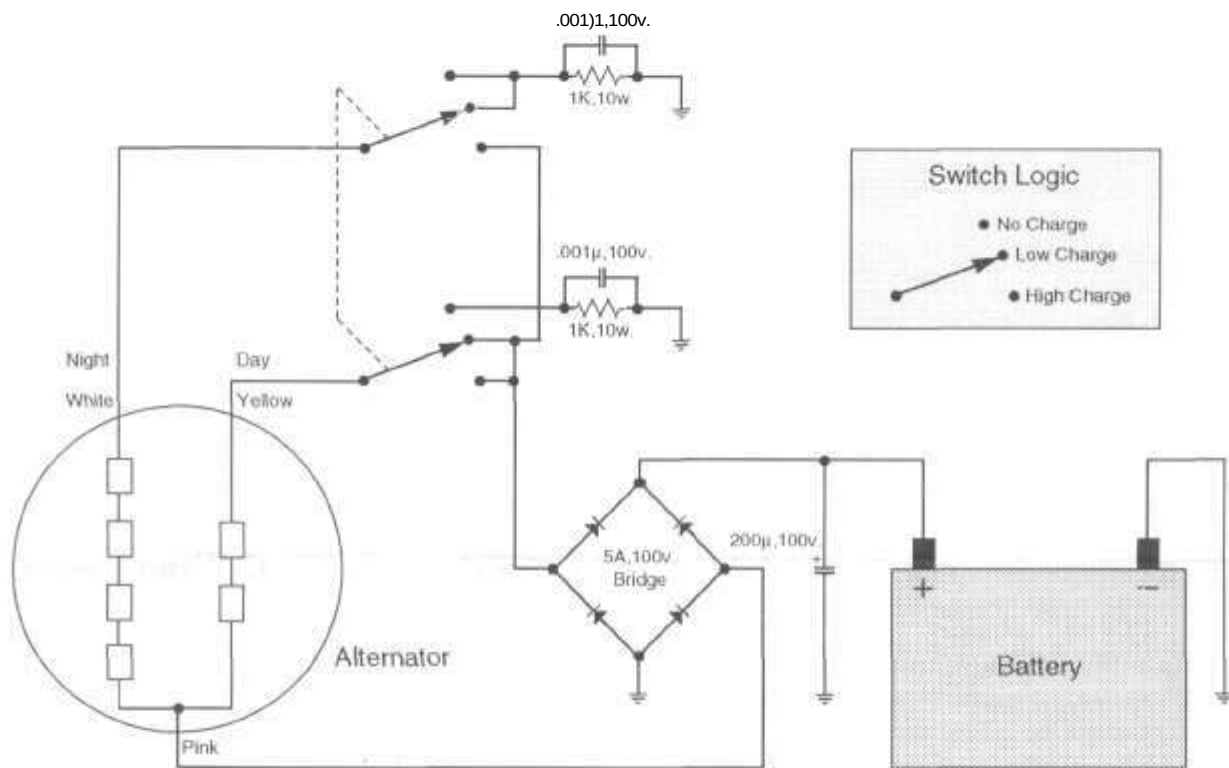
The daytime winding is the smaller of the two and puts out sufficient current to meet daytime demands. At night, when lots of lights are lit, the higher demand is met by paralleling the daytime and nighttime windings for higher available current. Simple as that.

The diagram shows how I've adapted Gary's revealed logic to my own electrical system (the old one). I'm using a "utility" battery (larger than a motorcycle battery) so I don't worry about overcharging it.

The old Honda system is archaic but it works well. And if it's wired correctly it'll perform about as well as the popular Syncro alternator.

My thanks to Gary Iverson.

Honda Motorcycle Alternator Adapted to VW-Based Aircraft Engines



NOTES:

1. The resistor/capacitor pairs "unload" the alternator windings when not connected, eliminating a loss of power due to physical resistance in the alternator.
2. The switch can be either a double-pole/triple throw toggle type or a high-quality rotary unit of the "shorting" type.
3. Basic configuration courtesy of Gary Iverson, Nampa Idaho. Thanks, Gary.

RUDDER PEDAL INSTALLATION

I can look back through my builder's log and usually, about every third paragraph, be reminded of something funny. When editor, Earl, asked me to write an article about installing the KR rudder pedals, I went back to the logbook and sure enough, got a chuckle. It wasn't so funny at the time 'cause it cost some unnecessary bucks but time passes and I can smile about it now.

The KR plans designed rudder pedals are easy to fabricate from 5/8" 4130 tubing. If you're just learning to burn holes in your clothes with a welding torch, this is a good exercise to start with. I even went one step farther and decided to make those simple nylon bearing blocks rather than buy the kit parts. Besides, how hard could it be?

I spent the better part of a day driving to, around and from Dallas locating and buying the correct chunks of nylon. The table saw easily cut them to size and I even remembered to split them horizontally before drilling the holes to carry the rudder pedal tubing. After clamping the blocks onto the drill press table, I spun up my expensive, new 5/8" drill bit at the slowest speed the drill would produce.

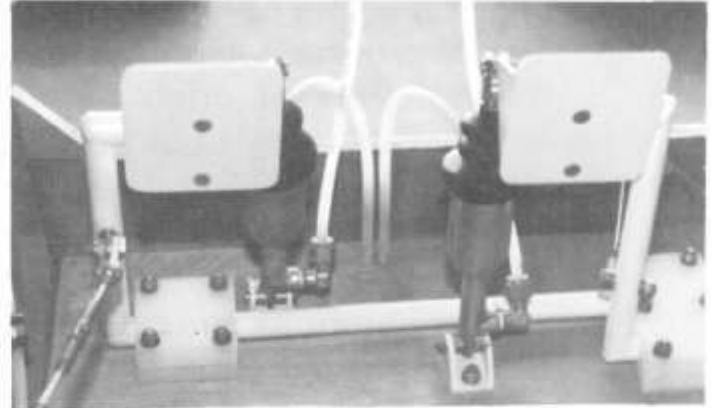
It took only a split second for that bit to hog into the nylon, twist it free of the clamps (nylon is slippery) and ruin the block. No problem... the shop door was open so I simply pitched the ruined pieces into the street. Besides, I had extras.

I never was able to get those blocks drilled to suit me. Ended up ordering the parts from Jeanette.

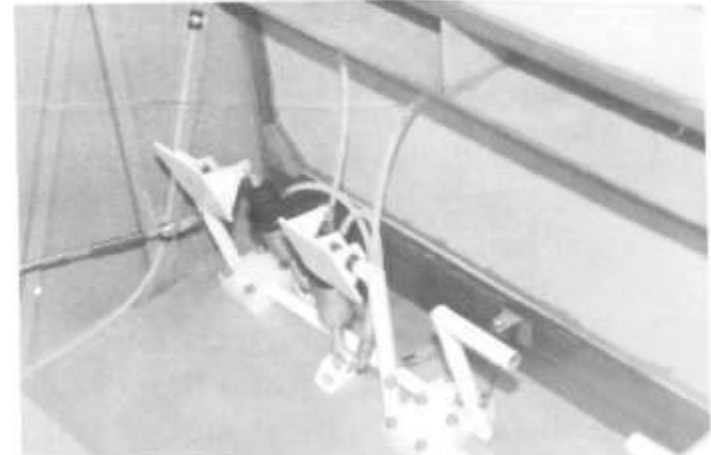
I've not had need to use that 5/8 bit again in over three years. Expensive lesson for me. Know when to say when.

You'll need to locate the rudder pedal mounting block positions prior to installing the cockpit flooring. Small, 5/8" thick ply or spruce spacers placed between the floor and belly skin will permit the nylon blocks to be anchored securely without crushing the thin plywood. A similar spacer block will be necessary for attaching any brake system components or brackets. The rest is easy.

Lastly, some provision must be made to close the rudder cable system "loop"; otherwise, the pedals will flop around anytime your feet leave the bar. I've seen solutions utilizing multiple pulleys, brackets, cables and springs that



**RUDDER PEDAL BALANCE SYSTEM
BRAKE LINES/VENTS**



**NOTE FILL/VENT LINE MODIFICATION (TUBES)
AT EACH MASTER CYLINDER BOOT**

run all over the cockpit. They may accomplish the job but there is a simpler and lighter way. The photo will explain most, while the sketch has some details and hardware call outs. Be sure to position the outer edge of the pulley close to the aluminum mounting bracket. This will serve as an effective cable guard. The 1/16" stainless cable does not need to be "drum tight" for the unit to work.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871

FOR SALE

KR-2 retract spring bar, hinge fittings and gear legs. \$100.00/or best offer.
KR-2 4-1/2" tail wheel, bracket and cable sprs. \$30.00.

Max Calkin
Rt. 1, Box 149A
Omaha, AR 72662
501-426-5037

FOR SALE

KR-2 in boat stage with spars built. Fuselage is one 14" bay longer with 5" added forward. Also: Hardware, controls, fixed landing gear, foam, fabric, Diehl wing skings, more.
\$2,000/080

Tim Rowin
2637 Van Buren St.
Carson, CA 90810
213-518-3086

1991 KR Gathering Video

The 11th Annual 1991 KR Gathering video featuring 2 KR1s and 14 KR2s, with close-up high-speed flybys, spot landing contest, and awards. This 1 hour 30 minute video is edited and titled in VHS only.

To order mail check or money order for \$29.95

to:
Donald F. Morin
P.O. Box 681
Cocoa, FL 32923

WANTED

Carburetor heat box and exhaust muff. New or used with or without hoses, clamps etc. Must fit 32MM POSA. Call or write:

John Duffy
237 Bridge St.
Bridgewater, MA 02324
508-549-8274 work
508-378-3411 home

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 177 FEBRUARY 1992



500
MONTE MILLER
190p PARKSIDE DR.
DENTON,, TX 76201





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



KEVIN LAYDEN'S C-FKEV, NOVA SCOTIA. CANADA

After many years of reading about other KR builder's pride and joy in the newsletter, I finally have a contribution. C-FKEV first flew in July 1990 after five years of construction. It is built to plans using all Rand Robinson prefab fiberglass parts. After two gear failures during normal landings I now have Dan Diehl's fixed gear. The tail spring and wheel wore out and broke over a period of time. I think the problem with the KR tail wheel is actually the spring, not the wheel. There is very little give to the stock KR spring. The spring that I have now is much longer. I made it from a car leaf spring. I ground it down to make it light and flexible. I am using a snowmobile bogey wheel. The result is a soft quiet ride. Next summer, when I get more time to test it, I will provide more information for the newsletter.

Continued page 2

Weight came out at 579 lb. The engine is a MAPI 1835 with dual electronic ignition and hydraulic lifters. I don't have any performance figures at this time because of all the changes I have made since the first flight. I couldn't get the engine to turn up past 2700 rpm static. Rex and Patrick Taylor kept telling me that there was nothing wrong with that engine... it has to be the prop. Five p'ops and \$2,000 later I was still no further ahead. Max Calkin provided me with the information I needed to get the engine producing enough power to take a passenger. A year later Tim Kern of Mosler Motors was kind enough to supply free parts and information I needed to get the engine working as it should. I purchased the engine as a kit from MAPI. They sent me so many wrong parts that it was three months before I could get it assembled. Tim Kern told me that I was lucky that I didn't blow the engine because I still had the wrong pushrods, valve springs, compression ratio and MAPI reamed their valve guides wrong.

I had no taildragger time and only 85 hours total time so there was no way I was going to test fly it. A friend of mine, Bob Poirier, is an experienced taildragger pilot and he volunteered to do the test flight long before the plane was completed. Bob had no problems with the plane at all...just the engine...no power.

I spent ten hours taxi testing and another 12 hours dual with Bob before I went solo. Flying Cessnas and Pipers will in no way prepare you for your first flight in a KR. Control is very sensitive but it is great when you get used to it. The KR goes where you point it NOW... there is no lag, control is instant. Taxiing with the tail up is harder than landing and taking off. I certainly recommend it because I was well prepared for my first successful solo in C-FKEV, I felt comfortable and in control.

I enjoyed every minute I spent building this airplane. Flying it is very exciting and I have no intention of ever selling it. My wife, Lynda, enjoys flying and is looking forward to some long cross-countries. My sons Paul and Barry also contributed a helping hand whenever required. When I had the second gear failure, Paul worked night and day with me until the damage was repaired and the new gear installed. If it wasn't for his help

I would have been grounded for months instead of three weeks. Many thanks also to Dan Diehl for his prompt service.

I built this airplane for my own selfish pleasure and in no way expected it to be a public attraction. So far, it has been in a local newspaper, three articles with pictures in COPA (same as AOPA in the U. S.), on two local TV programs and I won the trophy for best homebuilt at our local EAA Fly-in. Everywhere I go I get held up with questions and camera. Last summer Lynda and I flew to an airshow in Yarmouth, Nova Scotia. After the Snowbirds completed their performance, two of them climbed out of their jets and came over to the KR to have a good look and ask questions.



When I started building C-FKEV I thought I would be on my own...no one would want to get involved in such a crazy scheme. Not so, help came from many sources... the most valuable being Wally Sloan and Max Calkin. Wally Sloan is a local homebuilder and machinist who was always available when I needed him. Many of you know Max Calkin... he has been around the KR scene for many years. Max was the KR expert I always turned to when I needed information not provided in the plans or the newsletter.

I made many new lasting friendships while fulfilling a lifelong dream to build and fly my own airplane. For all of you out there still building... don't ever give up because the end result is very rewarding!

Kevin Layden
25 Pondicherry Cres.
Dartmouth, Nova Scotia
CANADA, B2W 5C4

CANOPY STAY

...was at a local sport aviation airport awhile back doing some lettering on a newly constructed Pitts one-holer. The owner hated stick-ons of any type, so I was earning my pay by doing what he called "six inch work". He meant that he wanted to be able to stick his nose six inches from my work before he could tell if it was handwork or computer generated graphics; all the while looking over my shoulder as I attempted to add a drop shadow to the just completed Pitts logo. Sorta the same anxiety level as if your mom was watching you on your honeymoon night and offering a critique!

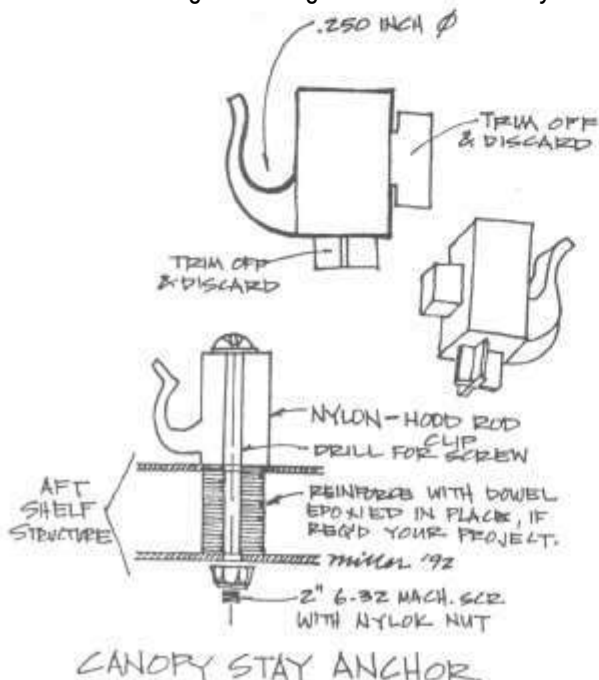
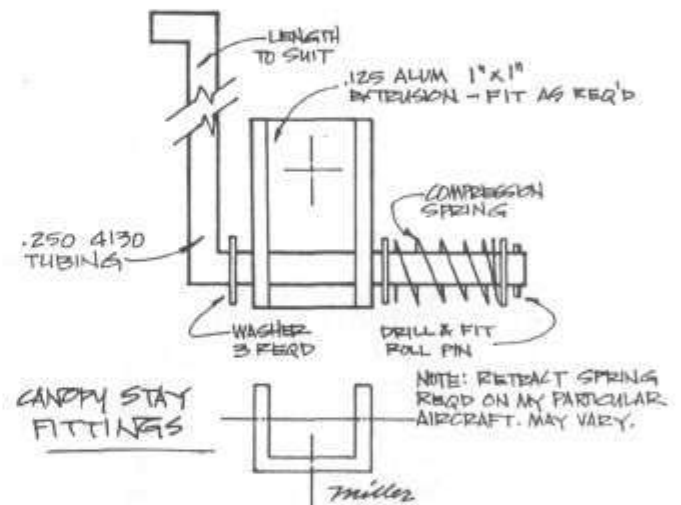
So what's this got to do with a KR-2? Well, I finished the job, got paid, and was enjoying watching the airport activity when a Christen Eagle was pushed out of the next hangar. Cool. The pilot mounted up, closed but did not latch the canopy, and hit the starter. As the big engine caught, the propwash violently jerked the canopy open, ripped it off the hinges and blew it back into the tailplane! Very unhappy owner with a ruined canopy and lot of repair work ahead. Needless to say, the Eagle was pushed back into the hangar for several weeks.

I remembered the incident as I worked on my KR; there needs to be some sort of canopy latch/stay systems to avoid repeating the Eagle incident. If memory serves, a back issue or two of the KR Newsletter showed a Rutan Eze-style safety latch that will keep the canopy down should a neighboring aircraft hit you with

his propwash. Gyro wizard Ken Brock sells a stainless steel version for about seven-fifty. OK, that keeps it closed yet accessible from the outside but what about when you want to leave that fishbowl opened up?

The stock KR canopy attaches to the airframe by using a long, aluminum hinge. Just fine buttoned up but subject to the stress of a long moment arm (the canopy) when open. These "retractable keychains" I've seen employed as canopy stays allow the canopy to flop over and depend on gravity alone to keep it there. That's just fine in a perfect world but there's nothing to keep it from bouncing up and down or being blown shut by a transient gust of wind. Just how many owners are willing to test their canopy's structural integrity by slamming it shut as hard as you can? No, what's needed is something simple, light, and easily fitted to the KR

Continued on page 7



BRASS RECEIVER TUBE FOR CANOPY STAY IS FLOXED INTO THE WOOD PORTION OF CANOPY FRAME.

M A T C O M f g .**PRODUCT INFORMATION**

We have received a couple of phone calls from builders who have had a problem with their brakes locking up on one side or the other. There may be several reasons for this to happen and we would like to address some of these so as to help the builder find the source of the problem. With very rare exception the source of the problem is almost always an installation problem.

First, let's look at the hydraulic system as a source of the problem.

1. If you have a wheel lock up and you can release the pressure in the system by opening the brake bleeder valve, the cause is probably in the installation of the master cylinder. The Matco master cylinder is so designed that the shaft must be all of the way out to its stop position to release the valve inside thus releasing the pressure. The springs inside of the master cylinder are not designed to support the weight of the rudder pedal system. The rudder pedal should not "lean against" the master cylinder shaft but should be held up by a separate spring system. When the rudder pedal system is being used to steer the plane on the ground be sure when you are pushing on one side that the other side is not creating a braking force on the master cylinder. If it is, the other side will hold the brake pressure as it is designed to do as long as there is a force placed on the master cylinder shaft. Almost all of the complaints received at the factory about residual pressure in the brake lines has been traced to improper installation of the master cylinder in this fashion.

2. Another source of the problem could be the installation of a brake pressure locking system in the brake line. Sometimes the brake locking mechanism malfunctions and doesn't allow pressure to release properly. If you have the residual pressure problem with a brake locking device, try routing the brake line around the locking device and see if the pressure problem goes away. If it doesn't, the problem is probably elsewhere.

3. Improperly tightened/installed brake line and fittings may compress the brake line improperly thus causing a restriction in the flow of hydraulic fluid.

4. The most common source of the problem is improper brake fluid. Only a petroleum based fluid can be used with the Buna-N o-rings used in aircraft brake systems. Aircraft brake fluid is recommended. If you use a glycol based automotive brake fluid, it will dissolve the o-rings and cause the brakes to lock up. This is stated very clearly in the printed material supplied with the wheels. Many times this important notice is overlooked by the builder.

5. A particle of foreign material floating in the hydraulic system can impede the flow also. Try flushing out- the system completely to make sure it is free of any particles that may have been introduced in the assembly.

Secondly, let's consider the wheel installation as the source.

1. The brake plate (torque plate, anchor plate) should be in a parallel alignment with the brake disc and in the same plane. If it is off to one side of the disc or the other it will cause the brake to work inefficiently.

2. The brake plate should be anchored so that it is not crooked and causing a bind on the brake mechanism. This may cause it to not release properly.

3. The brake spacers that go through the brake plate and upon which the movable brake shoe travels should be free of corrosion so that they will not bind. The wheels we have made within the last three years have nickel plated brake spacers and will not corrode.

4. Check to see that the holes in the brake plate allow the spacers to slide back and forth freely, that the holes are not oversized (should be a "V" size) or have worn irregularly and causing the brake mechanism to bind.

5. Check to see that nothing is touching the brake puck housing like a wheel pant or gear door thus causing it to bind.

If you are certain that there is no force on the master cylinder shaft and there is still residual pressure in the brake line and you have tried the other suggestions listed above, feel free to contact Matco to see if we can help you resolve the problem. All of the master cylinders and brake pucks are tested at the factory before shipment to assure you of a high quality product when you receive it. There are thousands of these brake systems in use today and installed properly should give you years of trouble free use. If you get stuck with a problem, our staff is available to help you resolve them, answer your technical questions and fill your aircraft component needs.

65 EAST KENSINGTON AVE. SALT LAKE CITY, UT 84115

MANUFACTURER OF AIRCRAFT COMPONENTS

KR-2 RR PRE-MOLDED COMPOSITES

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN
INDIVIDUAL COPIES \$1.50 EACH.

Cowl (2100D Turbo) \$138; Front deck and
tank \$167; Canopy and canopy frame \$215;
Wing tips \$94; Also marine Loran. Never
used. Same type used successfully in
Long-Eze \$150. All FOB San Antonio, TX.

Martin Luker
5819 Rue Burgundy
San Antonio, TX 78240
512-614-6020

BUILDER'S REPORT FROM NEW MEXICO

Hi, there, my name is J. R. Galle and I'm about 85% through with my KR-2. I would like to share some of the things learned or completed through this point. First, my dad and I have done Volkswagens together since high school (back in the 60's) so getting the motor set up had to be a snap. I know VW's... no problem. Besides, I bought Rex Taylor's "How To Build A Reliable VW Aero Engine", and I have the "Chilton" and "Clymer" publication manuals on V-Dubs.

When it got too cold to glue in my cobbled together shop in the backyard, it just made sense to save time and slap together my engine in the meantime. I broke out the Taylor book, got a "HOT VW" magazine and really got after it. Of course, now was the time to get those extras just to make this one a little special. Like the 041 "Racing Heads". Doesn't cost that much more and the airflow just had to be better! Right down the list getting the top of the line on everything in the book. Yes, I got a forged stroker crank for the highest dollars. Selecting the cam was the hardest. There are so many grinds out there you can go nuts. So I invested in multiple phone calls to the cam suppliers to get the best for low end torque, up to about 3400 RPM or so. None of that street stocker stuff or race cams, high lift etc. Dune buggie cams seemed the most appropriate. I even ordered the case with case savers and the machining to fit the crankshaft. Yep, that's about it, except I bought Taylor's prop hub (HAPI) and the supercase, with alternator, starter and a supercarb. OK, well instead of saving half the price of an engine from HAPI or Revmaster (I hadn't heard of Great Plains yet) I was saving almost a third of the price. Still, I've been doing V-Dubs for 25 years and this is going to be my best yet. Oh yeah, I did send my crank back to Taylor to get it tapered and magna-fluxed just to be on the safe side. While I was waiting on that job, I had plenty of time to go back and look at his catalog and get the oil cooler, fixin's and an electronic ignition while I was at it. Well, maybe saving a fourth of the cost.

Dad and I did the most super job of putting this engine together. Torque valves, pre-lubes, lock nuts, new stuff to work with! The micrometers showed true to three decimal places! We did great. I even took time to weld up an engine run

test stand to try this dude out! Bolted it into the back of my truck. One thing that I should mention though, this is the first V-Dub engine I ever saw that didn't have an oil dip stick. I found the place to put one and spent a couple of days working with aluminum to make one down on the bottom. On a trip I found out that somebody else must have had the same problem (you can buy what I made). So I bought that too. Just costs four quarts of oil to install. What the heck.

By the way, I found out while hooking up my Westach quad gauge combo that this engine didn't have a place to screw in the oil temperature gauge and the oil pressure gauge. Now if that don't beat all. I haven't seen anything like this in all my years! Lucky I bought all the fancy stuff to put on that oil cooler. A little innovative plumbing and those things worked fine.

When the time came to start this dude up, I went back over everything several times. The Props, Inc. 52 x 48 propeller was torqued to recommended values, no trash laying around, no excuse to wait. I forgot, I had bought Taylor's tuned exhaust too. I followed Taylor's instructions down to the dime in setting up the timing, ignition, etc. and even let the fuel drip out of the supercarb before starting... and did it ever start! Lucky I had bolted it down to the bed of the truck! It snorted and bellered and just about pulled the truck backwards. I had a real fire breather here. Never saw such power out of a V-Dub before! I tried to keep it under 2000 RPM the first time but it blipped up to 2500 at least once and while my lips and lids were flopping it might have seen well over three grand! I shut it down as soon as I saw I had plenty of oil pressure and the temperature was coming up. Besides, I had the ampmeter hooked up backwards. That's about all I remember. I whooped and hollered and did a back flip out of the truck and sprained my ankle.

Next, since all the neighbors were out watching anyway, I got the wife to get the video camera so I could do it again! Right on cue, the beast roared. I couldn't believe how fast the throttle reacted and how fast the RPM's came up. What a beast! I obviously needed a different prop because static RPM will be over 3500 and the sound barrier will fall! Again and again I did this for the camera. The third time the engine roared but the prop slowed down! I couldn't believe my

eyes and ears but shut down was quick and the prop just freewheeled on its own. Why it didn't come off and kill the kids or neighbors I'll never know but will be forever grateful. Next time it's out in the boondocks.

On engine tear down, two things appear to be a combined problem. Perhaps fortunately, in retrospect, the prop bolt was too long. Just a bit, but enough. The micrometer had it true to 0.002". It was torqued correctly but it was too long. The other thing wrong was the power... there was too much. I knew that when it was running but wouldn't let myself admit it. I questioned everything...the cam, pistons, valves. I ain't-a-gonna tell you how long it took me to figure this out but do you know what 041 racing heads mean? It means 41 cc's in the combustion chamber or 0.041 liters in combustion chamber... 'cause I measured them. Stock V-Dub has 53 cc's. Instead of my 8.2:1 compression ratio as I had figured, it must have been 12 or 13:1 (maybe more, I didn't refigure it). I could have done myself a lot cheaper to buy Mr. Bennett's Great Plains engine. Remember that high dollar crank? Well, I got another one and Mr. Bennett's Prop hub. The engine runs pretty good now and is installed on my plane. If I had it to do over again, would I? I don't know yet because I know a little more about V-Dubs. By the way, Barbara Streisand and Omar Sharif got taped over my video. What the heck! #13 is scheduled to fly summer of '92. (After beaucoup number of taxi hours). Grins

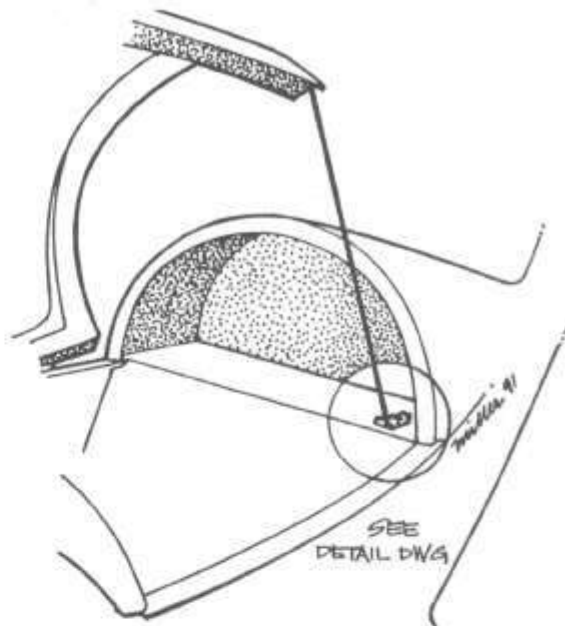
J. R. Galle
303 Elmdale
Carlsbad, NM 88220
505-885-9205 after 5 p.m.

KR-2 FOR SALE

KR-2, built in 1978, 1918cc VW 70 hp, Super Posa Carb, empty weight 510 lbs Alum, header tank, dual controls, stock retract landing gear. Burns 3.36 gallons per hour at 75%, 140 TAS, 900 FPM climb. With extra bubble canopy, transponder and misc. equipment. \$4,500.00 or best offer.

Earl Teporten
P. O. Box 579
Lakeville, MN 55044
612-435-7275

Miller continued from page 3...



that will hold the canopy without having to reinvent the wheel.

The sketch shows a support that was installed in my KR-2. It allows cockpit entry without problem, it quite light, stows easily and is cheap to construct. The design will retrofit existing airframes fairly painlessly. Attach the aluminum fitting to the rear shelf. The free end of the canopy stay rod is inserted into a matching brass or aluminum tube (hobby shop variety) that has been epoxied into the canopy frame rail and trimmed flush.

You might check your local auto parts shop for a nylon hood rod clip to use on the rear deck. I found one that was cheap and looks very "factory".

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871

1992 SUN 'N FUN

The 1992 Sun 'n Fun held in Lakeland, Florida, will begin with fly-in on Sunday, April 5 and run through Saturday, April 11, 1992. Morning fly-bys and an air show are scheduled for each day. The Sun 100 race is scheduled for Monday, April 6. "Forums, workshops, seminars and idea-exchange sessions will be plentiful. Noted aviation authorities are scheduled to speak." For more info, contact: Sun 'n Fun office at P. O. Box 6750, Lakeland, FL 33807 or call 813-644-2431. Or contact KR builder:

Virgil Salisbury
5445 SW 89 Place
Miami, FL 33165
305-271-3608

FOR SALE

Engine baffle patterns and instructions for KR-2/Volks. Easily adapted to other Volks designs. \$8.50

MonteMiller
1900 Parkside
Denton, TX 76201

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 178 MARCH 1992

FOR SALE

KR-1 project, woodwork complete, tail feathers ready for paint. All brackets made, retract gear, spars, 1200cc VW KR engine mount, bubble canopy and much more \$ 1,900.00

1850 VW Monnett conversion for Soneri. Complete running, very low time.

\$ 1,500.00

IS00cc Porche, type 4 engine, force 1 bearing, slick mag. OTSM \$ 2,200.00

Mike McKusick
401 Washington St.
Brighton, MI 48116
313-227-6509 Days

FOR SALE

Partially completed KR-2. Fuselage wood structure and spars completed and signed off by the FAA. Also have: 4' x 4¹ birch plywood, aluminum retract gear package and spring bar, wheels, tires, mechanical brakes, axle kit, bolt kit, all foam, fiberglass cloth, canopy, piano hinges. Will sell complete or separate components.

Mark Bridgeford
6659 Fresno Ct.
Alta Loma, CA 91701
714-944-2663



KR NEWSLETTER

ISSUE NO. 179

APRIL 1992



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



**RICHARD RING'S N25RR, PRATT, KANSAS
SHOWN AT OSHKOSH '91**

Richard's KR is powered by a 100 HP O-200, spinning a 60 x 66 Prince prop. The firewall is extensively beef-up to handle the O-200. The fuselage is extended one foot (2" in front of the main spar and 10" behind the main spar). Empty weight is 700 lbs, gross weight is 1200 lbs.

Top speed is 200 MPH, cruise 180, climb 1400 FPM, wings and fixed gear are Dan Diehl designs. The O-200 burns approximately 5.5 gallons per hour. Richard's project was completed in two years, nine months and six days... totaling 1400 hours. Richard says he's very glad he changed his retract gear to fixed gear. Ground handling and clearance are vastly improved and he no longer worries about gear collapsing.

BUILDER'S UP-DATE

My tail is done, having to re-do my gas tank as it was too small (11.25 gals). Controls are in... working on brakes. Then I will start on the wings. I don't know just what stage you would call this but is to me, close to 40% done -• +. My cowl is coming in a few weeks from a votech school in OK. It's pre-molded from the ad I put in the KR Newsletter (they're making one instead of sending me the mold). Tur-deck is premolded as you can see in the photo. Spars are done (long time ago). Landing gear in long time ago and working. Wing attach fittings and spars are on the plane. Keep the newsletter coming my way...love it...big help to me.

John Cromwell
3908 W. Mandarin Circle
Tucson, AZ 85741
602-744-3303

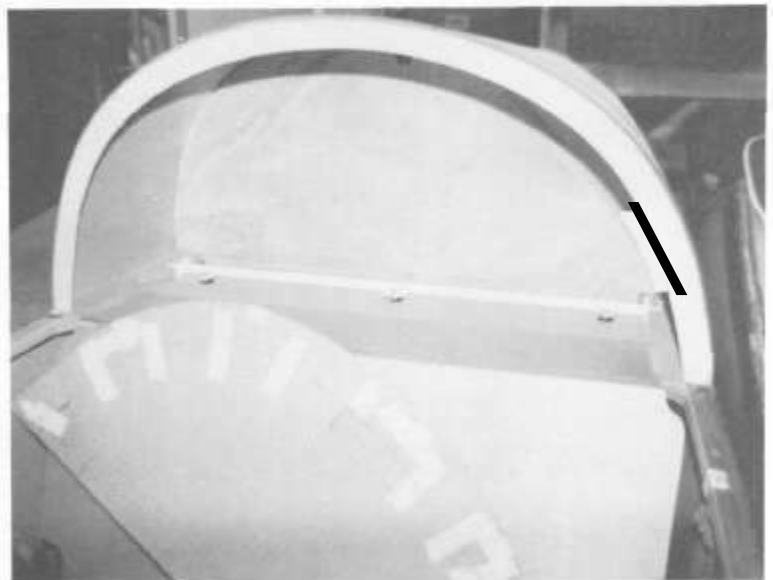


AFT COCKPIT BULKHEAD

Here's a simple idea that will assist in finishing out the KR interior; an aft cockpit bulkhead that's very lightweight, looks good and is easy to fabricate. Best of all, most of the materials should already be in your shop if you're far enough along to be working in the cockpit.

The primary construction material is 1/4 inch foamcore artboard. This product has a hard paper surface bonded to a dense foam liner. Very rigid, economical and available at most any art supply store.

A single ply of KR-style fiberglass cloth is laid up on each side of the panel and allowed to cure. While this is going on, fit a cardboard pattern to the aircraft, transfer the shape to the cured panel and cut out. Be careful not tear or delaminate the bulkhead. A sanding block works well to true up edges for final shape.



An important point is to route out the foam on all cut edges and fill the void with epoxy-flox. This step will insure a well built bulkhead.

My particular KR has a zolatone-style spatter paint interior so it was a simple matter to shoot a coat onto the bulkhead after first using a Uni step-bit to cut a finger pull hole. (Reinforce cut edges on this too.) You upholstery fans won't have any problems, either.

Several benefits are achieved by building the bulkhead. Besides slicking up the looks, it will reduce the rumbling noise generated by the tailwheel during taxi operations and is a good spot to attach a vinyl document envelope to help

keep you legal

CONT'D PAGE 3

Keep construction light as the area is not intended to carry any objects that could become unguided missiles during flight. Three spots of Velcro are more than sufficient to hold the bulkhead in position. Go overboard on the sticky stuff and you'll have a tough time getting the panel free...trust me on this one!

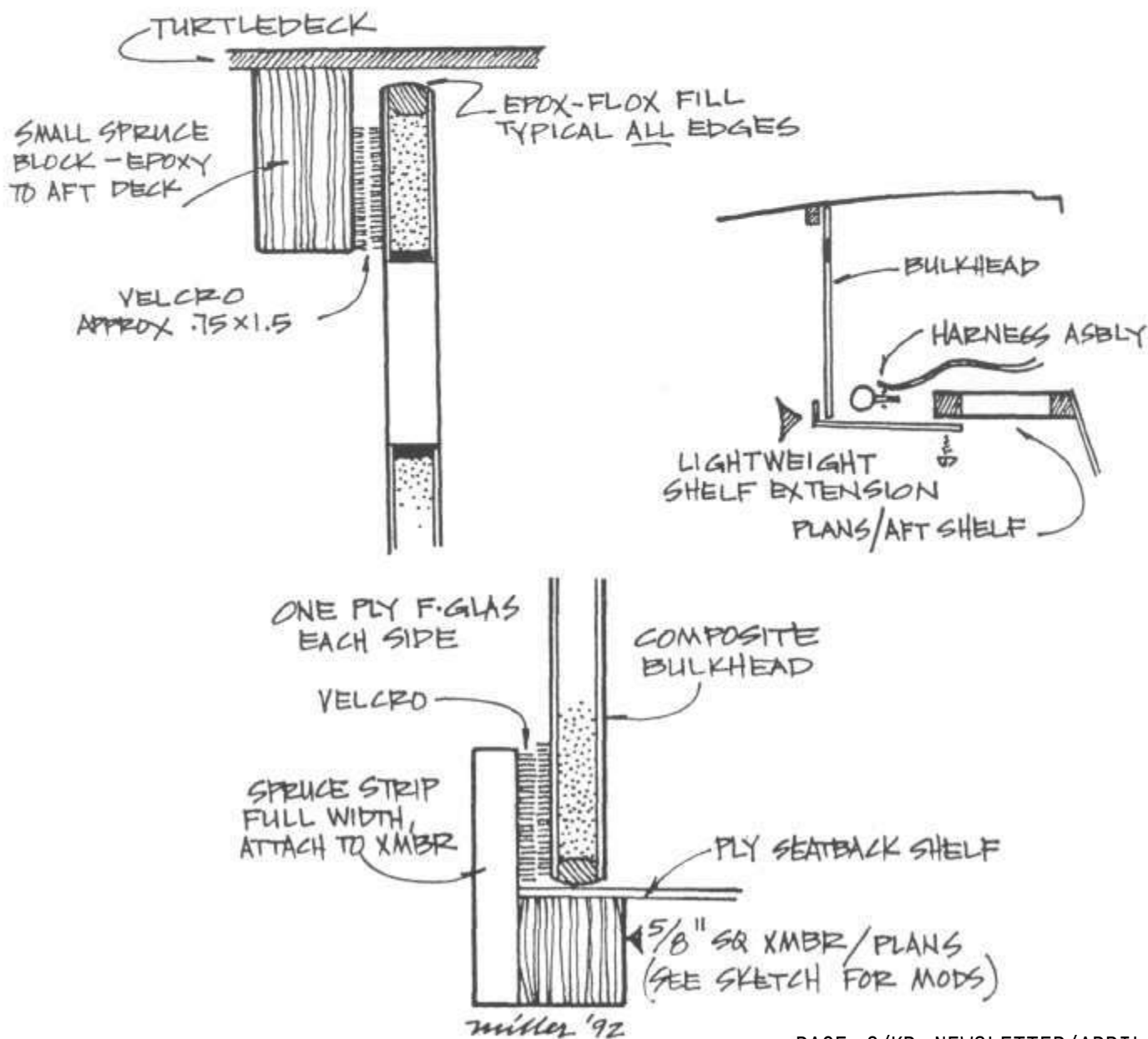
The sketch and photo shows the lightweight shelf extension in my aircraft. This modification clears the harness anchor, provides a better feeling of spaciousness in an already small cockpit and lets me have room to park headsets instead of throwing them in the seat.

Monte Miller
1900 Parkslde
Denton, TX 76201
817-566-5871

FOR SALE

Engine baffle patterns and Instructions for KR-2/Volks. Easily adapted to other Volks designs. \$8.50

Monte Miller
1900 Parkslde
Denton, TX 76201



COMPOSITE OF BUILDING IDEAS

I thought it was about time to take my turn at writing an article for the KR Newsletter. My KR-2 is about ready to fiberglass but won't be ready to fly for another two years or more since I am not a pilot yet. As an aeronautical engineer, I have analyzed many aspects of the plane and how builders have modified it. Focus of the information gathered from other builders and from analyses has been to get an idea of the safety and reliability of the airframe. Most builders have had to address the following issues and my positions are offered as food for thought.

Weight, stability, strength, deterioration over time, inspectability and safety are my main concerns. Being conscientious in obtaining good characteristics in those areas is likely to yield dividends in the areas of good speed, climb of rate, ground handling, range, useful load, control responsiveness, maintainability and safety. Without proper prioritization there is no way to get all of those benefits out of any plane.

The empty weight of the plane is about the most important factor in estimating whether a plane is as structurally safe and stable as it could be. There are many good KR-2s out there that weigh more than 600 pounds but the added weight has altered them from the original design even when they fly well. We all have gone through the mental loops of maximizing performance but it is too easy to over simplify the process and look only at benefits of a modification. Builders are usually aware of the down side of modifications they select but let's examine one decision process anyway:

Bigger engine or more avionics, fuel or load... faster, fancier... heavier and may consume more fuel and need bigger fuel tanks... more weight may need bigger wings for climb performance... bigger wings need bigger vertical tail or longer fuselage to maintain same cross wind landing performance... bigger vertical tail or longer fuselage adds weight and requires proper design and testing... longer fuselage means more bending... more bending?!... should we beef up structure and add more weight?...

All of this may sound negative but the original KR's balance many factors and need very few changes.

In the area of stability, the major concern is pitch sensitivity. Analysis seems to bear out that the KR-2 was designed for low drag, high efficiency, high maneuverability and simple construction. No news, right! The tail design delivers performance that fighter pilots often desire but not what many long distance travelers prefer. Aft center of gravity positions aggravate pitch sensitivity of aircraft and require more control inputs in turbulent conditions but that doesn't mean to add weight in the nose. To have the best pitch behavior, avoid installing fuel tanks that give the plane an intercontinental range while weighing down the wings. Avoid over-loading baggage compartments. Also, analysis of the vertical tail reinforces the notion that the KR-2 is not very safe in hazardous cross wind landing situations. Diverting to better oriented runways is advisable or going for a gear-up, head-wind landing if diverting is not possible.

By far the most important factors in obtaining good strength are to make good epoxy joints and follow the plans with the following exceptions. Builders should use Lance Niebauer's firewall modification as published in previous newsletters. Retractable gear appears to be safer in crash landings but I believe either of the fixed gear configurations to be stronger. Also, I will use solid foam cores in the wing leading edges instead of hollow cores to make the wings more resistant to bird strikes.

Deterioration due to wear or exposure to the environment are basic problems we face with everything. The key is to know your enemies and to know when they've stabbed you in the back. For the KR's, know that water is the primary enemy of wood and metal and sun is an enemy of plastics.

Even when you know what might cause damage, you will never know it unless you can detect it. For everything that can get damaged, you must either remove the potential for damage, take advantage or redundancies in structures to give you time to detect impending failures or make it inspectable without degrading the structure. Hinge and control horn sections, cables primary attachment structure, landing gear fittings and other parts may develop problems that cannot be easily detected. Three hinges on both the elevator and rudder may allow you to detect a break in one hinge before the

part falls off. An inspection hatch would allow you to inspect cables, horns and attachment structure in the tail. A small inspection hole with cap may allow you to inspect for damage at the base of upper exterior fixed landing gear attachments. Be creative and don't get in the situation of wondering what could be cracking now.

Seat belts, shoulder harnesses, safe fuel line detachment mechanisms, fire and smoke barriers and safe control sticks and instrument panels are some of the important factors that can save your life, in even minor crashes. Install seat belts that keep you in your seat. I am designing a light weight system for installation of shoulder harnesses. I'll publish it when I'm sure of the design but to give you a hint, it will borrow heavily from Niebauer's firewall modification concept. Heater vents are in many KRs but the pilots should be able to seal off the cockpit from engine smoke. One pilot carries a hose to stick out his exterior vent for breathing in case of smoke but that won't help if he can't see. Make an instrument panel that your head and hands can break if they had to during an impact not vice versa. Don't use a control stick that your forehead will be impaled on during a vertical crash. Use a fuel line configuration that won't rip out the bottom of your header tank if the engine is ripped off the firewall. Don't crash.

I like hearing from other builders and swapping ideas. Call or write anytime.

Don Blankenship
2874 McKay Rd.
Dayton, OH 45432
513-427-2741

RESPONSE TO AIRCRAFT BRAKE QUESTION

In Issue #177 (February), Don Cornwell raised a question in regard to brakes. This response is from Gene Darst:

I believe all master cylinders, car or aircraft, must be returned to full release, i.e. the rod must be all the way out so piston releases the fluid on Cessna brake cylinders -- Cleveland, etc. -- must be full release to relieve fluid and fill the piston from reservoir. On any cylinder I would say... get a data sheet, full specs, etc. to set it up. I used a Cessna 150 maintenance manual and it works.

Gene Darst
585 Iowa Street
Beaumont, TX 77705

FOR SALE

FUSELAGE FOR SALE -- Wooden fuselage on retractable landing gear, with center section spars, seat, control stick in. Outer wing spars completed. Horizontal stabilizer and elevator completed and fiberglassed. Excellent workmanship! Building lower-performance plane instead. \$1,000 or trade for Rotax or good small car for teenage daughter.

Kerry Cartier
108 W. Creekview Drive
Red Oak, Texas 75154
214-372-7084 work
214-617-3901 home (near Dallas)

FOR SALE

KR-2 HAPI-1835 (270 hrs), front hinged canopy, Diehl, fixed tri-gear with hydr brakes and new wheels/tires. Alt, IAS, compass, hour meter, tach, EGT/CHT, oil/temp & pres. Nov. 91 annual.
\$8,000.00

2 SUBARU ENGINES:

- 1) 1982 EA81 (OHV - 90 hp) \$400
- 1) 1985 EA82 (OHC -130 hp) \$600

H. L. (Bud) Powell
4900 18 Mile Creek Road
Westport, KY 40077
502-627-2923 (days) 502-222-5410 (nights)

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN
INDIVIDUAL COPIES \$1.50 EACH.

WITH GREAT SADNESS...

we received the following information from Pete Peterson, Des Moines, Iowa. Ray Bristow of Des Moines, Iowa was killed on February 3, 1992 when his KR-2 crashed west of Boone.

The crash was unobserved but it seems that CG may have played a part. Ray was using sand bags to simulate a passenger and may have concentrated too much weight in one spot. He also did not have a full header tank. We speculate that he lost his canopy, went inverted where several of the bags fell free, then split-S'd into the muddy cornfield, impacting about 30 degrees nose down and slightly left wing low. We can't know whether he tried to pop the canopy or whether he went inverted and some loose sandbags forced it open. The canopy was found about a mile ahead of his direction of impact.

Ray was a careful pilot and a meticulous builder. I had often told him that he would win a prize at Oshkosh. I'm sure that he would be saying to us: "Learn from this!"

Our sincere condolences to Ray's wife, Doris, and the rest of their family.

FOR SALE
LIST OF SALVAGE FROM RAY BRISTOWS KR-2

REVMaster 2100-D VW aircraft engine with mags, starter, REVFLOW carb (busted prop seems to indicate the engine may have been idling on impact, external damage appears only to the push rods).

INSTRUMENTS: Hobbs meter, RPM, airspeed, EGT, ammeter, voltmeter, electric turn and bank, oil press, CHT (most with lights).

KR-2 COWLING (undamaged), set of wheel pants (undamaged), KR brake/rudder pedal assy (slightly damaged, hydraulic), throttle quadrant, trim tab control, tail wheel assy, two other tail wheel bars, dual shoulder harness.

MISC. ITEMS FROM SHOP: Grimes light (28VDC), VW block, crankshaft and pushrods, two wheel assemblies and tires (4.10-4NHS-new); two wheels, two slightly used tires (3.4-3.00-5), KR-2 retract Idg gear parts, one VW motor mount, one VW engine block, one cam shaft, Hobbs meter (32VDC), stdby mag compass (28VDC), elect, fuel gauge, one Merl #3 ELT (appears operable but needs new battery).

FOR BIDS ON ALL THE ABOVE CALL: PETE PETERSON 515-279-1215 244-8603 OR
DORIS BRISTOW 515-276-1022

UPDATE ON THE AL CAMPBELL ACCIDENT

In the January issue (#176) of the newsletter we informed you of a crash that claimed the life of Al Campbell and a passenger, both of San Antonio, Texas. There are seldom absolute answers in these types of situations but here is the final speculation.

According to Dan Diehl (who helped in the investigation), the FAA conducted a thorough search for the accident's cause. The airframe and engine were carefully analyzed and found to be in order. The focus for the crash then centered around the canopy. Pieces of the canopy had been found one-half mile before the plane's impact. At first the speculation was a bird strike or sudden down draft causing their heads to strike the canopy. After a thorough gathering and assembly of all the canopy pieces, there appeared a clearly visible "bullet hole".

Local police interviewed two young boys who had been seen target shooting in the vicinity of the crash. The boys admitted they had been target shooting but denied having shot at the plane.

The final speculation is obvious. This appears to have been a tragic mistake but there may be a lesson we can learn. Before the crash, witnesses on the ground said they saw what appeared to be a "model airplane" spinning out-of-control. It wasn't until it impacted and burst into flames that they realized it was a "real" airplane.

As a pilot of a KR or any small aircraft, remember as you consider flying low along the countryside, there may be someone down there who is bored shooting at target's or squirrels and is waiting for something exciting to shoot at like a "model airplane".

KR Anniversary Committee

Oshkosh '92, Uuly 31 - August 6, 1992

Jim Faoghn • **Steve Bennett** • **Dan Diehl** • **Herb Bull** * **Earl Teporten**

EarlTepotten
Editor - KR Newsletter
P.O. Box 579
Lackeville. MN 55044

DearEarl:

Enclosed please find the list of people who have responded and are going to fly in or help at Oshkosh 92. I'm sure there are both more planes planning to fly in and more people who want to help at this event. It is very important they let me know who is coming so I can coordinate the event with the EAA. Please publish the list and the mail back form once again. Perhaps there are a number of people who haven't had the opportunity to reply yet,

I appreciate your help! Call me at work 314-371-0233 or home 314-647-4012 if you haw any questions. Jim Faughn **5615 Botanical St. Louis, MO 63110**

Last Name	First	Street	City	State	Zip	CodeFly	Help	Park
Mderman	Steve	825 S.Pratt	Longmont	CO	80501	Y	Y	
iailev	Sam	91 A West 4th	Pratt	Kansas	67124	Y	Y	
Calkin	Max	Rt. 1 Box 149A	Omaha	AR	72662	Y	Y	
looke	Charles	220 Mar Vista Dr *27	Aptos	CA	95003	Y		N
ottle	Ken	712 Randy Lane	Columbia	MO	65201	Y	Y	
Diehl	Dan	1855 North Elm	Jenks	OK	74037	Y	Y	
Faughn	Jim	5615 Botanical	St. Louis	MO	63110	Y	Y	
Heath	Daniel	1265 Old Cherokee Rd	Lexington	SC	29072	Y	Y	
Lenard	Norm	207 Teak	Gillette	WY	82716	Y	Y	
Jnd	Richard	33 Calle Melinda	B.S. Margarita	CA	92688	Y		N
latre	Mike	3828 E Kemper Rd	Cincinnati	Ohio	45241	Y		N
Michael	Ladio	6822 S Toledo Ave *421	Tulsa	OK	74136	Y	Y	
Roberts	Martin	8279 E 37th St.	Tulsa	OK	74145	Y		V
Vvarner	Terry	3357 Columbus Road	Centerbura	Ohio	43011	Y	Y	
Wetherbee	Clyde	817 Evans	Waupaca	WY	54981	Y		N
Crov	Dan	7030 Bedrock Dr	Gelli	WY	82716	N	Y	
Hunter	Maur	4108 Columbia	Des Moines	IA	50313	N		V

_____ I am planning to fly my KR to Oshkosh, 1992.

_____ I would like to help with parking KR's at the Fly In.

N Number: _____

Name: _____

Address: _____

City: _____ State: _____ Zip" _____

FOR SALE

KR-2 project, fuselage and spars completed to plans by very meticulous builder. Controls and linkage installed including hydraulic toe brakes. Retractable gear, Diehl tail feathers, full set of foam and cloth. Much extra spruce, mahogany, aluminum, hardware, etc. Must sell •- no room at new home! \$1,500.00

Jeff Brauer
133 Paradise Drive
Hendersonville, TN 37075
615-822-6441 nights
615-859-2930 days

1991 KR Gathering Video

The 11th Annual 1991 KR Gathering video featuring 2 KRis and 14 KR2s, with close-up high-speed flybys, spot landing contest, and awards. This 1 hour 30 minute video is edited and titled in VHS only.

To order mail check or money order for \$29.95

to:

Donald F. Morin
P.O. Box 681
Cocoa, FL 32923

FOR SALE

KR-2 70% built on fixed gear. Used Rand premolded turtledeck, canopy and forward deck. Includes all spars complete, Diehl wings and tail surface skins, Great Plains motor mount, control cables installed, main header fuel tank. Lost medical. \$3,600.00 & 600 hrs + invested. Selling it all for .20 on the dollar. \$720.00 takes everything (firm).

Gerald L. Heffner
R. R. #1, Box 429
Humboldt, PA 18201
717-455-9138 (weekends please)

WANTED

Proven KR-1 with or without engine or a KR-2 fuselage proven.

Joe Sultan
437 Easy St.
Thibodaux, LA 70301
504-447-5871

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 179 APRIL 1992



KR NEWSLETTER

ISSUE NO. 180

MAY 1992



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



BILL ROWLAND'S N8055T, CHESHIRE, MA

Having recently flown my KR-2 for the first time and experienced the usual first time glitches it seems worth a report.

Garrel Rogers in Missouri built the plane and finished it in 1980. He flew it with a 1600cc home conversion and was very pleased with it. After only a couple of hours (he never got to put the gear up) a fellow offered him so much for it he couldn't refuse.

There were no records of ownership after that until two years ago when I bought it from a fellow in New Jersey. When he got it it had a 2100cc Revmaster with electrics and only seven hours on the Hobbs. On his first attempted flight he went off the runway because of torque effect and broke a prop and dinged a wing. His wife gave him a choice and he put the plane up for sale.

Cont'd from page 1

The Hobbs was up to twelve hours when I got it. I spent two years studying it and redoing things and taxing and trying to learn to fly again (had about five hours in the last 35 years). Finally got the bi-annual end of last summer, after quite a few dual 152 hours. Then some 152 solo hours in preparation for the big day.

The first KR-2 flight was letter perfect and the greatest thrill of my life. Perfect take off, climbed to 3000, did some turns, tried a stall. It indicated 60 knots for a poweroff stall which is way high. Everything else seemed fine so I went down for a landing, 80 knots for final and the best three-point landing I ever made.

The next day I thought I had gotten over my excitement and took it up again. Everything was fine until I landed, dropped it in and bounced like mad, hit cockeyed next contact. The right gear gently folded forward as I turned onto the taxiway. The gear nuts had stripped, original 3/16 bolts. Surprisingly, the spring ends didn't even dent the upper wing surface foam.

Two days later the plane was ready to fly (a spare prop was on hand) and we gave it another try. Bounced the first landing a bit so the second one was done with more back stick, resulting in more bounce and a swerve left during the bounce. The third try resulted in a bounce, swerve almost off the runway and demolition of two runway lights, not to mention some wing skin.

At this point I was ready to throw in the towel because the plane seemed to be beyond my ability. At home, relaxing with a drink, I remembered that I had offset the rudder to lessen the torque swerve on take off. Also, witnesses had told me my tailwheel was hitting while the mains were still a wheel diameter off the ground. It occurred to me that when the tailwheel hit, my feet automatically adjusted to the castered tailwheel position and held there. An instant later the mains hit hard and bounced the plane into the air with a lot of left rudder causing much confusion in the cockpit. Actually, the KR's response to control deflections is so quick there wasn't even time for confusion.

The rudder was lined up with the tailwheel, wing patched and several non-destructive flights accomplished. I find it much easier to wheel land this plane because it doesn't stall in the three-point results in a slower landing speed, the landing attitude is critical. The torque swerve on take off is not a problem.



The following information was written a year later.

We have flown off our required 40 hours and have been okayed to fly anywhere in the USA. Still doing wheel landings on the home 4500 ft. runway. We are occasionally attempting three-points and sometimes with success. Weight has been added to the tail to adjust the eg to the point where, with the trim tab neutral, the plane cruises hands off. Stall is smooth at 50 knots since this eg adjustment. The tail weight has been pulleyed so it can be moved from the cockpit to act as a trim control. This weight will be in the form of useful load and about 25 lbs is required.

A lot of cleaning up still needs to be done. The gear is naked, the canopy is very rough, the cowl inlets are way oversized. In its present state, cruise is 105 knots at 2800 rpm and 25 in manifold pressure. Wide open 120 knots at 3200 rpm. A 52 x 48 Tennessee prop is now installed.

The empty weight is 600 lbs and I have converted the passenger seat to a chart and instrument area because the landing speed would be rather high with a passenger. This is all easily removed in case I find a lightweight girl friend.

It should be mentioned that the low time Revmaster engine was revamped last winter. At Revmaster's suggestion, a forged crank was installed and, since the valves were leaky, we had Revmaster install stainless valves and seats. It is very important to check valve clearances and torque the head bolts after an overhaul! Often, at first! It is interesting to note that, when they reworked the heads, Revmaster reduced the compression ratio from 9.6 to 8.5!

And they say 100LL is still necessary!

The KR-2 cost \$4,500 and a bit has been put into it in time and money, but the time has been fun and the money not too much. I can fly 50 hours per year for about \$1,000 including insurance and tiedown which makes flying affordable for me.

I owned a Luscombe back in the early 50's for about two years. It was a fun plane and the KR is very much like it. The KR wing loading is higher so it is a



dash hotter but the responsiveness of the controls is very similar.

This KR-2 is very stable on the ground. From day one, there was no problem taxiing straight. However, during the time I was figuring out the offset rudder effect, stability was in question, so toe-out was investigated. With the plane on jacks and gear down, unweighted, the toe-out was neutral. The toe-out was adjusted slightly by filing the axle holes before it was realized that the forward slant of the gear coupled with the splay when weighted, introduced a pronounced toe-out.

Also, this toe-out automatically increases as the tail comes down and the eg shifts rearward. A beautifully stabilizing situation! It is tough on tires but I have found the Shin 4 plies hold up quite well.

As I have said, the KR-2 is very stable on the ground, FOR A TAILDRAGGER!! It seems that many KR owners are trying to fly it as their first taildragger experience. If possible, get some dual time in some taildragger first. The eg is behind the mains and this is an unstable situation no matter what. Otherwise, taxi, taxi, taxi tail up, taxi tail up and be ready to push that left rudder on take-off!

This KR-2 has the mechanical go-kart brakes. These have been beneficial so far, since I'm sure it would have cost me even more props (3 so far) if the brakes had worked better. The one time, very early, I tried to lift off and immediately land there didn't seem to be enough runway and when I grabbed the brakes, the plane swerved left so I pulled on the right brake and hopped. The KR gear stance is wide enough so I executed a perfect Mannix turn with only a little distortion of the tailwheel assembly and discovered a very effective way to make emergency stops. Practice with these brakes during the taxi stage is very important, particularly at the end of the tail-up run. It seems best to do low speed taxiing with one hand on the throttle and the other (right) pulling the brake cable. But when wheel landing it's important to keep the right hand on the stick and brake with the left. Although I did not, taxiing without the wings seems like a good idea and would make tail up operation feasible with no danger of unintentional flight. This could be very important if one has not done taildraggers.

Jeannette and the folks at Rand Engineering have been a great help as have the people at Revmaster. They have been very generous with their time and patience.

Bill Rowland
176 Wi How Cove
Cheshire, MA 01225
413-743-4553

REMEDY FOR ALTERNATOR NOISE

Ever since day #1 flying my KR I've had alternator noise in my radio (Terra TX720). I've tried several different electronic RF1/RM1 filters (which are little more than capacitors shunted to ground) but nothing seemed to work. Lately, however, I tried a noise "eliminator" which consists of a PC board on which is mounted a diode, (2) capacitors and (3) large transistors with heat sinks. Well, this sucker sure did eliminate the noise. My headphones are now whisper quiet. Martin Roberts had the same problem and is also using one of these "eliminators". I believe Marty's radio is a VAL760 Comm. Both Marty and I are equipped with Dan Diehl's accessory case. Marty has the new style alternator and I have the old style.

If anyone else is having this problem and is interested in trying one of these units, they are available through J. C. Whitney & Co., Part No. 03-7093N for \$17.95. That sure beats a \$32.00 Cessna alternator noise filter that doesn't work. The only catch is the size of the unit (2-1/4" dia. x 5" long) but for the sake of getting rid of that infernal buzzing, I'd make room for it somewhere. If anyone has any questions about the noise eliminator or my installation, I'd be happy to answer them.

Mike Ladigo
6822 S. Toledo Ave., #421
Tulsa, OK 74136
918-495-3662

FUEL LINES

Jeez! If you're like me, this whole mess of pipe thread sizes, AN fittings with their secret codes, dash this and MS that... a simple gravity flow fuel line gets pretty confusing; particularly if you're shopping from a catalog and are not able to get some hands-on confirmation. Stuff ain't cheap.

The drawing illustrates a system installed in my KR-2. Simple, once you figure out what you don't need.

You will need a 37 degree flaring tool (don't be tempted to use an automotive 45 degree flare... you'll be very sorry later) and a tube bender. Fortunate folks have these things but I borrowed and bought the guy lunch... lots cheaper.

The quarter-inch plywood firewall must be modified to accept the pass-thru fitting. Thread grip lengths on the fitting mandate using a hole saw to help bring the firewall thickness in this area to 1/8 inch. A small knife will easily pick out the ply laminations. Just use care with the hole saw and cut shallow.

Finger tight dry assembly is fine for initial installation of parts but a tiny bit of thread lube during final assembly will prevent galling of the aluminum fittings. Do not overtighten. Few homebuilders are ever guilty of undertorquing anything.

Study the sketch, ask what others are doing, then work your way out of the maze.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871

FOR SALE OR TRADE

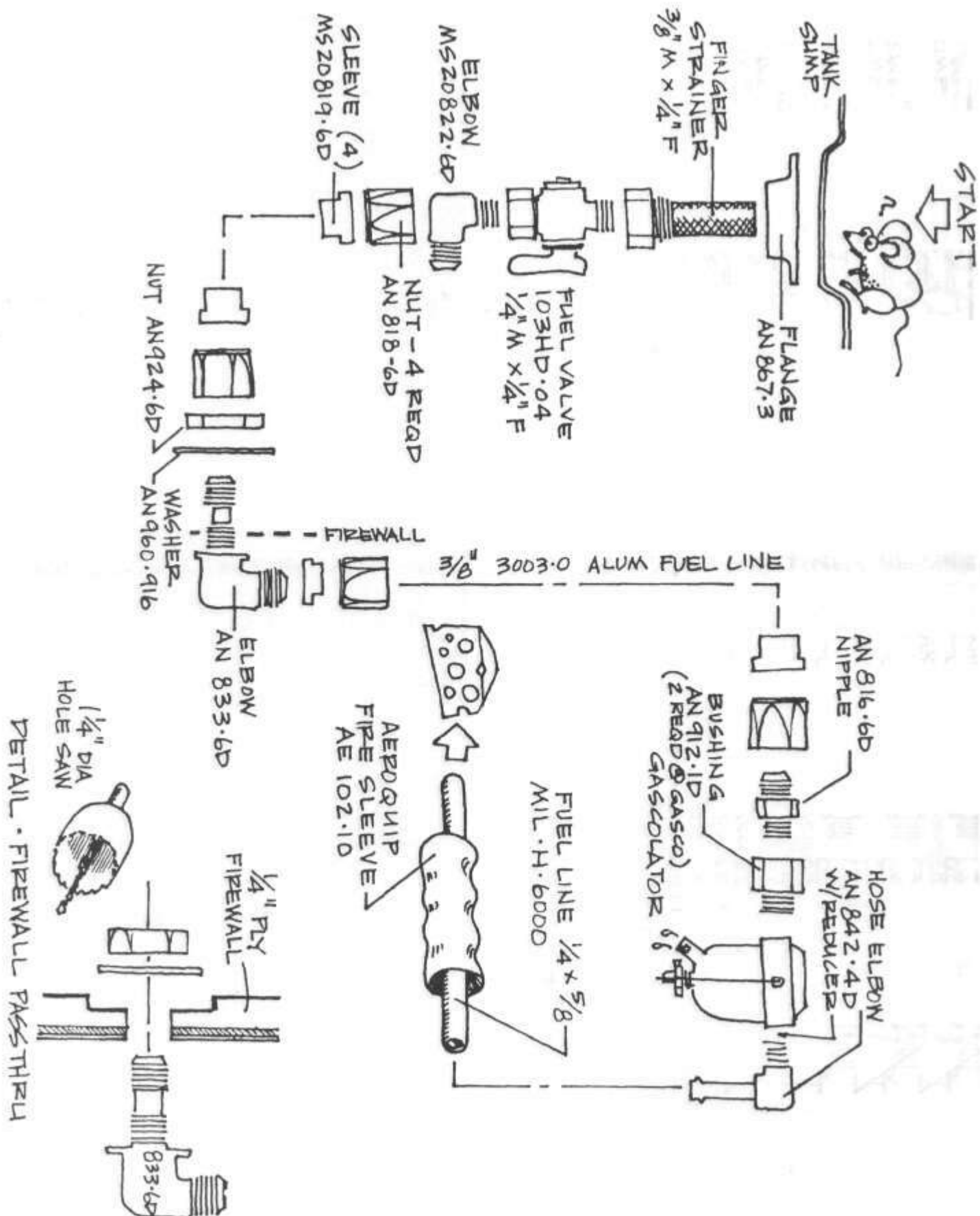
Very good Type IV engine for conversion either trade for KR-2 parts or sell for \$300.00. Building a retract KR-2 and need many parts. Contact:

James R. Gogniat
6212 Blossom Drive
Watauga, TX 76148
817-498-0116

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN
INDIVIDUAL COPIES \$1.50 EACH.

MONTE MILLER'S FUEL LINE MAZE



BUILDER'S UP-DATE ON 0-200

I started my project 1-1/2 years ago! I'm working on a modified KR-2 using an 0-200, fixed gear with 600 x 6 x 13-1/4" tires, a 6" steerable, full swivel tailwheel, a 24" stretch on the fuselage, dual sticks, toe brakes on left side (Cleveland Wheels and brakes). I'm looking for a fast x-country AC that will handle grass strips.

Because I'm 6'4", I have raised the Instrument panel 1-3/4" and cut 1" off the bottom edge. I was still able to get a full gyro panel (from a C-150 I bought and parted out) and a Narco Mark 16 with glide slope (heavy but price was right)!

I have Included a few pictures. When making scarf joints for wing spar webs I used a radial arm saw with a 1-1/2" sanding drum and built a small table to mount on saw table. With this process, I can cut a "perfect" 16 to 1 on a spar web piece in about 2 seconds with no guess work.

The gear is Dan Dlehl's with a 1/4" 4130 steel lower fitting to take the C-150 axle and Cleveland wheels.

Larry Flesner
23 Mockingbird Lane
Carterville, IL 62918
618-985-2373



HELP !!

We're running low on articles and photos for the newsletter. Please take a few minutes to share your Ideas and photos with all of us. Thanks for your support!

OSHKOSH 1992

"20TH KR ANNIVERSARY"

This year at Oshkosh we will be celebrating the 20th Anniversary of the KR series of homebuilt aircraft. A KR MEMORIAL FLYBY is planned the first weekend, as well as dally flybys.

The KR FORUM will be held Friday, July 31, 1-2:15 p.m. in Tent 3.

Look for the Rand Robinson KR display tent this year.

The KR DINNER on Sunday, August 2 will highlight the KR's history and development. The dinner will be served family style featuring beef, fish and chicken. To attend the dinner you must pre-pay at Great Plains Aircraft booth located in the center exhibit building. Cost this year will be approximately \$15.00 per person (non refundable). This price includes dinner, tax, tip and helps pay for other 20th Anniversary costs.

The KR Anniversary Committee has a few other ideas up their respective sleeves, which, of course, are surprises! If you haven't been to Oshkosh in a few years, this is the year to make that extra effort. Each KR pilot who flies in this year will receive a special 20th Commemorative Anniversary Award.
BE THERE!!!

FOR SALE

KR-2 in boat stage, wing panels finished, stabilizer, vertical stabilizer and rudder completed, dual controls installed, engine mount, positive pin retract, wheels and brakes, canopy frame, fittings completed, most hardware and materials to complete project. \$ 2,500 OBO

L. Sugamele
55 Keywester Dr.
Lake Havasu City, AZ 86403
602-453-5012

BEAWABE

AMATEUR-BUILT/ULTRA-LIGHT AIRCRAFT SAFETY DATA EXCHANGE BULLETIN BOARD SYSTEM

There is now a new service through the Federal Aviation Administration (FAA) for the use of those involved with Amateur-Built and Ultra-Light Aircraft. This new service consists of a Bulletin Board for those who wish to participate in the Service Difficulty Reporting System and Safety Information of said type aircraft.

By establishing the Bulletin Board, interested users can obtain service and safety information from 1630 to 0700 central time (Monday through Friday) and 24 hours on weekends and holidays. Reports which are entered on-line into the tystent by members of the aviation public will be available to everyone within 12 to 24 hours.

Any PC with a modem or any terminal equipped with a modem can be used. The same equipment used for connecting with DUATS can be used with this system. Normal parameters are 1200-N-8-1, but any baud rate from 1200 through 2400 is useable, and the system is entirely menu driven for ease of use. The telephone number for this system will be 1-800-426-38,14, and the password is SAFETY. Also this system is programmed to use UPPER CASE letters only.

Users of this system will be pleased to know that it is designed to protect the anonymity of the submitter. No identifying information such as registration number, serial number, city, etc., can be entered into the data base. The only identifying element will be a model name such as "Varieze." Even in the unlikely event that someone should wish to use the information in the data base for an enforcement action, it would be impossible.

Accident and incident reports will not be made , available in this system in the traditional accident report format. A major complaint from users has been that accident reports were detrimental in many ways to the pilot or owner of an aircraft. Since the Safety Data Exchange Bulletin Board is interested in the rapid exchange of safety information, the service or safety problems contained in an accident report will be extracted

KR-2 FIREWALL FORWARD!

Revmaster 2100 D engine. Accessory case with alternator and geared starter. Rev-flo carb., intake and exhaust manifold.

Dual mags, engine mount for KR-2, Sterba Prop & 10" spinner, all baffling and logbook. Needs rebuild. All you need to plug in and go! Costs over \$5,300 new. All for only \$2,500 OBO.

Also Westac gauges for above. Fuel, tac., oil pressure, oil temp, cycl temp, exhaust temp, amp gauge and ignition switch with key. Would cost over \$790 new. All for only \$350 OBO.

Also -0- time 1835 VW engine set up for aircraft. With crane CAM, Gilbert Duty prop hub and ring gear with alternator pulley. \$1,800 OBO.

Robert Lester
709 N. E. 4th St.
Ft. Lauderdale, FL 33301
305-765-0501

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 180 MAY 1992

WANTED

Info on adapting a battery-C.D.I. System to the slick mag for starting only.

Bob Woodward
14 Highland Terrace
Prescott, AZ 86301

FOR SALE

KR-1 project, wood work complete, tail feathers ready for paint. All brackets made, retract gear, spars, 1200cc V. W. KR engine mount, bubble canopy and much more. \$1,900 OBO.

IS00cc Porche, type 4 engine, force 1 bearing, slick mag. OTSM \$2,200

Mike McKusick
401 Washington St.
Brighton, MI 48116
313-227-6509 days



KR NEWSLETTER

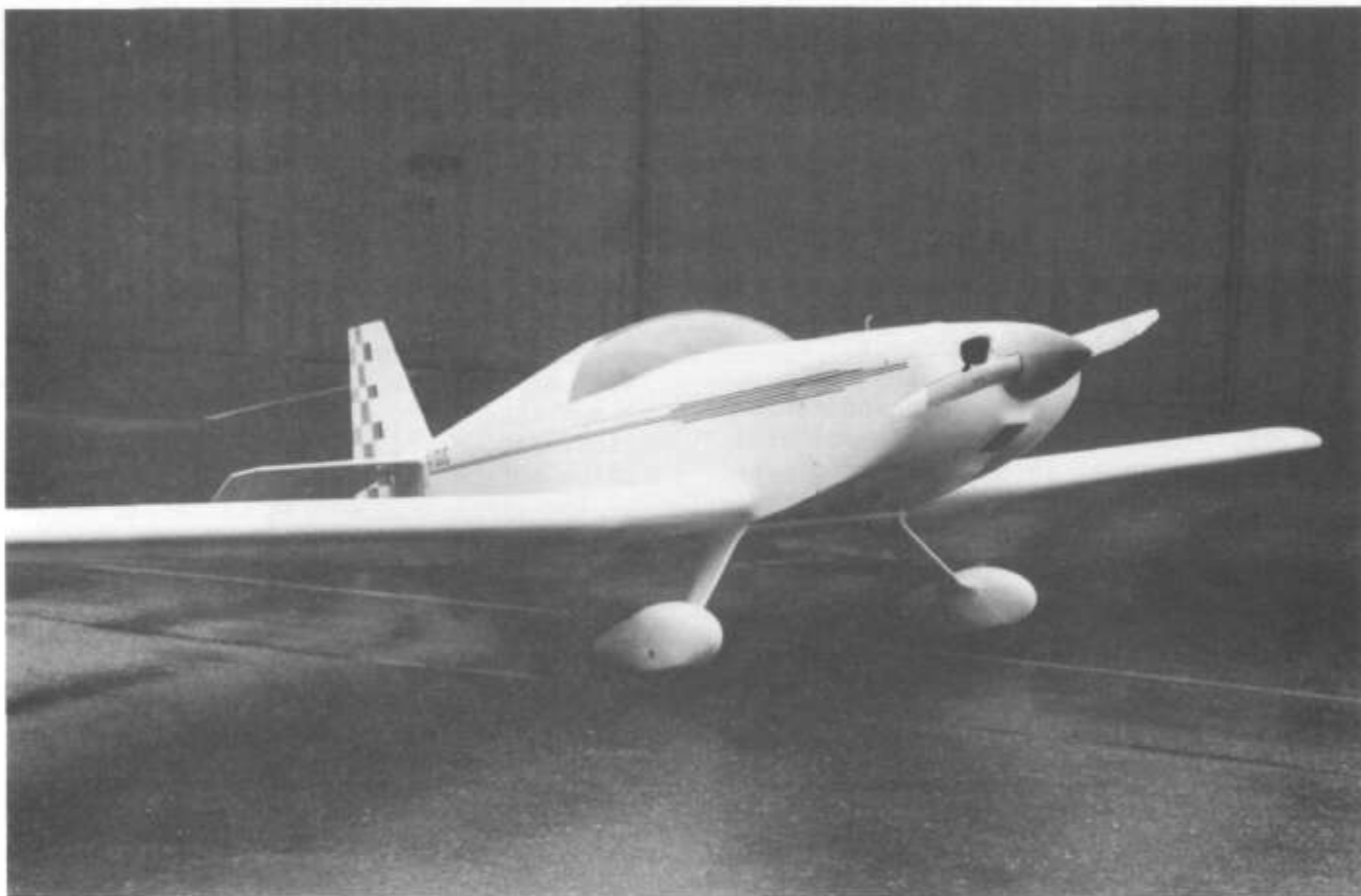
ISSUE NO. 181

JUNE 1992



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. **Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder.** The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



LARRY BUCK'S N13UG, FROM GIG HARBOR, WASHINGTON

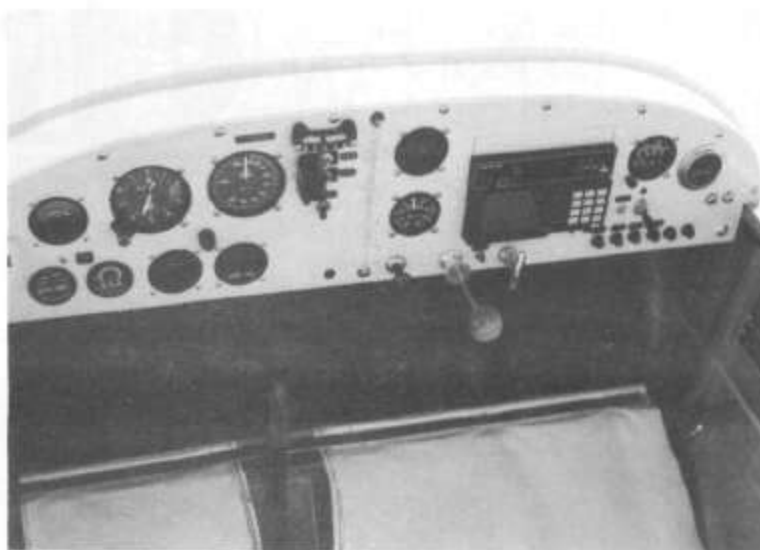
Here is a picture of N13UG, first flown on 6-17-91 at an empty weight of 483 lbs, single controls, single ignition, no electrical system. It was weighed on electronic aircraft scales so I know the weight is correct. At the time I had over 400 hours in my Luscombe and 20 hours in a friend's retractable, 600 lb KR-2 so the first flight went off with no surprises, although I was really impressed with the responsiveness due to the light weight. After my first takeoff, I circled the runway at 2000' for about 30 minutes while I let the temps and my heart stabilize. It needed a little rudder trim but other than that it flew hands off. I was a little disappointed in the cruise speed of only 130 mph. This was due to the unfaired, fixed landing gear and climb prop. The landing was a perfect wheel landing at about 70 mph. Rollout consumed about 2000'. It's Miller time.

Cont'd page 2

After 20 hours, I decided that hand propping, single ignition flight over hostile terrain with dead batteries in my hand held radio and only a chart for navigation was not helping me to relax. An electrical system was a must, overweight be damned.

I installed a flywheel, starter, alternator, crank triggered electronic ignition, amp gauge, 25 amp gel-cell battery, EGT gauge, manifold pressure gauge, Val 720 comm, AZURE Long Ranger Loran, all wiring, wheel pants and finished off the rear bulkhead/baggage compartment. I was surprised by the scales as to how much weight I had added. The new empty weight came out at 555 lbs.

The engine is an 1835 VW. I used a Revmaster accessory case, starter, alternator, flywheel and prop hub/bearing. GREAT PLANES supplied the heads, cylinders, 4 in 1, pipe, crank triggered electronic ignition, oil cooler and oil cooler adaptor. I cc'd the heads, measured the deck height and shimmed the cylinders to get a compression ratio of 8.3:1. Thermo-Tech heat tape was used to wrap the exhaust in order to keep cowl temps lower and help prevent vapor lock. The Posa Carb works flawless although it has taken some tinkering. Mixture is controlled by a needle valve bypassing the fuel valve. I just open the needle valve, close the fuel valve and start closing the needle valve while watching the EGT. This works well and is stupid simple. I used Steve Bennett's parts to build my crank triggered electronic ignition. I mounted the triggers 180° apart on an adjustable ring around the prop hub bearing and mounted a small magnet to the prop hub itself. I also installed two LED's in the trigger circuit and a degree wheel permanently on the back of the spinner. To check the timing I just disconnect the plug wires, turn on the ignition and watch the lights. The timing has not moved a fraction of a degree in 70 hours. I run the mag primary at 28BTDC and the electronic secondary at 27BTDC. The valve covers I use are Scatt stainless steel snap-on covers. The reason I chose this type cover is that they don't leak, they are easy to get off and on for valve adjustment and they don't put additional pull on the rocker arm studs which have been known to pull out, causing engine failure.



I feel that cowl flaps are a must on this airplane. This gives plenty of cooling for hot day, full throttle climb outs and still lets you keep the engine warm at altitude. My plane picks up about 3 mph when I chose the cowl flaps and runs about 350 CHT on a full throttle, 80 mph climb out on an 80 degree day.

The first prop was an Ed Sterba 54x44. It was returned for repitching to 54x57 but still proved to be under pitched for what I wanted. I ordered a new Ed Sterba 54x50 and am very pleased with the great top end performance although the climb solo is only about 1200 FPM. I get a comfortable 160 mph cruise at 3200 RPM, 24" MP, at 3000 ft and use 3.0 gph. I plan to upgrade this engine this winter with the GREAT PLANES 2180cc upgrade kit. This should help the performance noticeably.

After flying and comparing both fixed and retract gear, I cannot find any advantage in the retracts. My friend's retract KR is no faster than my fixed gear and I don't have to give gear-up landings a second thought. The fixed gear feels much more stable on the ground although I think the retracts would be easier to build, considering all the work to closely fair in the fixed gear.

A note of caution while I'm thinking of it. When my friend bought his KR-2 we could not get it to run rich enough on the top end. We inspected the needle in the Posa Carb and discovered that it had been almost filed away in what appeared to be numerous attempts to richen the mixture.

CONT'D PAGE 3

We also noticed in the log books many problems with overheating, valve problems and carb problems in the 200 hours it had flown. We decided to jack the plane up to a full climb altitude and do a fuel flow check. Surprise, surprise... it would only flow 5.3 gph at the carb. My calculations said that this engine requires at least 15 gph flow. Hmmm, something wasn't right. The builder had used 1/4" nylaflo tubing with various fittings so that he could mount the fuel valve on the left side of the cabin. This extra long and small tubing plus the many small fittings caused way too much flow restriction. Keep in mind that this is a gravity flow system. We removed the builders handiwork and installed a fuel valve in the bottom of the tank with 3/8" aluminum a/c tubing with AN fittings all the way to the gascolator. After rechecking the flow, we were pleased with the flow of nearly 20 gph. We reinstalled a new needle in the carb and started tuning. After a few adjustments, the engine ran perfectly. It's hard to believe that fuel line length and size can make that much difference so be sure and do a fuel flow check.

In closing, I would like to say that my KR-2 is by far the most enjoyable project I have ever built. It flies both fast and slow, it's very economical, draws a crowd to the point of embarrassment, fits like a comfortable leather glove and is like riding a little magic carpet. I can't stress enough the importance of keeping it light and simple. Anybody can add stuff to try and make it a better plane but I really think the best way is to stick to the plans.

Larry Buck
7215 86th St. Ist. W.
Gig Harbor, WA 98335
206-851-2506

BROKEN MAGNETO DRIVE ADAPTOR

Thanks for putting my article and ad in the newsletter. I got some of the things I needed and I met some nice people too. One of them was Carl Curtis, a KR-1 owner. Sometime ago Carl's plane was severely damaged by two youngsters who broke into the hangar where he keeps it. On a recent weekend he and I were working to fix some of the worst problems. I pulled the prop turn over and heard a louder than normal noise come from the rear of the engine. We checked it out and found that the magneto drive adaptor was broken into a least three pieces. In a few minutes we had it out. Carl didn't build the plane and hadn't had occasion to pull the mag before this, so hadn't seen the adaptor. It was made from nylon and had been machined to fit over the gland nut on the crankshaft. One side looked pretty normal but the other side was carefully machined to fit snugly over the nut. It had broken at the point where it was thinnest. I'm not absolutely certain why it broke but here are my best guesses. First, as you probably know, nylon is susceptible to UV radiation and this particular piece had been made 15 or 16 years ago. Second, even though the piece exhibited a high level of craftsmanship, it was not made using good engineering practice. The corners of the hex machined into it's face were not radiused. The combination of built in stress risers and the weakened nylon was enough to allow the part to fail. Carl was happy that it had broken on the ground.

Carl is in the process of making another drive adaptor which will duplicate the general shape of the broken one. The new one will be made from aluminum and will be properly radiused in all the right places. We know that most builders use commercially made drive adaptors but thought we'd pass this along for whatever it is worth. Another bit of advice for people who buy partially or full completed homebuilts... learn your aircraft. It is you, not the builder, who is in the air and who will suffer the consequences of any mistakes that have been made.

Dale Work
2791 Prince Harold Ct.
Herndon, VA 22071
703-476-9021

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN
INDIVIDUAL COPIES \$1.50 EACH.

BUILDER'S REPORT

My KR-2 was to be "plans built" except for dual sticks and movement of the fuel tank to the wings. Sounds simple, right? Well as they say, you can't make even one "simple" change to an airplane!

I started with a pretty basic two-stick design from an early issue of the newsletter but could not make it work. Upon installation, I discovered that moving the stick fore and aft for elevator changed the length of the aileron cable and caused the rear spar to flex. "Plan B": A version of the sticks found in issue number 46 worked beautifully.

Next, I decided to put on a fixed gear so I could put the fuel tanks in the wing stubs. This solved the problem of having to drain the fuel each time the wing panels were removed. Off came the retracts!

The first fixed gear, made from 1/4" steel brackets with 3" wide springs bolted on, was just too heavy. I might be able to use it as an anchor if I buy a bigger boat! The new improved version, made from 1/8" 4130 brackets and reinforced streamline tubing, was much lighter (approx. 12 lbs) and easier to build.

With the controls in and gear on; the fuel system was next. I came up with a very simple system that operates with one toggle switch, has two fuel pumps and three 1/4 turn stops as backups. The toggle switch has three positions. When tipped to the right, the right pump is on, centered is off and to the left the left pump is on. The pumps have built-in check valves so one pump can't pump fuel into the other tank. If a check valve fails, there is a stop at each pump with the handle extended into the cockpit. Should one pump fail with the other tank dry; there is a crossover pipe. Fuel is gravity fed from one tank to the other when the third stop is opened.

Now to seal the gaping holes in my new wing stub tanks (!), out came the aileron cables and in went push rods and torque tubes as shown.

About the only other changes, so far, are balanced control surfaces and roll bar. The roll bar (my wife's idea) is probably the best and least problematic change yet. Not only does it provide something a little more solid than my head to slide on, should the need arise but it also becomes a perfect mount for the shoulder harness (an inertia reel system out of a Volvo).

I should also state that my airplane has **not** yet flown and I am **not** an engineer so all of this stuff is untested. I hope for a first flight this spring. Had I not decided to make all these improvements, it probably would have flown last spring and my scrap pile would be a lot smaller! SEE SKETCHES SUBMITTED BY PATRICK ON NEXT THREE PAGES.

P.S. I do have a complete retract system including wheels, tires and mechanical brakes for sale.

Patrick Kiley
RFD 15, Box 125A
Concord, NH 03301
603-798-4163

OSHKOSH 1992

"20TH KR ANNIVERSARY"

We will be celebrating the 20th Anniversary of the KR series of homebuilt aircraft at Oshkosh this year. A KR memorial flyby is planned the first weekend, as well as daily flybys.

The KR Forum will be held Friday, July 31, 1-2:15 p.m. in Tent 3. This year Rand Robinson will have a KR display tent at Oshkosh.

The KR dinner will be on Sunday, August 2 and will highlight the KR's history and development. The dinner will be served family style featuring beef, fish and chicken. To attend the dinner you must pre-pay at Great Plains Aircraft booth located in the center exhibit building. Cost this year will be approximately \$15.00 per person (non refundable). This price includes a delicious dinner, tax, tip and helps pay for other 20th Anniversary costs.

The KR Anniversary Committee has a few other surprises. Each KR pilot who flies in this year will receive a special 20th Commemorative Anniversary Award. Oshkosh will be great fun for everyone. HOPE TO SEE YOU THERE!!!!

1992 KR GATHERING

This year's KR Gathering will be held September 11, 12 and 13 in Covington, Tennessee. More info to follow in future newsletters. Contact person: Jim Faughn 5615 Botanical, St. Louis, MO 63110 314-647-4012

Roll Bar is made of
5/8 x .035 4130 steel

Duel Sticks with
push pull tubes

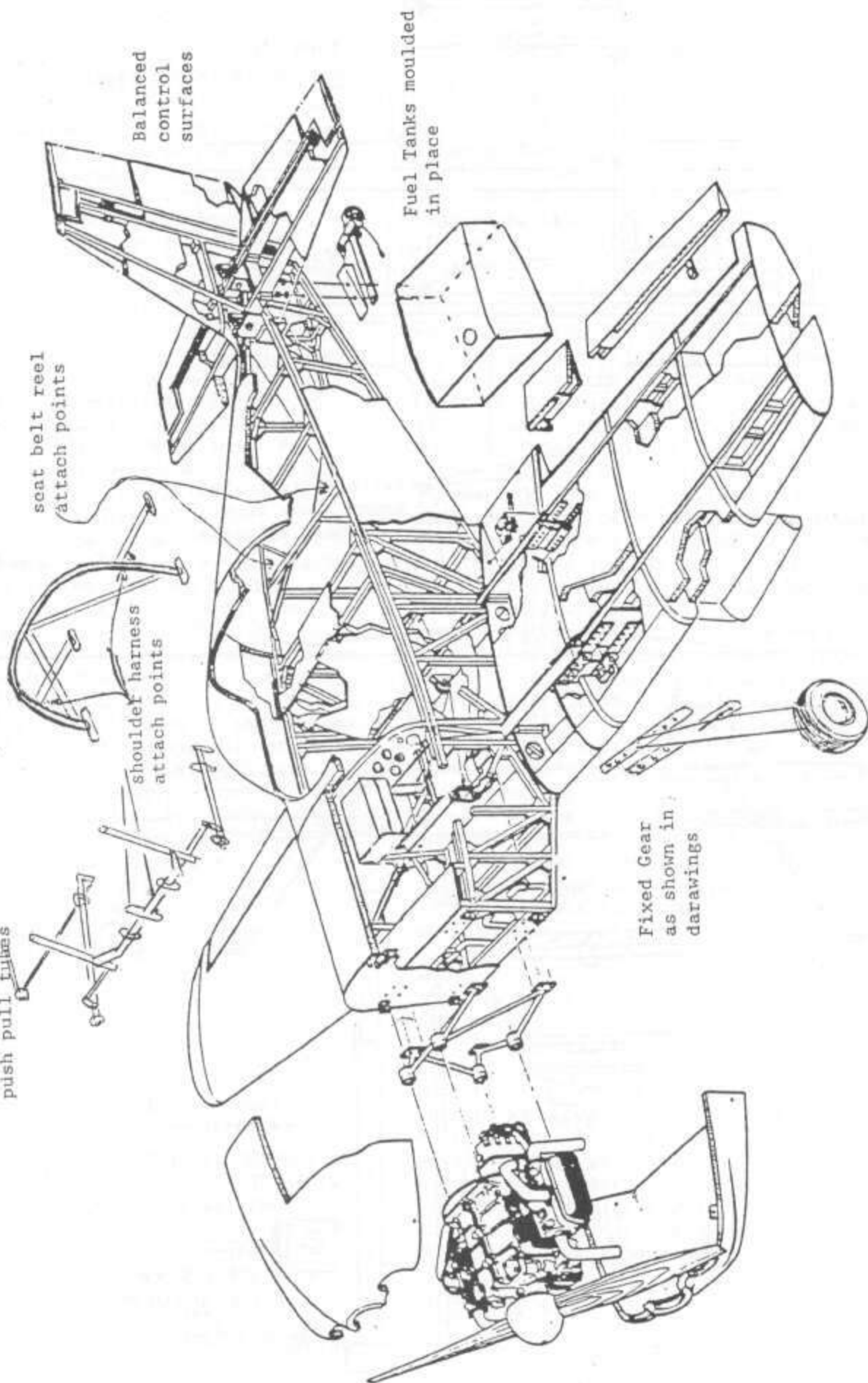
seat belt reel
attach points

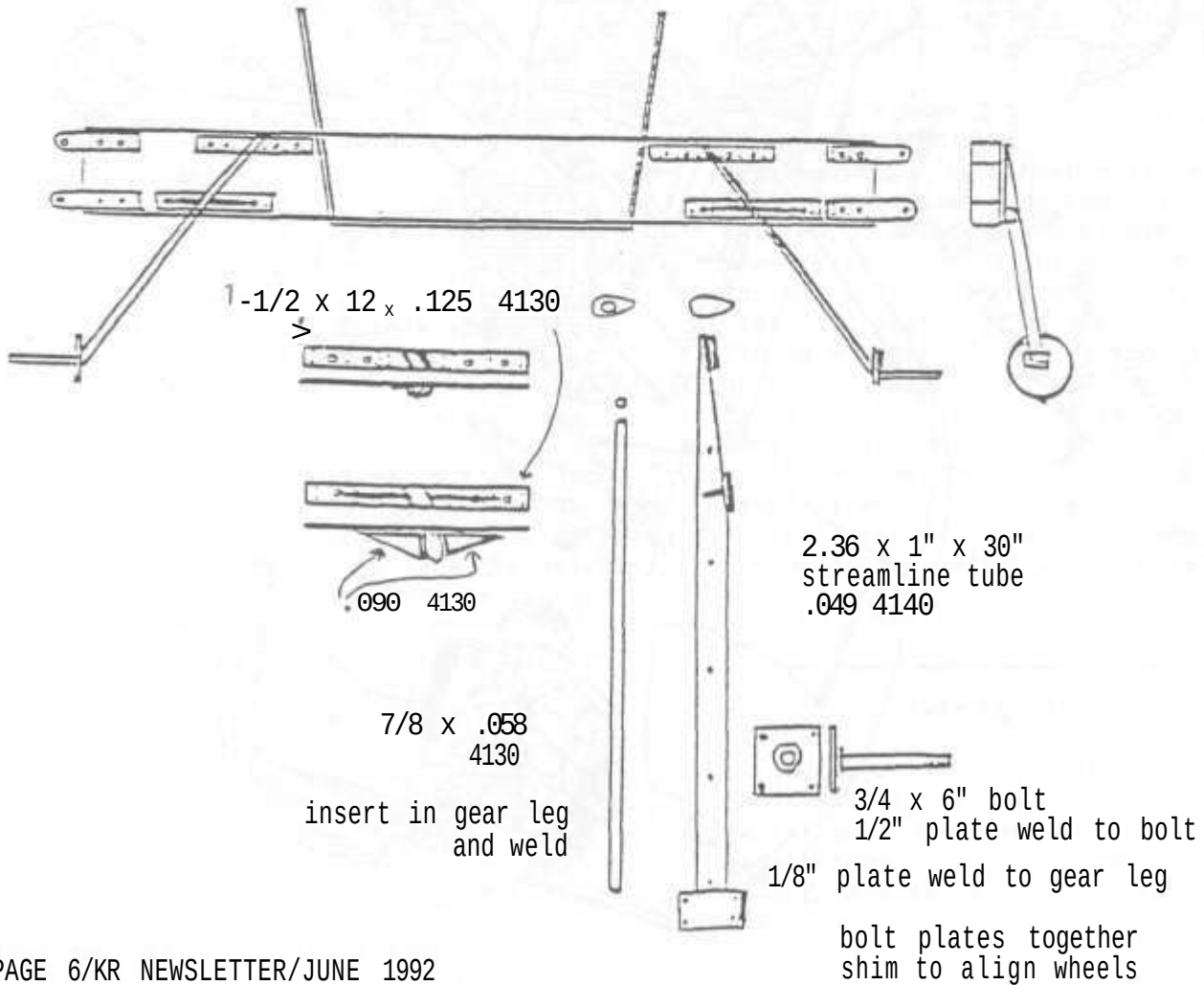
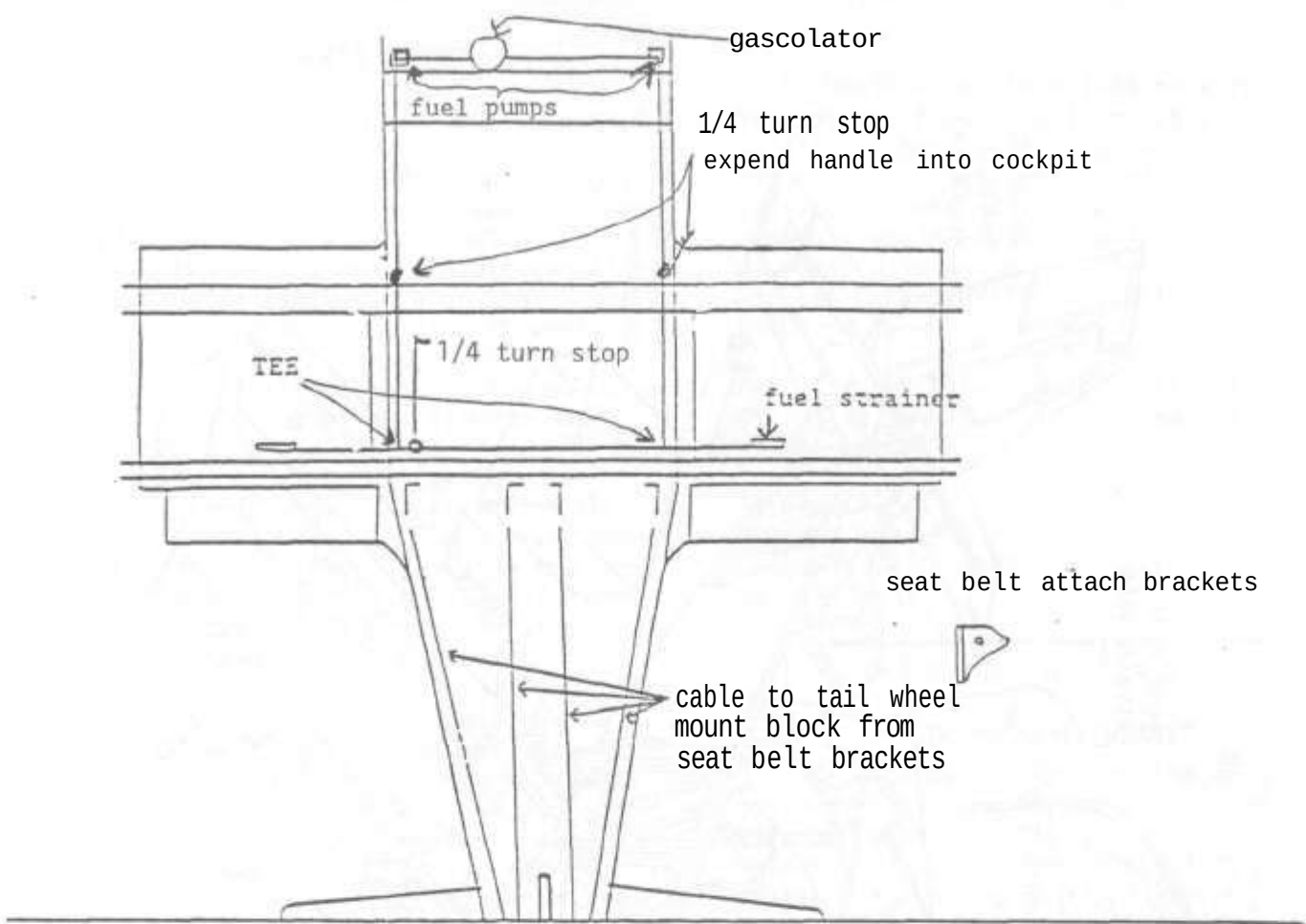
shoulder harness
attach points

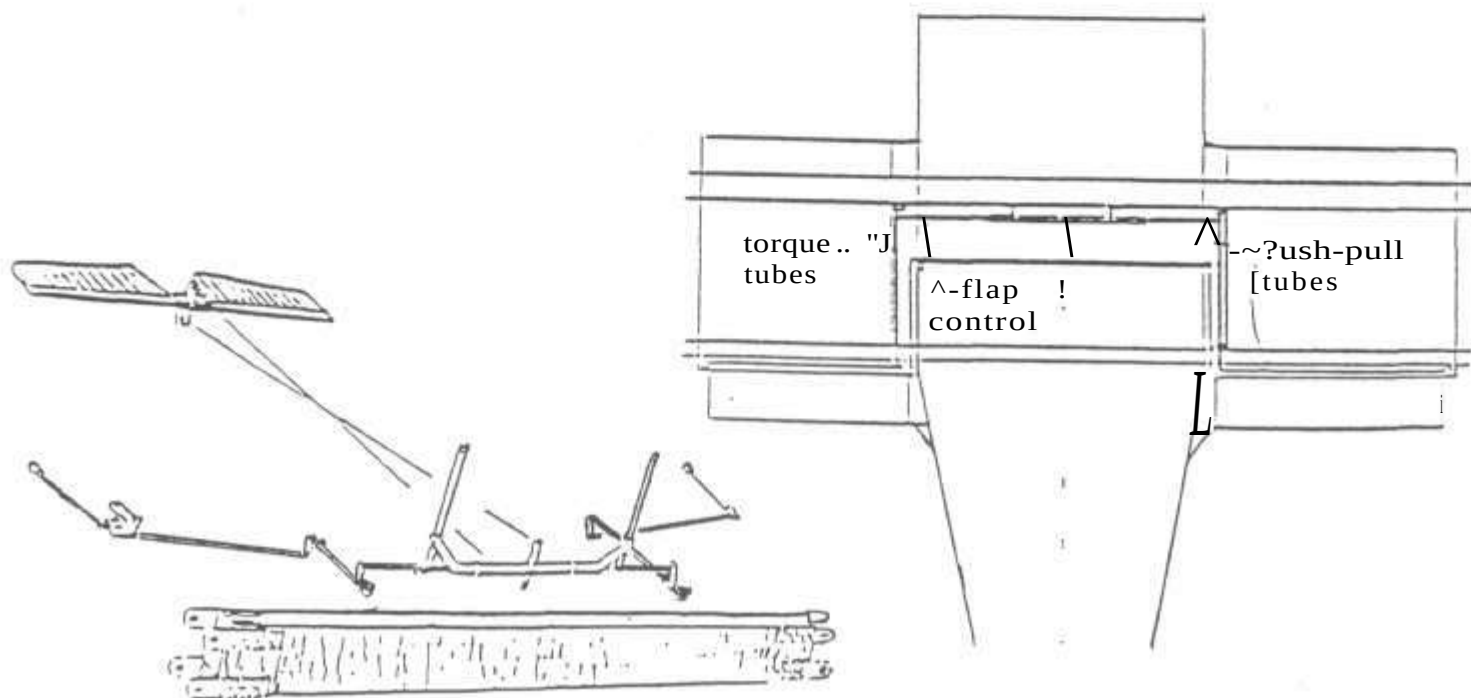
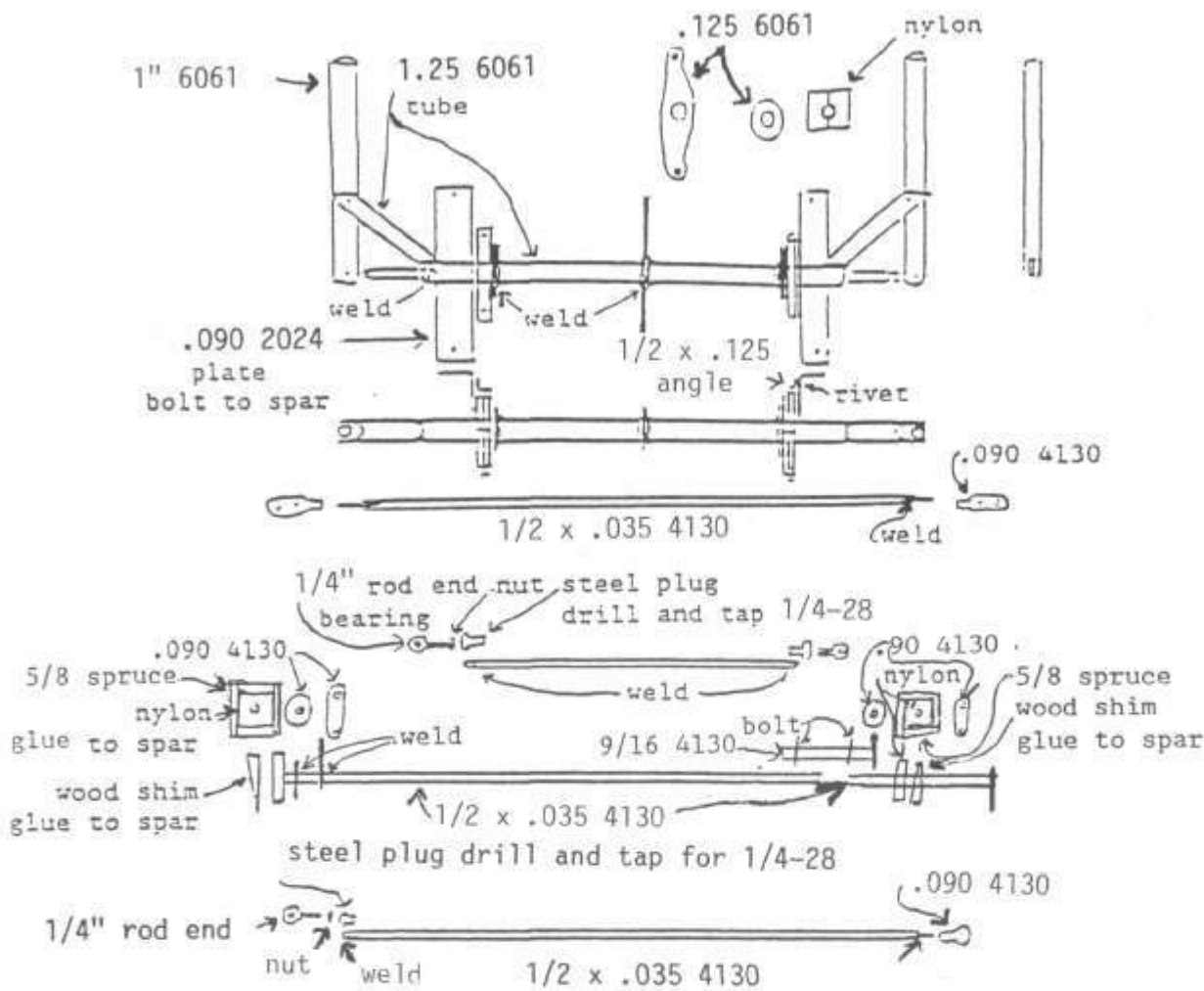
Balanced
control
surfaces

Fuel Tanks moulded
in place

Fixed Gear
as shown in
drawings







ENGINE PARTS

1 set MAPI intake manifolds for SCAT individual heads - won't fit my Sonerai. \$15.00 to cover shipping.
Brand new case \$175.00 plus shipping -- free regrindable crank, good rods, valve covers with purchase.

Ryan Young
2901 Santa Clara Ave.
Alameda, CA 94501
510-769-1923 nights/weekends/leave mess.

FOR SALE

Prince P-Tip 52" x 49" propeller.
\$350.00 includes shipping.

George Toth
920 Lawrence St., #304
Tomball, TX 77375
713-987-5655 days
713-351-9132 nights

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 181 JUNE 1992



KR NEWSLETTER

ISSUE NO. 182

JULY 1992



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



KEN RAND

This year marks the 20th Anniversary of Rand Robinson Engineering and the KR Aircraft. Ken Rand and his partner, Stuart Robinson pioneered the first usage of composite materials for the construction of homebuilt aircraft. Their efforts began a new era in sport aviation. An era that today includes countless designers and builders who understand the advantages of composite construction.

The following article appeared in the March, 1974 issue of "AIR PROGRESS". Also included are some pictures of the early open cockpit KR-1.

CONGRATULATIONS to Jeannette Rand and all the folks at Rand Robinson Engineering. I hope that someday the EAA museum will include a permanent display recognizing the historic achievement of the KR aircraft and its visionary designers.



Ken Rand, of Huntington Beach, California, stands 5 feet 4 inches tall and giggles a lot when he gets excited. It's easy to mistake him for a slightly overgrown kid. His airplane, the KR-1, stretches all of 12½ feet, weighs just over 300 pounds and is made out of styrofoam. It's easy to mistake the KR-1 for a slightly overgrown model plane. But while you're down on the ground trying to get gas for your plane, the overgrown kid in his overgrown model will be out flying, and if you ever do get up in the air with him, he'll most likely leave you in his propwash and then go land on a tennis court somewhere. For Ken Rand's KR-1 is quite an extraordinary little airplane.

The overgrown-model description of the KR-1 is not all that farfetched. Rand's background in aircraft design and construction stems mainly from the hundreds of control-line and radio-control models he's been designing and building since he was 12. (*Science & Mechanics*, a handyman's magazine, went so far as to call the KR-1, in huge headlines, a MAN-CARRYING MODEL PLANE!) "The construction techniques and aerodynamics are basically the

same," comments Rand. So I didn't see any reason I couldn't build a real plane." Gulp.

So, a student pilot with zero hours experience in designing "real" airplanes, he started building his KR-1 in 1969, using foam sandwich construction techniques that no one had ever tried before in an airplane. But Rand knew better. After all, he'd built some models that way, and they'd worked fine.

Well, the KR-1 worked fine, too, and its reputation among homebuilders has mushroomed since its first flight two years ago. Rand has sold 4,000 sets of plans, and nearly 50 KR-1s are now flying. A guy in Alaska is even threatening to put one on floats. Rand drew huge crowds at Oshkosh, won EAA awards for construction technique and aerodynamic efficiency, and is now working on a two-seat version, the KR-2.

Rand is lucky, too. In these times of sudden fuel scarcity, the KR-1 is making him look like a prophet: With its 36-hp Volkswagen engine sipping 2.2 gallons per hour at a cruise speed of 155 mph, the KR-1 racks up 70 miles



per gallon. Throttled back to about 50 percent power, the KR-1 uses one gallon per hour and will show you 100 mph. That, friends, is One Hundred Miles Per Gallon. Rand gleefully points out that fuel costs for his KR-1—about \$1 an hour—are less than his larger R/C models, which burn exotic blends of nitromethane at \$3 a gallon.

And that's not all. With an economic recession or worse coming on, it's interesting to note that Rand's initial investment in his KR-1 totaled \$500, approximately the cost of a Thorp T-18 cowling. It's enough to make you bullish on styrofoam and Volkswagens. Rand is the consummate scrounger, of course. His fuel cap and filler neck, for example, were sawed from a plastic water bottle. Cost: 29 cents. His engine came from a wrecked 1957 VW beetle. Cost: \$30. His carburetor came out of a junked MG; his magneto was 27 years old. "Man, that old mag would get hot and quit on me, one cylinder at a time. Five days in a row I flew around till all four quit, then deadsticked back home." All told, Rand spent less on his KR-1 than he usually does for a good radio-control model. (He has since splurged on a new carb, mag and even a radio. The radio alone more than doubled the cost of the airplane.)

Though the KR-1 is widely known among homebuilders as That Little Styrofoam Plane, its soul is spruce. The lower half of the fuselage is 3/32-inrh plywood. ("Until we put the wings on, most of the neighborhood kids thought I was building a boat.")

Fuselage longerons and wing and tailfeather spars are spruce. The rest, however, is straight out of Rand's own personal think tank.

His basic construction material is a foam/fabric/epoxy resin sandwich. Planks or blocks of foam are glued in place (Rand used styrofoam for his own plane, but is specifying urethane foam in his plans, because the urethane is not as likely to get eaten up by spilled gasoline). The foam is sanded to the desired shape (spinner, cowl, wing, rudder, whatever), then a sheet of Dynel fabric is spread over the foam. Epoxy resin is then spread over the Dynel, bonding everything together in a light, strong sandwich structure.

A 4- by 8-foot sheet of urethane foam (one inch thick) costs \$10 at building supply stores; it takes two sheets to build a KR-1 wing. Dynel is the same stuff artificial hair is made from. When woven into cloth, it's lighter and stronger than fiberglass cloth. Unfortunately, Dynel is in short supply now. Its manufacturer, Union Carbide reports that fabric makers now have to wait four to six weeks for delivery. Aircraft Spruce and Specialty in Los Angeles, the only outfit to specialize in Dynel fabric for aircraft use, had none in stock at press-time, but expected a shipment soon. Rand prefers epoxy resin as his bonding agent because of its strength and minimal shrinkage during cure.

The foam, either styrofoam or urethane, is sinfully easy to work with. A builder can sand double compound curves to his heart's content. Rand has two degrees washout and Hoerner-style tips on his KR-1, all accomplished with a piece of sandpaper. "I did need one piece of complicated tooling to shape the wing root fillets," Rand concedes. "I had to wrap the sandpaper around a mayonnaise jar to get the concave shape."

The KR-1 wing ribs are foam sandwich, epoxied to the main spruce spars. Foam sheets are then glued between ribs and sanded to shape before application of the Dynel and epoxy. (The wing also has three non-structural plywood ribs on each side, but these serve strictly as templates to help the builder sand his wing to the right shape.) To make a KR-1 rudder, simply glue a slab of foam to the spar, sand out the shape you like and epoxy it.

Rand's foam sandwich, besides being light (he likes to dangle his cowl- ing from his little finger), strong (he likes to jump up and down on his wing) and easy to shape, is also eminently repairable. Rand should know. He's dinged his KR-1 three times now, once ground looped by a friend, once blown over by a Staggerwing's propwash, once ground looped when a wingtip—only a foot or so off the ground, remember—brushed some tall grass alongside a narrow runway. In each case, he either quickly patched the damage with some body filler, Dynel and epoxy, or simply sawed off the damaged area and glued in a new block of foam. "That wooden rib out on the right wingtip must be tooth-picks by now, it's been beat up so much."



In toting up the advantages of foam sandwich construction, we've saved the most spectacular till last: aerodynamic cleanliness. Every surface can be polished to perfect smoothness, every lump or crevice or corner in the foam can be exquisitely faired. Rand's own airplane is exceptionally slick, by normal standards, but would win no Oshkosh prizes for finish.

"Frankly, my airplane is about the roughest of all the KR-1s I've seen," Rand admits cheerfully. His "rough" KR-1 delivers astonishing performance, though, especially compared with the other popular VW-powered homebuilts like the Volksplanes and Teenies, aircraft that cruise at 80 or 90 and have horrifying glide ratios. While pacing our Cessna 150 camera plane out over the Pacific, indicating about 90, Rand casually announced over 122.9, "I'm well under 50-percent power now. How about you?" He then peeled off, circled around and shot past us in a fighterlike climbing turn. Rand reports a cruise speed of

155 mph at 3600 rpm and a top of 170 mph at 4200. "I've set 3600 as my maximum continuous rpm, mainly to lengthen engine life. After all, an overhaul costs almost a hundred bucks." Rand even boasts that he can pass *Soner,ii* and *V-Witt*, the two 65-hp VW racers generally regarded as the hottest of the VWs.

Sadly, I didn't get a chance to fly the KR-1 myself to check his performance figures (a fellow can get pretty enthused about his own airplane, especially when he's making \$75,000 a year selling plans for it). Asloundingly, Rand still works eight hours a day, so we had to get together on a weekend, a weekend on which the normally placid Southern California climate let us down. Saturday it rained,

clearing just before sunset in time for a frantic photo session. Sunday, the wind was gusting to 25 knots at 7 a.m. and forecast to get worse. Would you make your first flight in a 300-pound taildragger when it was gusting to 25? Me neither.

At the low end of the speed scale, the KR-1 approaches at a comfortable 60 mph or so and stalls at 42, slow enough for most folks. The airfoil is an RAF 45, the same section used by the Spitfire, the most docile of fighters. Wing loading has been kept under 10 pounds per square foot to satisfy Canadian homebuill regulations, and the result is a docile, fast-climbing machine that, says Rand, gets off the ground in 200 feet or so. "Elevator response is about like a Cessna 150, much less sensitive than a Teenie. I'd say the roll rate is about four times quicker than a 150." The KR-1 isn't really meant for aerobatics, though Rand's has been rolled. The main spar is stressed to 20 Gs, but the engine mounts-would fail long before that.

Surprisingly, the KR-1's cockpit is reasonably roomy. I'd half expected the liny ship to be a one-man airplane designed around Rand's own unique stature. Not true. The standard seat provides ample room for a 6'2-footer. Rand has his own quick-change seat back that puts him a foot closer to the pedals, leaving enough room behind the seat for a medium-size kid. (Rand has raised a few eyebrows taxiing the KR-1 around with two people aboard, canopy buttoned down tight, but he's never flown it that way.) The KR-1 has a left-side throttle and right-side wrist stick, similar to the arrangement in the BD-5. The brakes are a good example of Riind's koep-tt-simple approach: The brake cable runs across the cockpit floor just in front of the seat, and if you want to stop, you lean forward and tug on the cable.

Gear retraction is a complicated process. There are three levers; to raise the gear, pull the right lever till it clicks, then release, pull the left lever till it clicks, release, then push the center handle forward till it clunks. To let the gear down, pull the left latch and haul back on the center handle. This complicated procedure is justified by the marvelously simple retracting mechanism, which consists of one moving part. The mainwheels are bolted to a sturdy transverse aluminum beam. So is the center gear handle. A push forward on the handle merely rotates the whole assembly, pulling the wheels back and up. One KR-1 builder reportedly installed the whole system in one evening. (And then there's the chap who spent two years building a retractable gear system for his Thorp T-18.) Though the retracted wheels still poke an inch or two out of the wings, the speed bonus is considerable. On the KR-1's first flight, Rand was happily puttering around at 115 mph when he remembered the gear was still down. He pulled it up, and speed shot past 140.

As the homebuilding grapevine spreads the word that the KR-1 is for real, that it's not just a funny little toy, Rand is already hard at work on his next project, the two-seat KR-2, which should be ready to fly by the time this appears in print. Basic design and construction is the same as the KR-1, but the fuselage will be widened to take the extra passenger and a foot will be added to each wingtip. Cross weight will jump from 600 pounds to 750, with wing area correspondingly increasing to 75 square feet. Power will be a 65-hp VW. Rand and his cobuilder, Stu Robinson, are hoping for a 150-mph cruise, and if they get it, a lot of T-18 and Tailwind owners are going to turn green.



Sitting very low to the ground. Rand reports a strong cushion on landing and no real problem with visibility.



KR-1 is aerodynamically clean design, and weighs only 350 pounds empty. It has already hit 135 mph, owner says.



The fuluro? Rand ran orrasionally be heard mumbling about a four-pas-senger push-pull VW-powered twin, styrofoam of course. And he's got this model of a jet-powered styrofoam delta that flies beautifully. rj

RAND KR-1 Specifications

Length.....12 ft 6 in
Wing span.....17 ft 2 in
Height.....3 ft 6 in
Empty weight.....310 lb
Gross weight.....600 lb
Fuel capacity.....7.5 gal
Maximum speed.....170 mph*
Cruise speed.....155 mph*
Stall speed.....42 mph
Range (Economy cruise).....750 mi
Range (50% power, no reserve).....750 mi
Range (75% power, no reserve).....500 mi
'Unverified reported speed for Rand's personal airplane. Brochure lists top speed as 140 mph, cruise speed 130 mph.



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD. OSHKOSH, WI 54903-3086
PHONE 414/426-4800

1. Nylon fittings for instrument Pitot/static hookup are available at most local hardware stores. Straight, elbow and Tee fittings with pipe thread and/or hose barb ends are used for instrument installation. Usually found in the plumbing department.

2. For a simple finish on an aluminum instrument panel, consider an Alodine treatment. After all openings and holes are completed, use a gray (fine) Scotchbrite pad to buff the bare aluminum. Keeping all polishing strokes parallel to one another will produce a nice look.

Clean the panel with Aluma-Prep prior to the Alodine bath. Follow the chemical label instructions closely. You'll eliminate paint chipping, wood checking, vinyl bubbles-

3. To clean up oily or waxy spots on fiberglass components prior to priming, use MEK. Lacquer thinner will only spread the spot whereas the MEK will dissolve it. Use caution with this stuff, it's hard on people and some materials.

4. Auto refinishing suppliers sell a blue crepe paper masking tape that will not leave a gum residue even when left on surfaces for an extended period. Excellent for masking on plexiglass and painted surfaces.

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$15.00 PER YEAR- U.S., \$20.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$75.00 U.S./\$90.00 FOREIGN
INDIVIDUAL COPIES \$1.50 EACH.

"20TH KR ANNIVERSARY"

We will be celebrating the 20th Anniversary of the KR series of homebuilt aircraft at Oshkosh this year.

The **KR MEMORIAL FLY OVER** will be **Saturday, August 1, 11:00 a.m. - 1:00 p.m.** See **Jim Faughn Friday, July 31, at the KR Forum or Rand Robinson Booth for preflight info.**

The **KR FORUM** will be held **Friday, July 31, 1-2:15 p.m. in Tent 3.** This year Rand Robinson will have a KR display tent at Oshkosh.

The **KR DINNER** will be on **Sunday, August 2** and will highlight the KR's history and development. The dinner will be served family style featuring beef, fish and chicken. To attend the dinner you must pre-pay at Great Plains Aircraft booth located in the center exhibit building. Cost this year will be approximately \$15.00 per person (non refundable). This price includes a delicious dinner, tax, tip and helps pay for other 20th Anniversary costs.

The KR Anniversary Committee has a few other surprises. Each KR pilot who flies in this year will receive a special 20th Commemorative Anniversary Award. Oshkosh will be great fun for everyone. **HOPE TO SEE YOU THERE!!!!**

1992 KR GATHERING

This year's KR Gathering will be held September 11, 12 and 13 in Covington, Tennessee. For more information contact:
Keith James
1328 E. 45 Place
Tulsa, OK 74105
918-745-8085



Dear Earl,

EXCITING NEWS !!! The Toledo KR group will be holding their 1st Annual Midwest KR gathering August 15th & 16th. It will be held in conjunction with the Toledo Chapter of EAA 582 Fly-in at Metcalf Airport (TDZ) starting 7:30 A.M. on the 15th.

Arrangements for arrival the night before (14th) can be made in advance.

ACCOMODATIONS & PROGRAM

TOLEDO INN
2426 Oregon Road
Northwood, OH 43619
(419) 666-2600 FAX (419) 666-0076

1st Class Accomodations with pool
Shuttle service to & from airport
Special KR Rates \$36.00 per night

METCALF AIRPORT (TDZ)

Featured Attractions:

B-25
KR work in progress displays

AWARDS BANQUET

Poolside - Toledo Inn
Saturday, August 15th 7:30 P.M.

Awards will be given followed by live entertainment & dancing
50's Theme
Banquet \$12.00 Cash Bar

Further inquiries are to be directed to me:

Ron Smolinski
4820 Harroun Rd., Sylvania, OH 43560
(419) 882-8478

Hope this information makes your next newsletter. Looking forward to seeing many KR Builders and pilots there.

Will see you at Oshkosh!

Regards,

A handwritten signature in cursive script, appearing to read 'Ron Smolinski', is written over a horizontal line. Below the signature, there is a small, faint, illegible stamp or mark.

FOR SALE

KR-2 boat stage, fixed RAND gear, tailfeathers glassed, controls in, oversized flaps mounted, outboard spars fitted, gauges, firewall forward to finish including 1835 MAPI with supercarb and 52 x 48 G.A. prop. 16 x 6 trailer, extras -plans, const, logs/pictures. Quality workmanship - only need wheels/ brakes/ epoxy to finish. Serious about sale--serious inquiries please.

Tom Humphrey
3000 Meadow Court
Marietta, GA 30064
404-215-0199 voice mail
404-426-8080 after 10 p.m. EST

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 182 JULY 1992

FOR SALE

65 HP Cont. Md. A65-8F S. No. 5379268
Exhaust, one mag, carb.
Everything to run \$1,200.00 Firm

Ralph Smith
1003 So. Jersey St.
Bluffton, IN 46714
219-824-1021

FOR SALE

4 - 600 x 6 Goodyear aircraft wheels. New condition. Much too large for my KR-1. \$50.00 ea. plus shipping.

Bob Petersen
P. O. Box 102
Hudson, WI 82515
307-332-4259



KR NEWSLETTER

ISSUE NO. 183

AUGUST 1992



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein **is solely that of the experimental aircraft builder.** The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



DAN CROY'S N302DC "CROY TOY" BEST KR-2 AWARD

Dan and I would like to thank all the people involved in the 20th Anniversary KR Celebration for the fabulous job that they did this year. We were very surprised and happy to receive the Ken Rand Memorial Award ("Best KR-2" Award) for 302DC. Our daughter, Jana, was the driving force behind getting the plane to Oshkosh, as we really didn't have all the finishing touches completed, i.e. the wheel pants were left at home because we didn't have time to get them adjusted, etc. We'll treasure the award forever.

(Cont'd page 2)

We were very disappointed that E.A.A. did not show more recognition to the lady who has spent the last twenty years promoting and supporting the experimental aircraft movement, Jeannette Rand. We really feel that if it had not been for Ken Rand's ingenuity, where would the composite aircraft industry be today? Ken was the beginning and should have been recognized for this. Why wasn't his aircraft put on display (not on the shelf at the FAA Building) where people could have seen it? What a shame!

The trip home for 302DC was another event. Upon reaching Sioux Falls, SD, Jana did not have any electrical to the landing gear. She had to declare an emergency and land gear up. She made a beautiful landing - no injury to herself and only a broken prop and Pitot tube to the plane. A big thanks goes to Norm Leonard, who was flying with her and talked to her continually, bringing her out of losing control emotionally several times. He flew with her down to the last 10 feet. KELO TV in Sioux Falls filmed the event and did an interview with her the next day; we have those tapes! She is a super pilot and has always used good judgment and it really paid off when she needed it. Another thanks to Steve Alderman, who air freighted a prop to us in order to fly the plane home. The personnel at Joe Foss Field including the control tower are to be commended for their help. We would recommend Business Aviation to everyone.

HINTS:

On the lighter side, we have a few hints for builders that we would like to share. When using epoxy with microballoons or flox, if you have some left over, instead of throwing it away, put it in the deep freeze. It can be thawed out and used as usual.

To cleanup your hands after using this goop, instead of using thinners or whatever, take a bottle of Vaseline Intensive Care lotion and put a generous amount on your hands and rub in. It will feel real squishy; however, when you take a rag or paper towel to your hands it will all come off and your hands will not be dried out from the thinners, etc. Sometimes it takes two applications.

When cleaning your windshields, windows, etc., take a piece of nylon net (you can buy it by the yard at fabric stores for little or nothing) and scrub the plexiglass or lexon with it. It will not scratch and removes stuck bugs, tape residue, etc. with ease. Wipe with terry towels, not paper towels and you will not have scratches.

A big thanks to everyone again and safe flying!

Dan & Barbara Croy
7030 W. Redrock Drive
Gillette, WY 82716
307-682-1363



**JANA, BARBARA, JEANNETTE RAND & DAN CROY
"KEN RAND MEMORIAL AWARD" FOR BEST KR-2**



**SAM BAILEY AND JEANNETTE RAND
"KEN RAND MEMORIAL AWARD" FOR BEST KR-1**



SAM BAILEY'S N35SB, PRATT, KS



N5276J STEVE ALDERMAN, LONGMONT, CO



RICHARD RING'S N25RR, PRATT, KS



TODD UNRUH'S N81BP, DATONA BEACH. FL



N382L CALVIN CAMPBELL. TULSA. OK



DAN DIEHL'S N4DD, JENKS, OK



N891JF JIM FAUGHN, ST. LOUIS, MO



N13706 MAX CALKIN, OMAHA, AR



MIKE MATRE'S N89MM, CINCINNATI, OH



N335KC KEN COTTLE, COLUMBIA, MO



N5826A NORM LEONARD, GILLETTE, WY



JOHN YOUKEY'S N70JY, YUMA, AZ



MARTIN ROBERTS N191MR, TULSA, OK



CLYDE WETHERBEE'S N817CW, WAUPACO, WI



MIKE LADIGO'S 1977M, TULSA, OK



LINDA BENNETT, JIM FAUGHN & STEVE BENNETT
HANDING OUT AWARDS

OSHKOSH 1992



**KR PILOTS WHO FLEW TO OSHKOSH
RICH SEIFERT, FOUNTAIN VALLEY, CA WON
"LONGEST DISTANCE FLOWN" AWARD**



**PRESENTATION OF HERB BULL'S ORIGINAL ART
COLLAGE TO JEANNETTE RAND**



For the KR Family this year's Oshkosh gathering was a source of celebration as well as tragic loss. I've struggled with how to talk about both in this article.

Maybe the best way is to just give you my perspective on the event.

Judy and I arrived at Oshkosh on Sunday, August 2 about 10:00 a.m. It was a beautiful morning. This event was special...it was the 20th Anniversary of the KR. Before I knew it we had our passes and were heading for the Flight Line. When we got to the flight line we met Jeannette Rand who said Herb Bull had just crashed. Herb's wife, Betty, and Jeannette were escorted to Paul Poberezny's office where they were met by Paul and a chaplain.

Jeannette asked that I express her sincere thanks for the compassion and help given by Paul Poberezny and his staff. Tom Poberezny met with some of the KR pilots to find out what happened.

The KR fly over was scheduled for Saturday, however, conditions were marginal and it was decided to try it again on Sunday. Herb's plane was one of the first to take off. The plane lifted off at the far end of the runway, banked left and went in behind some trees in an unpopulated area. Jim Faughn who had also just taken off, radioed the tower but there wasn't anything anyone could do.

The coroner said Herb had suffered a massive heart attack. The speculation is that he had the heart attack as he proceeded down the runway for takeoff. Herb was 71 years of age.

That night at the KR Dinner we saw a slide show that Herb had prepared on the history of Ken Rand and Jeannette was presented with a wonderful painting by Herb. The painting chronicles the history of Ken Rand and the KR aircraft.

Jeannette was overcome with emotion when accepting it because it was not only a wonderful tribute to Ken Rand but also to the person who painted it. We will all miss Herb very much. Cards can be sent to:

Betty Bull
1450 Northwoods Dr.
Deerfield, IL 60016

I'd like to express my sincere appreciation to Steve Bennett for the way he handled the KR Dinner. He did a wonderful job keeping our spirits up during the 20th Anniversary Dinner.

CONT'D PAGE 6

Thanks also to Jim Faughn, Dan Diehl and the others who did such a wonderful job in organizing the event.

I have also been informed of the passing of two other members of our KR family. James Takemoto, Colorado and Eugene Lee, Florida. James crashed in June on take off from Aurora Air Park, Colorado in what witnesses thought could have been health related. Jim was 74 years old and was a widower.

Eugene Lee crashed in June at Holmstead Airport, Florida as he attempted to turn back to the airport at an altitude of 200' when he experienced engine trouble. Cards can be sent to:

Nola Lee
P. O. Box 1324
Homestead, FL 33090

Our sincere condolences to their families.

1992 KR GATHERING

This year's KR Gathering will be held September 11, 12 and 13 in Covington, Tennessee. For more information contact:

Keith James
1328 E. 45th Place
Tulsa, OK 74105
918-749-8085

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

There is no great thrill in confessing an error, or parading before your peers the fact that you didn't know the aircraft well enough before you took her up. But there seems to be merit in telling such a story if it can be helpful to someone else.

On that premise, I will tell what this man's heart went through a few months ago at our State EAA Fly-in. Seems a friend had his new KR-2 there. I had flown it on it's maiden hop sometime previous. He came to me as others were taking off for fly-bys and asked if I would take his baby out and demonstrate it's capabilities.

Obligingly, I took her out. Now, I must say that on the maiden flight I was very, very gentle. Nor did I retract the gear. But this time, after some 45 hours by it's owner, I was not going to be so conservative, especially with two RV-4s and a Glasair RG already in the air and exciting the crowd.

So, I dutifully fired up, taxied out, took off and moved out of the pattern a bit to warm things up and retract the gear, the latter being a little of a chore, since my arms are not as long as the 6'1" builder/pilot. I finally wound up shoving the handle to the floor with my right foot, not an unusual act for a KR jockey. Then I moved back into the pattern where the action was.

Well, the RV's were fast and the Glasair faster but so is the KR in the proper hands. Or at least it would appear so, if one makes tighter turns and steeper pull-ups, which the little KR is able to do. The only challenge is to keep one's position in the line-up. This we did. But on the first descent from 1200' AGL for the runway, the throttle was brought way back because this little gal was smokin' in over red-line. Then I remembered that the owner had told me that the reason he put a 180 MPH ASI in was because that is what he had. Well, I was coasting in at something around 200, at least the ASI was indicating about straight up. The little Hapi 1835cc never did over-rev; they never do with the proper Warnke prop. When you tip it over and go downhill all you do is go faster as the "Almost Constant Speed" flexes ever so slightly and takes it's heavier bite as the RPM begins to build.

Knowing the KR like I did, I was hesitant to go much beyond that for the builder had not balanced the tail

feathers. I knew from the designer's notes that 200 with no tail balance was ok. Then I wished the builder had done the balancing because 200 was quite slow for downhill in my KR. Anyway, a few more low passes transpired and then the Glasair moved away and it was just me and the RVs. They smoked down the descent in trail. While I was jockeying to stay out of their wake, I tried to make the descent and low-pass look as professional as I could and really concentrated on precision and form. It was then that I quickly scanned my "primary six" and to my horror the ASI was indicating 70!!

I had flown my fully-balanced KR at 250 downhill on numerous occasions and was sure there were no problems with the design at those speeds except the balancing of the tail control surfaces.

Needless to say, the low pass and speed bleed-off climb out was the smoothest a man ever did. I had visions of me shedding control surfaces in angry flutter and I did not put one ounce of unnecessary load on those critical parts.

At that point I decided we had had our fun for the day and it was time I took the man's airplane back to him in one piece. So, I got the speed down to the tried-and-true figure of 100 MPH, nose slightly up and RPM at 2000. I reached toward the floor to grab and squeeze the gear unlock handle. It was then I realized how critical it was for the pilot's arm to be as long as the builder's. I just plain couldn't reach the gear handle with anything but the tips of the fingers on my left hand. I tried several times, unsuccessfully, to position my body so as to get more reach. All I needed was ONE MORE INCH. The sick feeling came over me that there would be a lot of folks watching me grind the man's propeller away as I bellied this beautiful little gal onto the runway.

I was out over the foothills well to the East of the field when I got my head working again. I undid the seat belt and shoulder constraint and slid as far forward as space would allow. My face was against the instrument panel and my right hand fingers on the center control stick. No rudder input, for I was literally laying on my side in that little cockpit. While trying to keep the craft right-side up and somewhat level in pitch. I strained for and reached the gear handle and squeezed it like a wild animal. Plenty of adrenaline flowing! The latch popped free, the gear dropped and I pulled

myself erect once more, pulling the gear handle back until I heard that always welcome "clunk".

I am sure if there were humans anywhere in those foothills they had a first-hand view of what a plane acted like when flown by a drunken pilot. On coming back to the field and setting up for what was to be a "picture-book" landing, I remember saying to myself, "Remember, this bird does not have flaps as N81NB had, so don't let the speed get too high or you'll overshoot this short runway."

Well, I did exactly that, but managed a very smooth go-a-round as if that is what I intended to do all along. On the second try, I did not overshoot as much but when I applied the brakes to slow down, the rapid approach of the opposite end of the runway, I again knew whey Jeanette Rand recommends paying the extra bucks for the Cleveland's. All I can say is that the drums were hot but that is all the damage to a sweet little white airplane. The rest of the fly-in, with all of its inherent excitement, was literally a yawn after the show I had given myself.

Neil D. Bingham
P. O. Box 16884, NW Station
Salt Lake City, UT 84116
801-298-4074

FOR SALE

New tinted bubble canopy (will help with shipping) \$100.00.
Old VW engine with single port heads (for use as a mock-up only) Free-U pick up with dual port heads \$40.00 (the core charge)
0-200 Cont. cyl. & piston assembly complete. 50 hrs. T.T.S.N. \$400.00
Cessna 150 carb good condition. Approx. 760 hrs. T.T. \$275.00

Karl Sheldon
12912 Apple View Lane
Burnsville, MN 55337
612-894-5514

WANTED

One set of KR-2 plans and drawings, will pay reasonable amount. Call:

Rodny Sebbly
3246 N. 100th St.
Kansas City, KS 66109
913-299-9751 evenings

FOR SALE

KR-2 Project, structure complete, all parts included. Needs exterior finish, cable/flight control rigging, etc., to fly. Includes MAPI 1835 engine, tuned exhaust, RST Nav/Comm and Intercom, dual controls, flaps, retracts, heel brakes, complete instrument panel. On trailer, ready to move. Life changes- force sacrifice sale. \$5,500 or BO. Finish it or part it out, at this price you can't lose. Call:

Gary Lorenz
7621 E. Alki View
Port Orchard, WA 98366
206-871-5793

FOR SALE

Great American 52 x 42 propeller
New condition \$175.00

Ed Fernandez
849 Hawthorne Dr.
Walnut Creek, CA 94596
510-934-5049 P.S.T.

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 183 AUGUST 1992

FOR SALE

New off KR-2 project. Landing gear legs with cast aluminum attach brackets. The landing gear has new 500 tires, tubes, axles and brakes. Also included are rudder peddles with toe brakes, cylinders, and fluid reservoir. List price for this equipment is \$1,058.00 + the cost of the tires and tubes. I will sell for \$500.00 plus freight. Call:

Fred Baldwin
1245 Meadow Way Cir.
Hollister, CA 95023
408-637-2747 5:30 - 8:00 p.m. (home)
408-756-6737 (work)

FOR SALE

Abandoned KR-2 project. Have 17 Rand kits. Save big! Send SASE for list and prices.

Sky Stemporosky
24653 Hill
Warren, MI 48091
313-758-0125



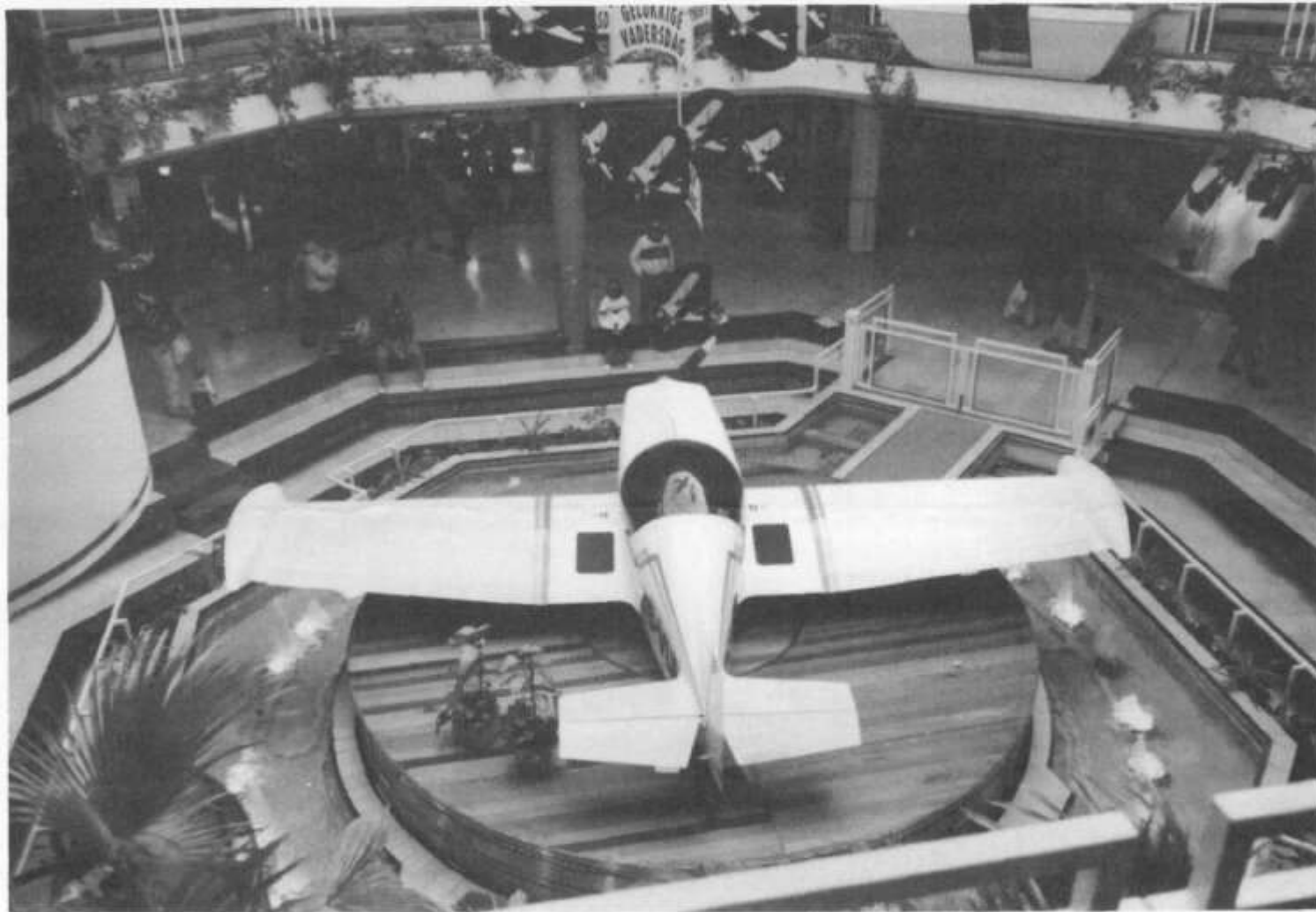
KR NEWSLETTER

ISSUE NO. 184
SEPTEMBER 1992



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of **KR Aircraft**. **Opinions** and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is **solely that of the experimental** aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



LOUIS FROUWS¹ ZS-VUH KR-2, SOUTH AFRICA
(on display in shopping mall)

The KR Newsletters which were produced by Ernest Koppe in the late 70's, early 80's are still on my list of regular reading. I find the KR performance specifications and builders' experiences a very handy source of reference. My newsletters date back to July 1975 (issue no. 1) to February 1981 (issue no. 68). I am keen to re-establish contact with KR builders and pilots and was given your address by Dan Diehl. I own two KR-2's. The one that I built has a retractable undercarriage and the one that I bought has a fixed gear.

(Cont'd page 2)

The KR-2 pictured was bought from Richard Chase two years ago. It has done a total of 220 hours of which I did 140 hours over the past two years. A friend and I have recently fitted two carburetors, replacing the Posa ultra carb and excessively long intake manifolds. A number of components had to be relocated. We moved the electric fuel pump, fuel pressure regulator/filter, voltage regulator/rectifier, battery, throttle cable and reconnected these items. A smaller starter, slick magneto and alternator were also fitted. A much better rate of climb has been achieved with a 10+% higher cruise. Before the two carb modifications a climb rate of only 100ft/min at 9500 ft (12000 ft density altitude on that specific day) could be achieved. Initial climb rate at sea level was 500 ft/min. The plane has a fixed undercarriage and is well-equipped which accounts for an empty weight of 720 pounds. My own mass is 65 kg and fuel capacity is 80 litre. The C of G is well within limits for two persons of 80 kg and full tanks. Cruise is now 135 mph indicated with 2000cc Volkswagen engine with standard camshaft. A 52 x 45 prop is used and runs a 3350 rpm at cruise. Static is 3200 rpm. A 52 x 50 prop would be better for cruising conditions, however, I do a lot of short flights across mountains and like the extra rate of climb to quickly get to 6000 ft. My home base is at 400 ft above sea level. The following is an excerpt from a recent letter I wrote to Dan Diehl:

"The dual carb set-up is very successful. On completion, I only had time to do three short test flights on a Saturday. On the next Wednesday, I left for the EAA Convention at Margate in Natal. The 700 nm distance was covered in six hours with two stops. I was chasing behind a cold front which had just past Cape Town. The first three hours of flight was at FL075 and two degrees centigrade. My feet were quite cold as I don't have cabin heat and was flying at freezing level.

Performance has improved from 120 mph @ 3200 rpm to 135 mph @ 3350 rpm at sea level using the same 52D x 45P prop. The return flight was via East London, Port Elizabeth, George and Worcester back to my home airfield at Fisantekraal near Cape Town.

I tried to cross the mountains by flying at 9500 ft. but experienced severe head winds of 90 mph and the front had closed in on the other side of the mountains. At Worcester Airfield the wind was gusting to 40 mph and I experienced bad turbulence descending and landing at the airfield. Somehow I made a good landing but had to use maximum rudder after landing and was lucky to get some people to push the plane to a sheltered place. Two people held onto each wing, two pushed and held onto the prop and I pulled on the tailwheel spring, all whilst still keeping it in line with the wind. This happened last Monday and I went to fetch the plane on a beautifully calm day on Saturday. It flew like a dream and all the bad turbulence was instantly forgotten.



Fuel consumption ranges from 11 litres to 17 litres at full power. The single plugs all look the same nice colour and there is no carbon in the exhaust piping. The dual carbs automatically compensate for altitude and therefore I no longer have a mixture control. At present there is only a choke and primer on the righthand manifold. This was done to improve starting. We plan to install a choke and primer on the lefthand as well. On this last trip the starter solenoid failed and I had to revert to prop starting using a rope to hold the tail whilst in remote locations with no help. My mother, 77 years of age assisted me in Mosselbay by holding the tail down. What are mothers for!?

(Cont'd page 3)

Margate was quite an adventure. There were 400 aircraft and you could fly whenever you felt like it, except when there was an airshow on. This became quite a problem as twice we had to idle for about 20 minutes after start-up. We had to hold about 5 miles from the field whilst a Mirage was doing some flypasts at 1000 km/hour at sea level. The national aerobatic championships were on at the same time and we were treated to some spectacular flying.

The tip tanks on my KR-2 have been designed aerodynamically to carry their own weight filled with fuel. I don't have fuel tanks in the tips but keep them for looks and extra lift. At Margate there was a KR-2 with similar removable tip tanks. The owner flew in from Harare in Zimbabwe and he told me that there is very little difference in speed with or without the tip tanks. The tanks are about the same size as those on my KR-2. This time of the year we have some of the best flying weather you could hope for. Between the cold winter fronts lasting 3 to 5 days we get lovely hot days."

Detailed photographs and drawings of the twin carb modifications are available. They show the new intake manifolds, carb linkages and give information about the carbs used and tuning. If any KR builder is interested in installing twin carbs, I will provide a set of drawings and photographs by return mail for \$12.00 to cover cost and postage.

I hope that with this letter we are able to re-establish contact after so many years. You and your family are welcome to visit us in South Africa. The KR is available for experienced KR pilots to fly in the Cape Town area. Sincerely,

Louis Frouws
10 Benurban Road
Valmary Park
Durbanville 7550
South Africa

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

AN UNFORGETTABLE TRIP TO OSHKOSH

It all started the Thursday morning before Oshkosh. Martin Roberts, Calvin Campbell and myself (Dan Diehl) departed Jenks Municipal at 7:00 a.m. Marty took off last and caught up with Calvin and me about 25 miles north of Tulsa. I noticed he was trailing a tremendous tail of black smoke. I called him on the radio and told him. As we turned toward the nearest airport, he was trying to lean the mixture hoping to solve the black smoke problem. As you guessed, it didn't help. By now the oil pressure was falling and oil temp rising. It was about three minutes to the airport. As the black smoke (which turned out to be oil) began to go away, white smoke began to boil out of the KR. I was afraid that he was on fire as I'd never seen that much white smoke come out of a plane. We were constantly searching for an emergency landing spot as we approached the Skiatook Airport. Well, the engine finally siezed about a half mile from the strip. Marty did a perfect job of stretching the glide and landed right on the numbers.

It turned out that a valve cover gasket had slipped into the head which let the oil escape. Upon teardown later, Marty ground the crank .010" and replaced the rods. As most of you know, he is already flying that engine again and was giving rides at the KR Gathering.

Well, to continue the story, we gave my dad a call on the phone and he carried my old 2180 from my N4DD up in the truck and in 20 hours we were in the air again. We met up with Steve Alderman about two hours north. We landed, ate lunch and fueled up. There was a front laying to the north. It was supposed to be narrow and flight service said in about 30 minutes we'd be past it. It was very turbulent below it so we opted to go on top. This turned out to be a bad move. After about an hour of flying "on top" we were all getting real nervous. Our flight of four turned back south and found a hole about 15 minutes after our 180. Dinner and hotel felt good while the rain blew over. The next morning it was clear and we made it to Oshkosh about 11:00 a.m.

We were glad to be there and see our friends. We were also looking forward to the Saturday Airshow that the KR's were to be involved in. The weather was not so good Saturday and the KR portion of the airshow was put off until Sunday.

(Cont'd page 4)

It was during this time when Herb Bull suffered his heart attack at the controls of his KR-2 and crashed. Four of our planned group of 13 KR's never even took off.

With this very trying experience behind us, we made the best of Oshkosh until Tuesday morn.

Our flight of three (Calvin, Marty and me) headed south. Calvin needed fuel about 1.5 hours out. We had noticed that his nose wheel was off to one side about 30 degrees. Marty and I landed first and Calvin followed. He shut off his fuel and mag once he had the field made. The prop stopped horizontal. As predicted the wheel went wild before it broke off and the KR slid to a stop on it's nose. We found a hanger to store his bird and made arrangements to have it there for awhile.



DAN DIEHL'S N4DD "OL'BLUE"

Calvin hopped in with me in N4DD and we started out again for Tulsa. About an hour later I began hearing noises that disturbed me. We landed at the next good airport. The engine (2600 Type IV) was still making good power and the instruments all looked good. Upon shut down we thought the prop was loose. Well, it wasn't. The crank had broken. Again we found a hanger and Calvin and another passenger of Marty's began removing the engine.

At this point we had four people and only two seats. I got in with Marty and we finally arrived in Tulsa 3.5 hours later. I told Marty I wanted my 2180 back so we pulled it out of his KR that night and loaded it into dad's Tiger. Dad and I flew back to Chillicothe, MO the next morning and installed my 2180 in N4DD. The 2600 took a back seat ride in the Tiger home. By the way, we also brought home Calvin and Gene.

Now with two of the three birds home we still had to go back to Fairfield, IA to get Calvin's bird. We did some serious research (described in my following article) and built a new nose gear.

Calvin and I took off about three weeks later and returned with his bird. The first landing with the new nose gear was back at Tulsa and he has had no problems with it since.

Needless to say, this was my worst trip to Oshkosh. Going back through my logs I discovered it was the 13th time N4DD made the trip. Now I'm not superstitious but it does make you wonder. My old 2180 had been together now about ten years and roughly 500 hours so I plan to take it apart, convert it to dual ignition and freshen it up with new bearings. Mike Latigo will replace the crank in the 2600 and install this powerhouse in his KR-2.

This year's KR Gathering in Covington, Tennessee was great fun and there were no problems with the KR's except a flat tire. All who attended enjoyed themselves and those who missed it, missed out. Keith James has done a terrific job of organizing this event for the last three years and has handed the reins over to Max Calkin. We look forward to the event next year!

Dan Diehl
1855 North Elm
Jenks, OK 74037
918-299-4444

ATTENTION! KR BUILDERS USING THE DIEHL LANDING GEAR

It has come to our attention that the lower casting is prone to breakage. In our quest for strength we ended up with a casting that has a yield and ultimate that are too close together. The upper casting is made of a more malleable material and has shown no sign of failure. At present we have sent letters to everyone we know of who has purchased our gear warning them of this potentially hazardous situation. However, some have purchased the gear from another builder and thus we have no knowledge of their existence. Please help to spread the word about this item. We are replacing all these parts with a steel, welded unit at no cost to the KR builder. We have already begun shipping these parts to the known flying KR's and will ship the remainder as soon as our

(Cont'd page 5)

fabricator gets them to us. If you are in a bind for these parts, please call us and we will prioritize your shipment. Again, this is a mandatory change and is not optional. We apologize for this inconvenience but feel that your safety is our utmost concern.

While we're on the subject of landing gear, let's talk about the nose gear. At present we have shipped about 30 of these.

A few of these have had an occasional shimmy problem. In our search for a reason why some have problems and others don't, we find that this is a common problem with all of the castering nose wheel designs. Because of this we decided to do more intensive testing. We built this "Rube Goldberg" contraption on the back of the truck. It allows us to load the gear at different weights. We can drop test the gear at different speeds and most of all we can set the wheel off to one side or the other and then drop it on at speed. This simulates the aircraft landing with different weights. What we found was this. The variables of tire pressure, impact loading, aircraft weight and tension on the shimmy damper and speed all have little effect on whether or not the wheel will shimmy.

What "does" cause the wheel to shimmy is an offset wheel at touch down. In other words, if the nose wheel is not pointed straight down the runway when it touches down, it will shimmy. It will shimmy regardless of what speed or how easy you set it down. We did find that the wheel pant will aggravate the problem. We intend to add a little counter weight to the nose of the pant to help in this area. One pound of lead epoxied into the very nose will help relieve this. Now, the real problem. What causes the wheel to get off center in the first place. This troubled us as we could only speculate. The testing gave us the answer. We thought that it was caused by propwash, however we would notice on the KR's flying that it would sometimes move to right always on some and others would always move to the left. That blows the propwash theory out the window.

What we did find was this. With the airplane traveling down the runway the wheel is straight ahead. At 40, 50 or 60 mph, when the nose is lifted off, the wheel is turning at high RPM. If the wheel is either out of round or out of

balance it will shake itself off to one side or the other. The pilot can't feel that vibration and doesn't suspect anything is wrong. When he lands, with the wheel to one side, it goes into the shimmy routine. It can actually be so violent that the nose strut can break. Obviously this will destroy the prop and scratch up the cowl bottom.

The key to not having this problem is a true running and balanced wheel. Stick on wheel weights are available for mag wheels at any tire shop. You can get the wheel spinning with an air nozzle blowing on the tire O.D. in the direction of rotation. The other thing that must be done is to install the spring we will send you soon. This spring will return the wheel to straight ahead once the wheel leaves the ground. It will come with a fiberglass fairing that will cover the pivot and spring and aid in mounting the wheel pant.

You "must" send the steel nose gear pivot to us to modify this unit. Turn around time should be quick. Again, this modification is a must so don't be out there flying your tri-KR thinking that just because you've never had a problem, your's is OK. It could be your next landing that bites your nose.

Then there is one other potential problem. It has come to our attention that our metal supplier sent us steel not up to our requirements. We don't know who got this soft steel but when you send in your nose pivot we will check it for hardness and replace this piece if it is not right. Anyway, all these problems have shown up only after many KR's are flying. We try to do our best to supply highest quality parts. We design, build and test prototypes and expect production units to perform the same. Then we depend on suppliers to provide constant quality parts but cannot expect all landing conditions to be the same. Only after many builders and flyers begin using the parts can we get all the variables the gear will be exposed to. We feel we have the problems solved and thank all who provided input to finding solutions.

Dan Diehl
1855 North Elm
Jenks, OK 74037
918-299-4444

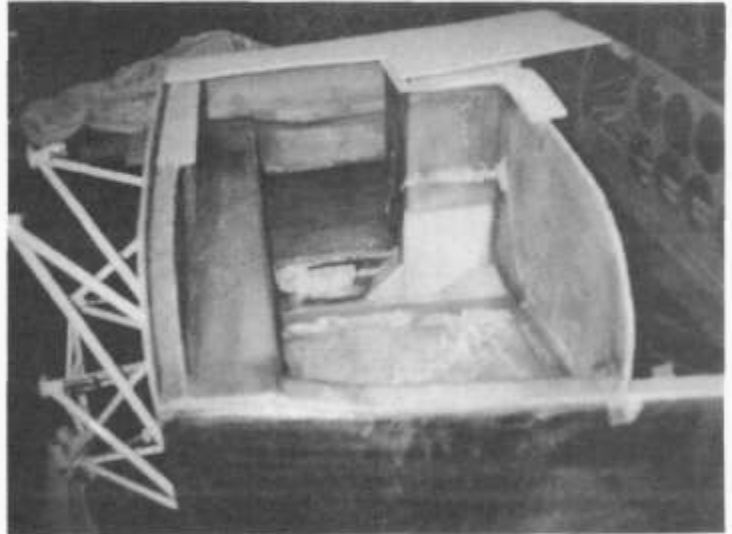
VISIT TO HAWAII

Gladys and I visited our daughter in Waimanalo, Hawaii in mid-June. We drove across Oahu to Hickam A.F. Base to visit with John Shaffer and his wife, Glenna. John and I talked airplanes and the women just relaxed, after supper that is. John is building another KR-2 on his lanai (patio). It's a lesson in determination. Let me tell you about it.

John flew his KR-2 retract tri-gear to Sun N' Fun '85 along with several others from the Oklahoma area. His gear was different than most in that the mains folded inboard and gear was attached to both the forward and aft spar. It retracted very clean. Some of you may remember - in 1986 John crashed (flat spin) on his way to Sun N' Fun. Critical injuries and many operations did not stop his love of flying. His new project is worth mentioning.

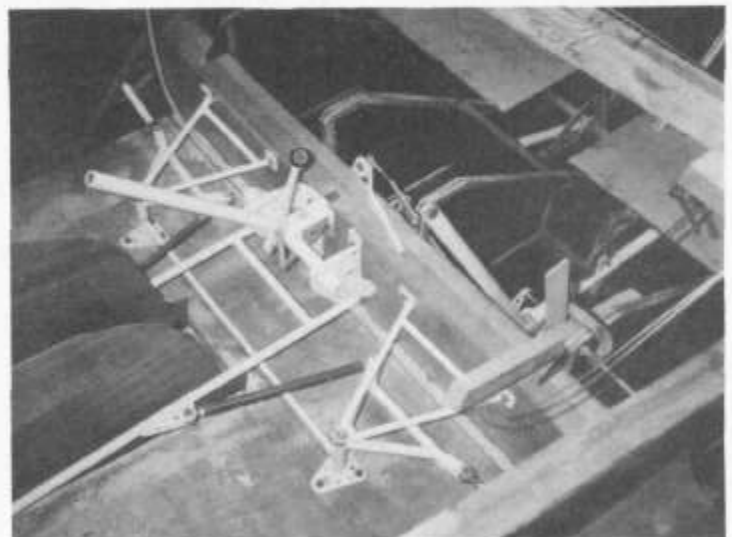
It is an oversized KR-2: 1-1/2" wider at the firewall, 2-1/2" wider at the forward spar and 4" wider at the aft spar. The fuselage is 24" longer (3" in front and 21" in rear). The top longeron is not doubled per plans. Instead it is tripled with the third longeron under the plans double. The aft deck is all plywood wrapped around from the sides. The forward fuselage sides have foam and glass between the longerons, uprights and diagonals-- to reduce the noise level. The seat is built in between the spars as was his first KR-2. He said there was no cushioning but was comfortable. The seat curve puts knees 1-1/2" above the forward spar.

The gas tank is being made using 1/4" clark foam glassed on both sides (Vynal Ester). Holding about 25 gallons, there will be no wing tanks.



The uprights in the spars will be full width because it will supposedly be stronger.

John's tri-gear retract system is his own design that he says is a development from one designed by Don Land years ago. Minor changes between his first KR-2 and this one shows this development is continuing. I believe the gear to be well thought out. A few of the original parts are incorporated in this gear.





Available space to build this aircraft is a challenge in itself. It is wall-to-wall airplane. Approximately 10' wide and 16' long, John has put plywood paneling on the outside wall and a very small tool room on one end. The other end is open.

In the tool room is a compressor, bench grinder, belt sander and metal lathe. To use the lathe John has to leave the door open to have a place to stand.

Recently he set the dihedral in the left (one side at a time) main spar. The small space was overcome by opening the sliding patio door and running the spar into his living room.

Engine parts are accumulated for assembly at a future date.

John started his project in February '91 but lost five months to sickness, mainland visitors, etc. and at this time is probably 45% complete. This includes building all landing gear and engine mount from scratch.

Bob Muse, Sr.
2194 Freydale Rd. S.E.
Marietta, GA 30067
404-973-3150

HELP!

I have received a number of requests for information on "successful" Loran "hidden" antenna systems. If you have had success with a hidden system, please share your ideas with the rest of us. Thanks!

"WASHOUT" MATH

Perhaps you're stymied about setting wing washout. Here's the information you'll need to do the job quickly and accurately.

Using basic trigonometry one can calculate the offset of each rib chord from horizontal to achieve the desired washout, at both the wing root and wing tip. Once the offset is calculated, level the top longeron and jig the wingribs to the numbers below and attach them to the spars.

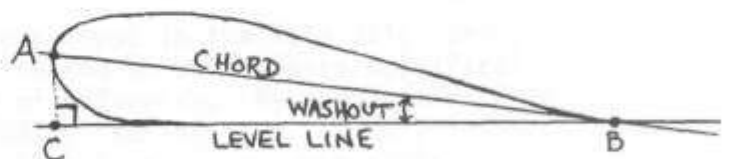
The root rib chord is 48" with a washout of 3-1/2 degrees, as pictured below. Presume that the rib is secured at the trailing edge, we must raise the leading edge to produce the washout. But, how far? From the picture we see that the chord is line AB and line CB is our level line, which is parallel to the top longeron. The distance AC is the height the leading edge is raised to produce the washout. We calculate this using trig as $\sin 3.5 = AC/AB$. Our calculator tells us that $\sin 3.5 \text{ degrees} = .061$. We also know that AB is 48". Thus, we calculate AC by rearranging the equation to:

$$\begin{aligned} (\sin 3.5) (AB) &= AC, \\ \text{giving } (.061) (48) &= 2.93" \\ \text{(or } 2\text{-}59/64\text{)} &\text{ for the distance} \\ &\text{to raise the leading edge, from} \\ &\text{level, for } 3\text{-}1/2 \text{ degree washout.} \end{aligned}$$

The wingtip washout is done the same except we use $\sin 1/2 \text{ degree}$ instead of 3-1/2 degrees. The value of $\sin .5 = .0087$. The length of AB, the chord, also decreased to 36" so we calculate

$$\begin{aligned} AC &= (.0087) (36) \\ \text{giving } .31" \text{ (or } 5/16\text{)} &\text{ as the amount to} \\ &\text{raise the leading edge at the tip.} \end{aligned}$$

I hope this helps someone out.



Ken Jordan
328 Green Ave.
Carney's Point, NJ 08069
609-299-0498

FOR SALE

Frustrated home builder came to the conclusion, "If it's not done after ten years, it probably never will". Must sell partially completed KR-2. Fuselage wood structure and spars completed and bought off by the FAA. Also have 4' x 4' birch plywood, aluminum retract gear package and spring bar, wheels, tires, mechanical brakes, axle kit, bolt kit, all foam, fiberglass cloth, canopy, piano hinges. Will sell complete or separate components.

Mark Bridgeford
6659 Fresno Ct.
Alta Loma, CA 91701
714-944-2663

WANTED

KR engine mount (prefer wide type), engine and flight instruments. Must be reasonably priced.

Tillman D. Mallory
696 Hall Road
Pembroke, KY 42266
502-265-2567 8-12 a.m.
502-475-4856 6-9 p.m.

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 184 SEPTEMBER 1992

WANTED

VW conversion parts for 1835 VW.
Need: Intake manifold for dual port, alternator, start and mag drive for Diehl case, 92MM pistons & cylinders. Also need: Cowling, motor mount. Call collect with any parts you may have for sale.

Terry Maxfield
1504 Grandview
Waterloo, IA 50703
319-236-1954 or 319-235-6633

20TH ANNIVERSARY KR MEMORABILIA

XL Shirts only	\$ 8.00	limited amount
Mugs	4.00	ea.
Pins	4.00	ea.
Hats	4.00	ea.

Add \$4.00 for shipping. All check to:

Linda Bennett
41 W. 720 Fox Bend Dr.
St. Charles, IL 60175
708-464-4177 after 6 p.m.



KR NEWSLETTER

ISSUE NO. 185

OCTOBER 1992



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and involvement in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



**TOM BAGNETTO'S, N911TB, WICHITA FALLS, TEXAS
WON "BEST KR-1 AWARD" AT COVINGTON '92**

September 13-14-15, 1992 Covington, Tennessee... What a blast! Cool weather, clear skies and lots of flying. There were thirteen KR's present and one KR-2 thirty miles away with a broken motor. There were lots of other experimental airplanes present; Pitts, Emerudes, Glasairs, Sonerai, ten ultralights, RVs and lots of spam cans. One KR builder flew in a turbine powered Beech King-Air.

(cont'd page 2)

We found out the U.S. Marine Corp. had set up a temporary tower for our use. They had an Oshkosh fire truck and emergency medical personnel in place. They had a N.D.B., Tactan, radar in place for the weekend.

The U.S.M.C. personnel were military air traffic control people from the Naval Air Station at Memphis, Tennessee. They were military experienced from Desert Storm Operations and needed civil aircraft experience. By the end of Saturday they were civil aircraft qualified. There were 313 operations over the Covington Airport compared to ten at the Memphis N.A.S. for the same time period.

The Marines were really supportive and enjoyed rides in KR's. We also got to see their crash/fire rescue unit in operation with the water cannon in action. It takes 22 seconds for the firemen to suit-up in their aluminum fire suits.

Covington is an impressive place to host a KR fly-in. Plenty of ramp space, hangar to keep planes in, very helpful people. Cannot say enough about the nice airport people. Chuck Grammer really put us on to a nice place to have a KR Gathering.

Friday, planes started arriving and fun flying began with lots of U.S.M.C. jets doing fly-bys... (call that high speed passes). That evening the traditional gathering at the Pizza Hut next to the Best Western. Had a good time and did hangar flying in various motel rooms until 1:00 a.m.

Saturday, more planes came in. Judges using Oshkosh rules, started to judge the planes. A pilots meeting laid down the ground rules for flying with the U.S.M.C. telling about their operations. Who else can have a fly-in with the military protecting their air space?

The spot landing contest was very close again. We had to rely on video cameras to determine the winner. Martin Roberts won this year by actually planting his wheels directly on the line. Second place, Jim Hill, was four feet away. Jim won last year. As usual Martin Roberts gave a lot of rides to people.

Saturday night at the awards dinner Bob and Gladys Muse had their 50th Wedding Anniversary. Their son, Bob Jr., had a cake ordered and in the middle of the dinner the cake was presented.

There were a lot of door prizes donated by Wicks Aircraft, which everybody really enjoyed.



**NORM LEONARD'S, N5826A, GILLETTE, WY
WON LONGEST DISTANCE FLOWN AWARD**



**MIKE LADIGO'S 1977M, TULSA OK, WON BEST
ENGINE INSTALLATION AND MOST INNOVATIVE
UTILIZATION OF A KR**



PHOTOS PROVIDED BY KEITH JAMES



**JIM FAUGHN'S N891JF, ST. LOUIS MO
WON BEST KR-2 AND BEST PHOTO ALBUM**



CALVIN CAMPBELL'S N382L, TULSA OK



**MIKE LADIGO, JIM FAUGHN, NORM LEONARD,
MARTIN ROBERTS & TOM BAGNETTO (WITH PROP)**



MAX CALKIN/TOM BENTON'S NT3706, OMAHA, AR

One note about the People's Choice Award. The prop was donated by Butch Koppe, the first KR Newsletter editor.

Next year's KR Gathering will be in Covington, Tennessee in September during the same time span... so plan ahead.

It has been fun for me to host the KR Gathering for the last three years. I've met a lot of neat people who I like to see each year but it is time for another to host the event. The new event chairman is:

Max L. Calkin
Route 1, Box 149A
Omaha, AK 72662
501-426-5307

Best regards!

Keith James
1328 E. 45 Place
Tulsa, OK 74105
918-749-8085



**MARTIN ROBERTS N191MR, TULSA OK
WON "BEST SPOT LANDING"**

"WASHOUT" FOLLOW-UP

I look forward each month to the KR Newsletter and the many Ideas and KR stories that fellow builders are able to share.

The September, 1992 Issue contained a short article about wing incidence and "washout". When I started my KR-2 and was studying the plans, I too had questions about how to properly set 3-1/2 degrees + incidence on the wing as measured from the top longeron. The process seemed a bit "hit or miss" to me so I developed my own method that I will share with other builders. Please remember that I am not an engineer, my KR has not yet flown and this is my first project. Keeping these facts in mind, let's proceed.

First, the drawbacks of the plans as I see them:

1. It is difficult to find level on the top longerons with their bow out and dip from firewall to tail.

2. How do you transfer from longeron level to 3-1/2 degrees at cord line?

In studying the plans, I realized that in theory (on the drawings), the top longerons are 90 degrees to the firewall or "level" when the firewall is "plumb". Also, with the firewall "plumb", the wing spars should be "plumb". Next, if you look at the full size rib drawings, you will see the cord line is 3-1/2 degrees plus if spar is "plumb". Having cleared that mental hurdle, the whole thing seemed to fall into place. I used the following procedure to "rig" my KR.

1. I made the firewall my base point or reference point as suggested somewhere in the plans. Everything would be set to it.

2. I blocked up the fuselage so the firewall was plumb and the fuselage was level from side to side across the top longerons at the forward spar location. I used a 48" level but an angle meter I later purchased would be an equal or better tool. I bought mine for \$7 at a backwoods hardware store. I later saw another model at a True Value Hardware store for \$15.00. They are both accurate to 1/2 degree and should be a **must have** tool for any builder.

3. I then set my forward center section spar in cutout in fuselage and measured for level side to side, plumb on forward side and 90 degrees to fuselage centerline by measuring from each tip to

the rudder post. When satisfied, I glued it in place while rechecking each of the three measurements again at least a dozen times before the glue dried!

4. I then cut my wing ribs and duplicated all the information from rib drawings to each rib (spar drawing and cord lines). If you bolt the ribs together for final shaping and mark your reference lines (for cord line and spar locations) on the edges while still bolted together, it will insure four identical ribs. The same thing applies to the tip ribs.

Next I cut each rib and used the center piece of one 48" rib clamped to the forward spar on each side of the fuselage to set my rear center section spar. Note: I used the spar drawing on the rib to precut my rear spar top cap to shape before installing in fuselage. A radial arm saw worked well. (Remember to cut only that portion of the spar cap outside the fuselage. Why do things seem so obvious **after** you have screwed them up?)

5. I clamped the rib center piece in place on the backside of the forward spar, slid the rear spar into the fuselage and located it to fit up the back edge of the rib. If you cannot locate the rear spar center section against the ribs, something is bad wrong. If your uprights and longerons are spaced properly, it should set right into place. Note: Check your forward spar for any twist (error from plumb) before cutting ribs. If your spar is twisted, trim rib where it attached to the back out of the wing. When I had everything correct, I glued the rear spar center section in place. If you do any trimming on the ribs, make sure to mark them so they go back to the proper location when gluing.

Given the foresight of Ken Rand to build 3-1/2 degrees + incidence into the wing with the spars plumb, the process went very smoothly and everything fell into place according to plan. Both spars rest on top of the bottom longerons as shown in drawings and required only small shims to compensate to fuselage errors and to achieve all required measurements.

I have not set my rear outer spars yet but I plan to proceed as follows:

1. I will bolt my forward outer spar in place and check for a "no twist" condition. If all is correct, I should be able to match my spar drawing on the outer rib with the spar itself and attach the rib to the spar.

2. I should then be able to locate and drill attach fittings to rear outer spar by matching rear outer spar to tip rib. This will give me the required 1/2 degree + incidence at the tip. I can double check by using my angle meter on the cord line drawn on the tip rib.

Next, some thoughts on the horizontal stabilizer. The plans say to "set the horizontal stabilizer at 0 degrees incidence with the top longerons. Shim if necessary. 3/32 shim is common under forward stabilizer spar." My question was how do you have the horizontal stabilizer at 0 degrees to top longerons with a shim between them? I went back to my base point, the firewall. I set mine by going 0 degrees or level across top of horizontal stabilizer spars, front to rear, with the firewall plumb. I checked for level side to side, and 90 degrees to fuselage centerline by measuring from each tip to a common centerline point. This gave me the "rigging" the plans called for without regard to fuselage errors or the fact that my fuselage is 24 inches longer than standard.

Please give these procedures some thought and check them against the plans. If I have overlooked something, please let me know.

Larry Flesner
23 Mockingbird Lane
Carterville, IL 62918
618-985-2373

washin, noun. A permanent warp or twist given a wing such that some specified or understood angle of attack (usually the Reometric angle of attack) is greater at tip than at the root. See WASHOUT and note.

irashout, noun. A permanent warp or twist given a wing such that some specified or understood angle of attack (usually the geometric angle of attack) is smaller at the tip than at the root.

Wddboot and winhln (wileh tee) are "otnetlmei given to opposite wines on an air-plane to counteract enclne toripie; wncliout is often Elren a wing to improve nblling characteristic!!.

VVa«bont (and **wshln**) are sometimes ipecllfed at aerodynamic. If the absolute angle of attack varle* between root and tip, or geometric. If there is variation in the geometric angle of attack between root and tip.

decalage, noun. The angular difference between the mean aerodynamic chorda of two specified aircraft surfaces set nt different angles of Incidence, commonly this angular difference between two wings of a biplane or multiplane, but also applied to two approximately horizontal surfaces in tandem, such as the wing and stabilizer of a monoplane; also, a sotting of surfaces that Incorporates this nngular difference.

Docnlape II considered ponltre when an upper Hurtace in a greater angle of Incidence than a lower surface, or when the forward mirfare of a tandem arrangement in at the greater angle. The decalme of tamle, uisurface* 111 sometime* Called "longitudinal decalaKe."

BUILDER'S COMMENTS

Just received Newsletter #184 and have a couple of comments.

1. On Dan Diehl's nose wheel alignment drift problem he might consider the probability of gyroscopic precession being the cause if the aircraft turns for any reason after rotation or lift off. Banking or roll will have the same effect. The "American" 2 place trainer, TR-2 service manual will show and tell how to solve the drift and shimmy problem.

2. The article on "Washout" math may be great for converting degrees to inches but the correct "terminology" and procedures for accomplishing the correct center section "decalage" and wing tip "wash out" must be understood completely "first" because if it is wrong now, you will need a chain saw to fix it later. The root rib is not fixed at the trailing edge. The fixed point is the rear spar bottom laying on top of the lower longeron! After the main spar dihedral is set, the outboard rib pivots at center on the end of the main spar to determine the 3 degree washout angle from the root rib and establish the dihedral angle of the rear spar! This will allow the rib/spar hold lines to match vertically.

The "Gypsy" wings are solid foam cores so there are no "ribs" in the wings but metal templates were used for hot wire cutting of the cores so the procedure for correct alignment was the same as for rib construction. (See clips from pages #56 & #180 from N.A.S.A. Aeronautical Dictionary 1959 to document terminology.) I am not an aeronautical engineer but for the last 50 years have been attending the Aircraft School of Hardknocks. I have designed, built, patented and test flown (2) "skyjacker" aircraft and built a 160 HP "Emeraude" CP-305A and the "Gypsy" N32U which I now have 26 flight hours of 40 required toward certification. This letter is not intended to criticize but only to clarify a very critical step of constructing a dandy little airplane. Questions? Contact me.

Ralph V. Sawyer
45432 Leatherwood
Lancaster, CA 93534
805-948-9642 home
805-824-4359 hangar

(MORE INFORMATION ON WASHOUT MATH
NEXT MONTH)

FOR SALE

- 32 M.M. Mikuni carburetor new C/W mounting flange \$65.00 U.S.
32 M.M. Posa super carb, new with jetting kit \$90.00 U.S.
MAPI, Mosler electronic primary ignition with auto advance, use with Great Plains coils & plug wires, new \$165.00 U.S.
Dynamo type belt drive alternator. Weighs 2 pounds, comes with balanced pulley mounted to forged gland nut and 3/4" drive 42mm socket. Comes from Thomas Morse skid steer. Mounts like belt drive magneto. Excellent for single ignition application. Voltage regulator can be purchased from dealer 12 volts. \$ 90.00 U.S.

I purchased all this to try out on my engine. I finally decided to go dual ignition because I didn't like the bump it put in my cowling using the HAPI Mosler electronic ignition. The Mikuni Carb didn't fit because I'm using an aluminum channel to lord mount engine mount. I can't run two belt drives and there's no place to place the belt drive alternator so I opted for an alternator from a 350 Honda motorcycle as per plans. Trying to stuff everything into a tight cowling has been a real adventure.

My KR-1 is basically stock (if there is such a thing) with retractable gear. I'm running an 1835cc VW that I've put together myself. I'm still involved in a carburetor and intake manifold adventure (I've got a beautifully contoured cowling and am not willing to give up any lines). I'm using shorty stacks, I've made a heater muff from an old propane cylinder. I solved my oil cooler fiasco with an oil cooler from a Honda 650 Nighthawk motorcycle. I've basically built this airplane three times and have gone way past 700 hours building time. All this should make my next project go easier hopefully. Thank you.

Don Chisholm
10 Sundance Cres.
Scarborough, Ontario
CANADA MIG 2M2
416-431-2482



THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

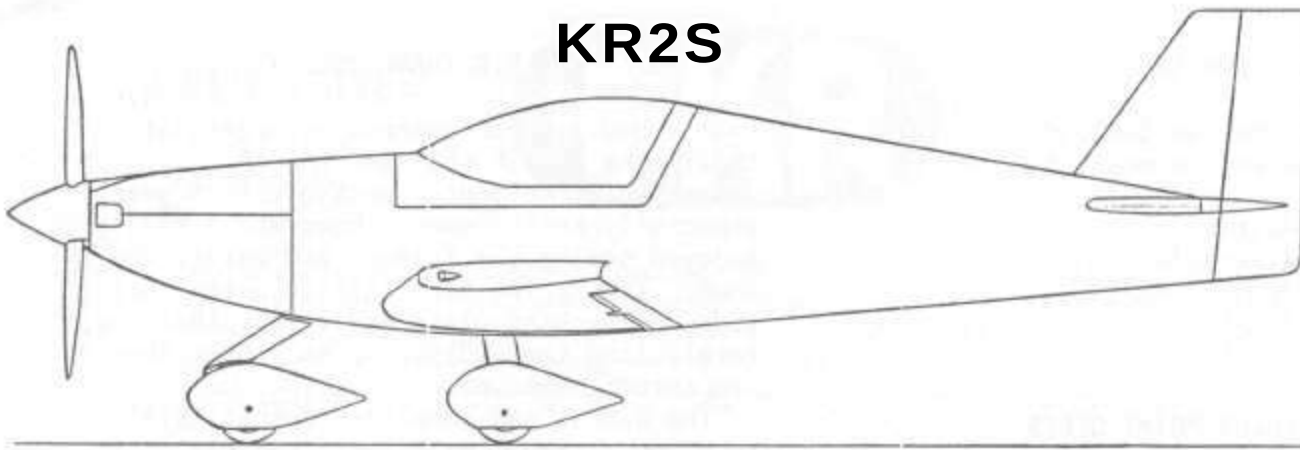
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

FOR SALE

Boat stage, new Revmaster 2100, new forged crank, wing and tail skins, hardware kit. Brakes, wheels, tires, cowls and premolded turtledeck, foam, fiberglass, engine mount. Make offer.

Fred Baldwin
1245 Meadowway Circle
Hoilister, CA 95023
408-637-2747

KR2S



RAND ROBINSON ENGINEERING, INC.

15641 Product Lane, Suite A-5
Huntington Beach, CA. 92649
714 898-3811

KR2S SPECIFICATIONS

Length	16'
Wing span	23'
Total wing area	88 sq. ft.
Empty weight	520 lbs.
Gross weight	980 lbs.
Useful load	460 lbs.
Baggage capacity	35 lbs.
Take off distance	350 ft.
Landing distance	600 ft.
Stall speed	48 mph
Maximum speed	200 mph
Cruise speed	180 mph
Range	1080 miles
Rate of climb (light)	1200 fpm
Rate of climb (gross)	800 fpm
Service ceiling	15,000 ft.
Engine	VW 2180
Fuel	12-24 gal.
Fuel consumption (cruise) (economy cruise less)	4.0 gph
Seating	2 across
Landing gear options	Fixed tri-gear OR Fixed Gear-Tail wheel version

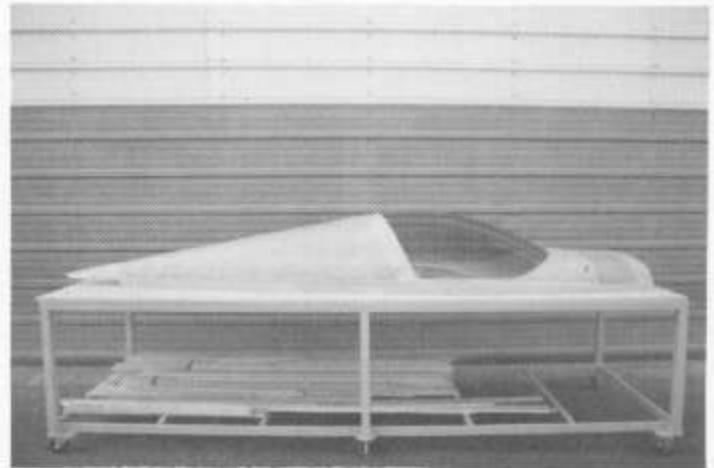


Photo of new canopy and turtledeck
provided by Wayne Heisler.

Rand Robinson is now offering a stretched version of the KR-2, incorporating a sleeker canopy design. We will be publishing additional information as it becomes available or contact Rand Robinson.

FOR SALE

Type IV engine \$400.00
Rand VW engine mount \$150.00

Brian Hunter
11690 Riverdale
Redford, MI 48239
313-533-2046

COLOR PRINT OFFER

I am offering to any KR builder 20 x 30 size color poster prints for \$15.00 each. Just send 35mm color negative and negative number to below address. Make sure not to cut negatives into singles, leave in strip of four!

Wayne Heisler
17090 San Carlos Blvd. S. W.
Ft. Myers Beach, FL 33931
813-466-0400

A BIG THANK YOU!

I would like to express my appreciation to all the people who made the KR Gathering at Covington possible this year, especially Keith James. Dawn and I really enjoyed seeing old friends and making new ones. The Marine Air Traffic Controllers added a touch of class and safety that you rarely find these days. I only hope they can return next year.

The awards and compliments that N911TB received exceeded my highest expectations. The People's Choice trophy will be treasured and given a place of honor in our home. Thanks again to all who made it possible.

Tom Bagnetto
4817 Reginald
Wichita Falls, TX 76308
817-691-1902

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 185 OCTOBER, 1992



KR NEWSLETTER

ISSUE NO. 186
NOVEMBER 1992



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. **Responsibility for application** of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



DAVID CARROLL'S N90JC "DUMBO", KENNESAW, GA

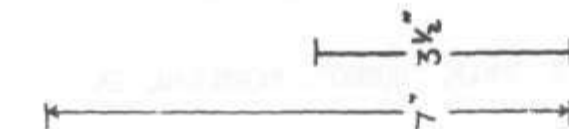
This photo was taken by EAA staff photographer Jim Koepnick during an air-to-air photo shoot at Sun-N-Fun, 1992. The plane is powered by a 2100cc homemade engine, cruise speed 155 mph at 3,000 feet, 3100 rpm. Stall speed 43 mph true. Weight 628 lbs empty, 1,000 gross. First flight, May 1991... since then Dave has accumulated 145 hours on the airplane. The plane is stock with the exception of cutting two inches off each end of the landing gear spring bar, bringing the gear legs in a little closer and allowing the gear to absorb a higher landing load. (See Dave's sketches next three pages on his dual-stick design.)

LE / RIGHT CONTROL

STICK
OD 4130 TUBE

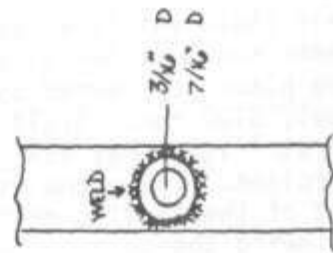
2 REQD

7" 3 1/2"



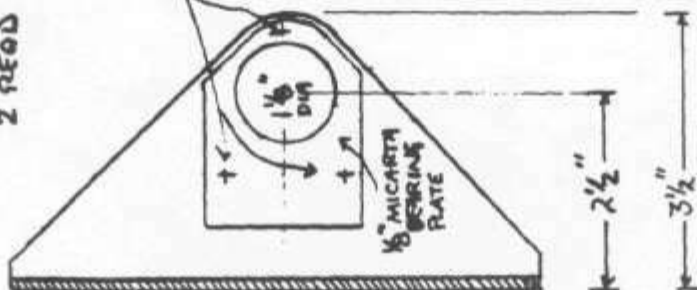
4130 BUSHING
WELDED
THROUGH
CONTROL
STICK

CUT SLOT IN
CONTROL STICK
FOR 1/8" TIE
ROD MOUNTING
ARM



LEFT/RIGHT CONTROL
SYSTEM MOUNTING
BRACKET 1/8" LOGICAL ANGLE

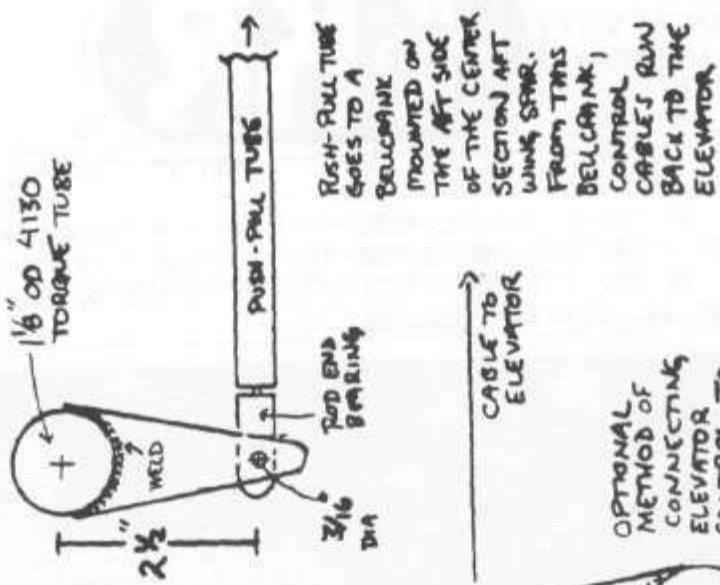
2 REQD



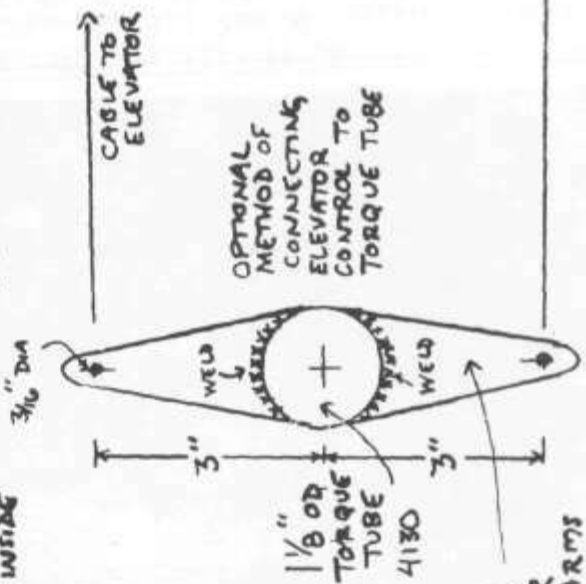
3/16" MOUNTING
PLATE

1/8" BEARING RATE
TO
CONTROL SYS.
MOUNTING
BRACKET
COUNTER SINK
SCREWS FROM
OUTSIDE WITH
NUTS ON INSIDE

ELEVATOR PUSH-PULL
TUBE MOUNTING
BRACKET
1/8" 4130 2 REQD



PUSH-PULL TUBE
GOES TO A
BELLCRANK
MOUNTED ON
THE AFT SIDE
OF THE CENTER
SECTION AFT
WING SPAR.
FROM THIS
BELLCRANK,
CONTROL
CABLES RUN
BACK TO THE
ELEVATOR



OPTIONAL
METHOD OF
CONNECTING
ELEVATOR
CONTROL TO
TORQUE TUBE

NOT DRAWN TO SCALE

1/8" 4130
ELEVATOR
CONTROL ARMS

CABLE TO
ELEVATOR

CABLE TO
ELEVATOR

CABLE TO
ELEVATOR

CABLE TO
ELEVATOR

CABLE TO
ELEVATOR

CABLE TO
ELEVATOR

CABLE TO
ELEVATOR

CABLE TO
ELEVATOR

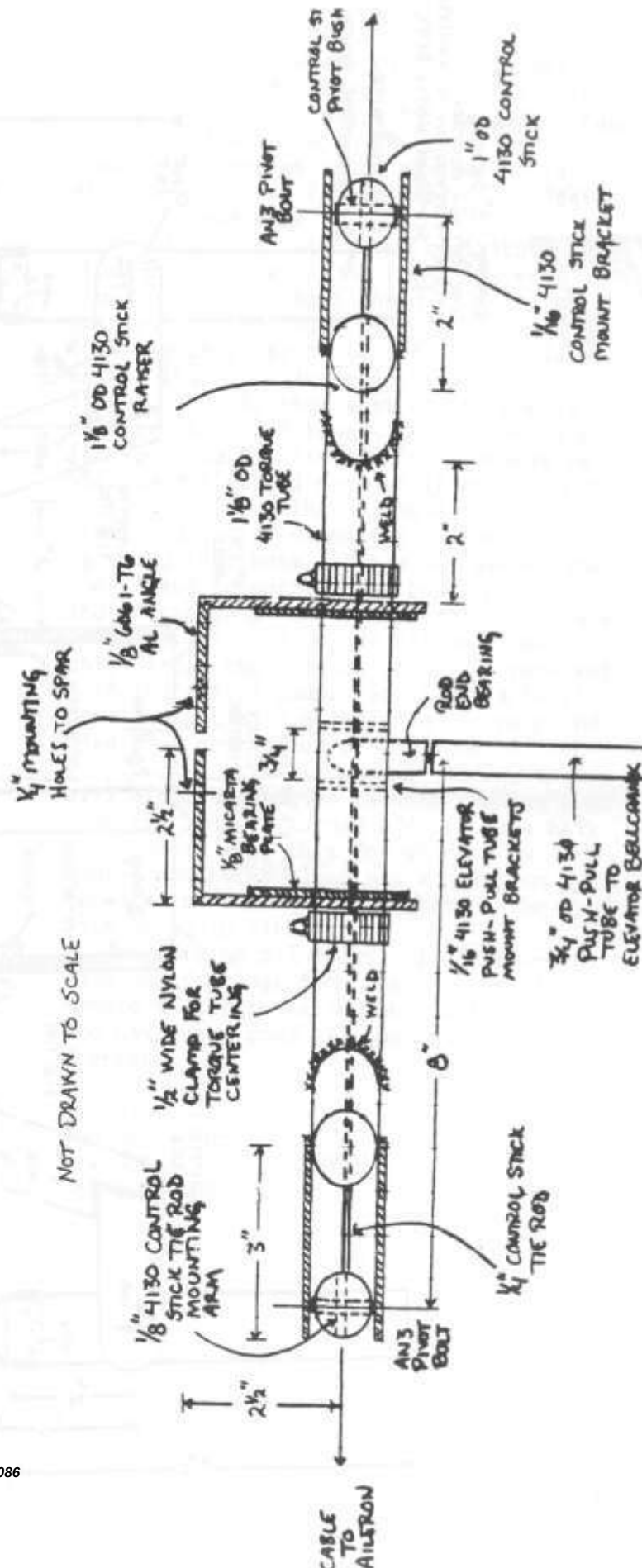
DUAL-STICK DESIGN

I have had many requests from KR-2 builders and potential builders to provide them with approximate drawings on the dual-stick system over the single stick control system.

This control system first started out in Jere Rosser's KR-2 "Tweety Bird" and then found its way into my KR-2 "Dumbo". Limited modifications were necessary to adapt the original design into what it is today. This control system is easy to build, very durable and provides a flawless and very smooth control response with just the right amount of leverage. I have logged over 130 hours with this system and I am sure Jere logged over several hundred hours with the original dual-stick system.

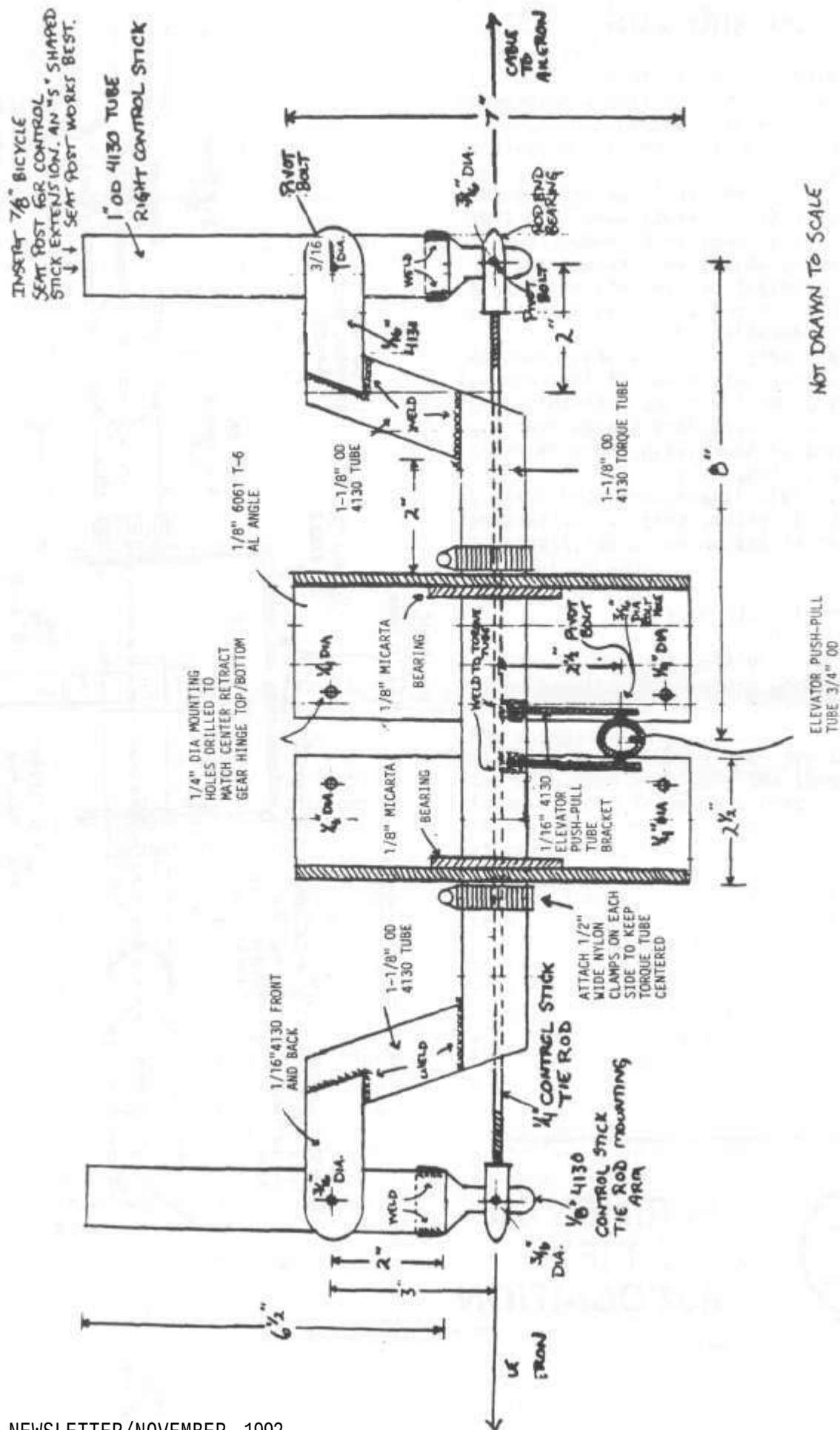
If anybody would like a completed dual-stick control system, they can contact me at the address and phone number listed below.

David Carroll
1713 Live Oak Dr.
Kennesaw, GA 30144
404-429-0092



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD, OSHKOSH, WI 54903-3086
PHONE 414/426-4800



COMMENTS AND TIPS FROM BUILDER

Thanks to Bill Rowland for his article in issue #180, May 1992. I was ready to throw in the towel also for the same reason only to find out that the tail wheel was my problem. I had a bent mount and compression springs which didn't allow the wheel to move much when it came to the ground and I kept looping and running off the runway also. Maybe we don't spend enough effort getting this small and not so insignificant part right the first time.

I want to caution everyone about the information they receive from other builders like myself and others that write in or otherwise communicate well meaning advise. It may work for them and it may not work for you. Here are some examples of what I mean, using Bill's article as an example and I will later talk about Monte's piece on fuel lines.

What is wrong with wheel landings? I have seen some beautiful wheel landings and have made some pretty good ones in my KR. I had heard that it was the only way you could land a KR. Since then, I have also seen some pretty good three points made by some very good KR pilots. I still can't make a three point in mine and I am not going to cry about it if I never do. It is very easy to wheel land if you give a little forward pressure on the stick when the wheels touch down. I learned to fly a tail dragger the hard way, in a KR-2.

I am very concerned about the 25 lbs. of dead weight being added to the aft CG of any plane and can't understand why that is necessary. My KR is 605 lbs. empty but the CG is just about perfect with an 1835. Please be very cautious and double check your figures before you add any extra weight behind the CG. You can live with forward CG but aft CG can kill you.

Are stainless valves beneficial? I have a friend who has had to replace his stainless with stock valves. The stems of the stainless were mushrooming under the pounding from the tappets and he couldn't keep them adjusted. I have stock valves and have never had a problem with them.

High speed taxi testing is a controversial subject. Some authorities insist on it and some do not. I tried to do high speed taxi testing with the tail up and broke my plane. The next time out, after much slow taxiing and short duration tail lifting, I put it on the firewall and had a successful flight. I think that an

experienced tail wheel pilot could get away with extensive high speed testing but for most of us, it may not be a good idea. As far as taxiing with the wings off, please seek professional advise before attempting this. I have read of at least one bad experience in this newsletter.

Now I have something to contribute about fuel systems. Monte really was right on target about the difficulty of getting all the right pieces. I found that the easy way is to decide on a dash number that you like and stick with it. If you like -6, then most of the pieces will be -6 or 3/8 tube. I like Aeroquip for fuel and oil lines. It is expensive but you don't need much of it and it sure is easy to use. The 303 hose is good stuff and not as expensive as the 601. By using this hose instead of tubing, you don't have to worry about bends or kinks and it can be placed and moved without any problems. I used -6 for all my lines until I got the Ellison carb. It requires a -4 and a fuel pump. So, I got a Facet pump and put a -6 going into the pump and used a -4 coming out of the pump to the carb. This still gives a fuel flow that will allow the engine to keep running even when the pump is turned off. I have only one problem with this for which I am hoping another builder has a solution. I cannot find a fuel filter that can be used with Aeroquip fittings.

One note on oil lines. I use 303-8 hose and fittings from the oil pump to a remote filter installed on the firewall and have very good oil cooling and pressure.

Dan Heath
130 Darian Dr.
Lexington, S.C. 29073
803-359-1008

SHOULD WE EVER ASSUME ANYTHING?!
IS YOUR FIREWALL REALLY 90
DEGREES TO THE TOP LONGERON?

The answer to the question is probably not! When I made my KR-2 side frames. "ALL" of my verticals were exactly 90 degrees to the top longeron. With this in mind, you could assume that when you joined your sides together to form your fuselage, that your firewall is still 90 degrees to the plane of the top longeron. A plane as described in the Webster's Dictionary is defined as "having to do with flat surfaces or points" (See Figure 1).

When my fuselage was on the jig table, I'd pick up a ruler every so often and check measurements. One day I grabbed the square to measure with and just for the fun of it I stood it up on the jig table against the firewall vertical and guess what? My vertical member was 3/8" out of square with the plane of the top longeron. But How?

After some thought, I finally figured it out. Figure 2 is an experiment for you experimental pilots. Take two pieces of string that are of equal length and stretch them out parallel to one another. They both span from point (A) to point (B). If you take one of the strings and pull it out a little and then pull the other string out further than the first one, one of the strings will be further away from point (A) than the other. The string that is shortest represents your top longeron.

If you turn your strings sideways you will see that your top longeron is no longer 90 degrees to the firewall. This is probably the reason Ken Rand wanted the longerons as flat as possible. Figure 3 shows that when you level the fuselage with a plumb bob at the firewall, the fuselage is not level. The tail is higher than the firewall end. Yes, the front and back of the longeron are on the same plane but where is your thrust line? The plans call for your top longeron to be at zero degrees incidence. This condition has been found to be true on other projects in my area when the top longeron and vertical firewall member were constructed 90 degrees to one another.

Due to misfortune, I no longer have my first KR-2 boat. But I am joining sides on my second KR-2 at this time. How would you feel about building four side frames? Think of all that experience? (Sounds better than, think of all that work.)

To correct the problem, I made a tapered vertical member at the firewall. The aft side of the vertical is still 90 degrees to the top longeron when building the side frame but the front side tapers from 1" down to 5/8" at the bottom longeron. When I bend my longerons (side frame) around the jig frames, I will have a firewall 90 degrees to the plane of the top longeron. This also gives more glue area to the firewall vertical to reduce torsion loads on this member from the weight of the engine. The benefits of this tapered piece are two fold.

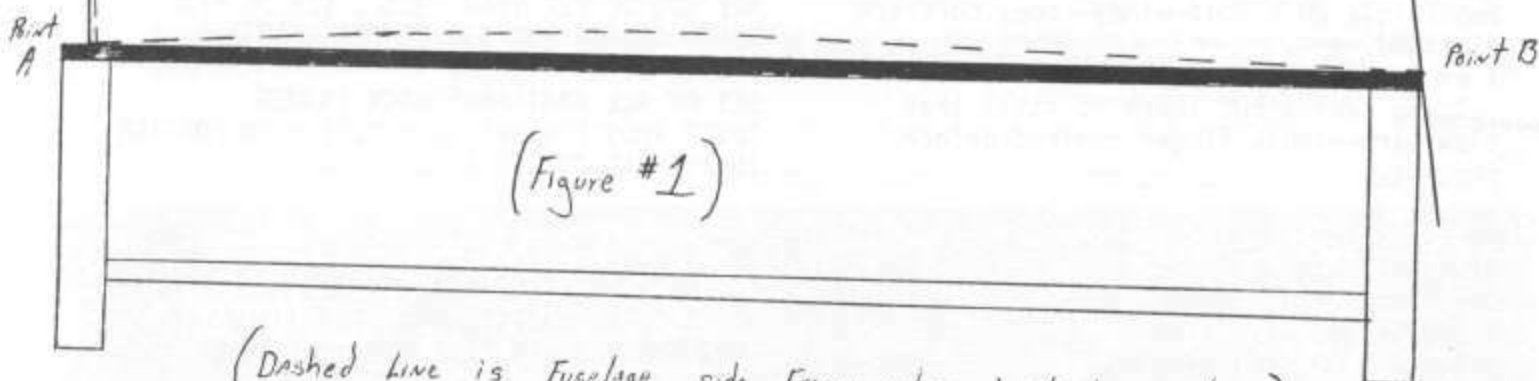
If you are past this point in construction, you may need to shim your engine at the top with a 3/8" spacer to bring your thrust line level with your actual longitudinal axis of the aircraft. Could this be part of the reason we have so many differences in speed between two airplanes with the same engine and prop combination? Think of all that form drag! As always, this information is for you to think about only.

JOINING SIDES

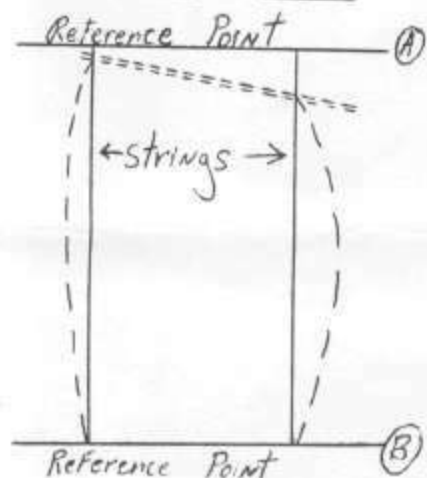
Here is a quick note about joining your sides together when using wood frames as noted in earlier newsletters. If you use the dimensions given, be advised that your plane will be about 1-1/2" too small at the shoulders with only the three jig frames. Four frames are needed. The one that is missing is the one that should be at the aft spar to hold the inside dimensions of the airplane. When you make the jig frames, use a piece of half round trim wood glued or nailed to the ends of your frames so the longerons curve around the frame without a sharp corner or you will have too much stress in one area.

When leveling your fuselage for the wing spars, level with a water level at the front and back of the top longeron with your clear tube water level.

James Gogniat
6212 Blossom Dr.
Watauga, TX 76148
817-498-0116



(Dashed line is Fuselage side Frame when bent to contour.)
 Note: Top longeron is not Flat on table top. But Point (A) & (B) are on the same plane as one another.

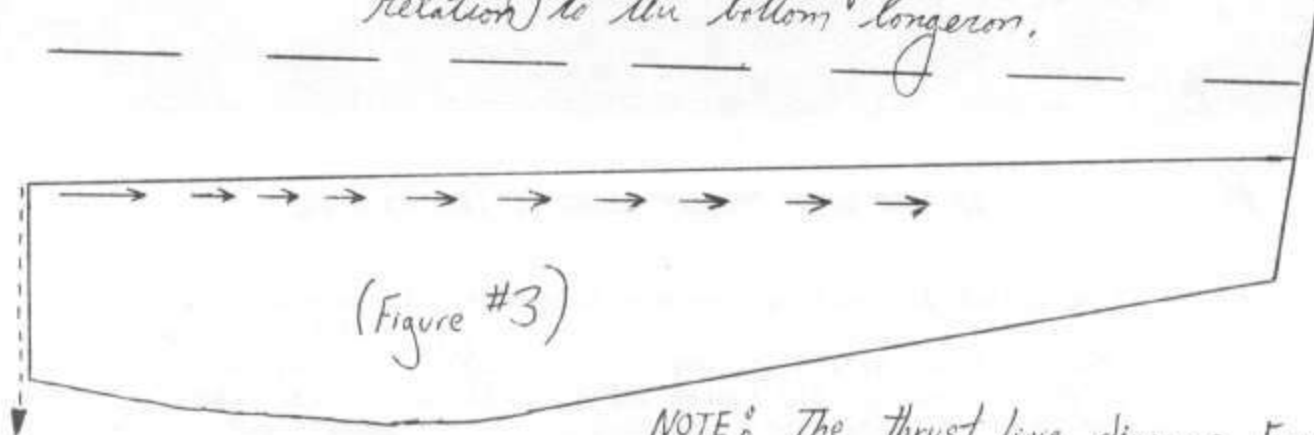


This is a plan view of your side Frame contoured

Imagine the dashed line on the left is your bottom longeron, the one on the right is your top longeron since it is bowed out more than the bottom one.

hed line is what your Firewall looks like with the Fuselage Contoured.

NOTE: The 90° angle no longer exists between the top longeron, and the Firewall vertical member in relation to the bottom longeron.



NOTE: The thrust line diverges From the longitude axis of the aircraft as you move towards the tail.

INFO WANTED

I would like to contact someone who has made a one-man folding wing mod to a KR. Especially a change in the 16 bolt wing attach procedure. One that is near impossible on a cold-windy-snowy northern airfield.

I am familiar with Col. Moore's 1 man folding device but there is still that slow warm-nimble finger rquired detach process.

Maury Hunter
4108 Columbia
Des Moines, IA 50313
515-244-7952 day
515-244-7980 evenings

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

**KR NEWSLETTER BACK ISSUES MAKE
A GREAT CHRISTMAS GIFT! ORDER
NOW AND HAVE IN TIME FOR CHRISTMAS!**

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 186 NOVEMBER, 1992



KR NEWSLETTER

ISSUE NO. 187

DECEMBER 1992



P.O. Box 579
Lakeville, MN 55044

The KR Newsletters devoted to the promotion of education and safety in (he construction of KR Aircraft. Opinions and **ideas expressed** in this publication are¹ solely those of the individual writer. **Responsibility for application** of any ideas or **suggestions contained** herein is **solely that of the experimental** aircraft hui lcier. The KR Newsletter is intended to provide the¹ builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



RALPH SAWYER'S KR-2 N32U "GYPSY", LANCASTER. CA

After reading KR-2 first flight reports in all of the newsletters from #1 to the present issue, covering a period of over twelve years (I have every one that has been issued) it is finally my turn to contribute to the long list.

My aircraft's construction was started by a Canadian, Mr. Gage, in Northridge, CA. He built the open-sterned rowboat with a bow post with excellent care and craftsmanship. Then Lockheed sent him back to Canada. He sold the project to my son, Robert, in 1978. My son continued construction in the same manner as Mr. Gage and with my help on the center section, wing spars and landing gear fabrication he got it on the gear with front and rear turtle decks, center section foamed and glassed complete with the wood firewall and framed/foamed tail feathers.

(cont'd page 2)

In 1980, priorities changed and he decided to give up the project. With so much good workmanship and some of it mine...I made him an offer and the project became mine and I named it "Gypsy" because it moved around a lot and was now "third hand". Most homebuilt aircraft are never finished and flown by the individual who started the project.

The Gypsy project did not continue until I finished N89E "Emeraude" (another project I had acquired from a 12 year building program by a master craftsman, Mr. Robert A. Barkaloo). After making the Emeraude operational, licensed and finished, I returned to the Gypsy project to make it an airplane! Having designed and built my own "Skyjacker" lifting body aircraft and finished the "Emeraude" and doing all of the test flying, I decided to make a few changes in the Gypsy to correct some of the problems and undesirable features I had read about in the KR Newsletter flight reports.

1. Over the nose visibility and head clearance - A new mold line and canopy shape above the top longeron blending into a new low drag cowling was a must.

2. The standard retract landing gear down lock has an auto retract during rollout feature after a hard landing and the 1/4" bolt that the lock bar pivots on bends forward in the center, allowing the down lock to unlock. Support the pivot bolt in the center by installing 90 degree angles on both sides of the lock bar.

3. All KR aircraft up to the late 1979 era that I looked at had lumps, bumps and cracks on both sides of the main and rear spars that ran from the fuselage to the wing tips. Solid foam cores covered with fiberglass are a must on wings, center section, front and rear turtledecks and tail feathers.

4. Short wings and poor lift performance go together- add 12 inches to wing tip and extend aileron 7 inches included in the 3 degree washout.

5. Plan details on aileron configuration, hinge point and roll system in general had errors and lacked system rigidity. The KR Newsletter ran a correction on the hinge point. Changed aileron to wing spars to a "C" section on each facing each other to provide a double flange for the full length extruded aluminium hinge with a one piece hinge pin. To attach the aileron to the wing, the lower flanges provide a "no gap" condition at neutral and full down position as the aileron flange rotates inside the wing flange as the aileron goes

down. Installed a pushrod type control system from stick to aileron horn with ball type rod ends, very rigid and frictionless with 16 degrees up travel and 8 degrees down from stop to stop.

6. KR Newsletters flight reports during take-off and landing indicate a lot of rudder activity so I increased the rudder area about 20% and after much research and soul searching, decided to put the rear spar down against the top of the lower longerons, which gives the wing center section a 3-1/2 degree positive angle of incidence in relation to the horizontal stabilizer angle being 0 degrees on top of the top longerons.

7. I don't like fiberglass fuel tanks especially if they are structural. I designed and built a 14.25 gallon removable .050-5052-0 aluminum tank with a built in sump to make it 10% useable with dual-crossed tank vent tubes mounted in the forward top corners of the tank with two forward facing vents on the belly in line with the lower corners of the fuselage. I installed four 3/4" tubes through the tank for engine, heat and vent controls to go straight through with no binding. A mechanical float type quantity gauge was mounted directly to the tank. So much for changes! The features and equipment list is as follows:

1. Dual seat belt and shoulder restraints system.
2. Dual elect, boost pumps with a free ball by pass.
3. Constant flow heat and vent system with a mixer valve.
4. Elect, start with a full elect. panel power distrib.
5. Red gear light and audio tone warning system.
6. Large oil cooler, carb. heat and flight adjust, cowl flap.
7. Cyl. head & E.G. temp, oil pressure & temp, tach. & Hobbs meter.
8. Elect, pitch & roll system.
9. King 145 nav/com 720 chan. w/intercom
10. "Mojave" 24 hr. clock & flight timer.
11. Elect. Mitchel 2-1/4" turn coordinator & voltmeter.
12. Day VFR type panel but nav. lights were a must.
13. Fuel press ind. & 2-1/4" G meter +10-4.
14. Dual headsets & 5 point canopy locks.
15. Overhead pivoted rudder bar system, sprung fwd.
16. Mechanical go cart brakes-cable operated.

17. Optimized Pitot/static assy, mounted below L/H wing near tip.
18. Custom cloth & foam cushions & back rests, sling seats.
19. Landing gear down lock "latch" for "Murphy".
20. High quality 4" tail wheel-may go to Scott 3200 pneumatic.
21. Engine = MAPI 1835 from Rex Taylor, from CA in 1980.
22. "Cowley" prop - scimitar, wood 52" x 44" rec. by Jim Loudon.
23. Empty weight-667 Ibs.-max. Gross weight-1092.5 Ibs.
24. Span - 23'3", length 15'2", wing area - 93 sq. ft.
25. Finally! All control surfaces and hinges that allow them to move are removable and tail feather hinges are bushed with stainless steel tubing.



So much for history, construction and equipment. Now for the flight report!! Mojave, California, elev. 2787', OAT 78 degrees F, time 0600, August 7, 1992. With no taxi tests of any kind N32U went down runway #30 for the first time for a 30 minute and 45 second flight. Contrary to all the flight reports I had read, the take off was straight and the lift off was smooth except for one small pitch oscillation after lift off.

I had never flown in a KR before and this was my first experience with a side stick. The left wheel was heavy over the right by 16 Ibs. during weight and balance so I had anticipated this at lift off with a little right stick and this probably triggered the pitch pulse. Take off run was about 1500 ft. because I came in with full power slowly as the aircraft accelerated. I held in considerable back stick until about 60 MPH and slowly released most of it at about 70 MPH. The aircraft left the runway in it's 3 point attitude and climb settled down to about 400 to 500 FPM at 70 MPH and 2500 RPM??

Static RPM had been checked during three five minute runs at 2800 RPM? I pressed on to 5K altitude MSL while monitoring engine parameters with the cowl flap open. RPM=2500, Cyl temp=225 degrees F, exhaust gas= 1050 degrees F, oil temp= 220 degrees F, oil press=45 PSI, fuel press=3 PSI. Levelled off and trimmed to "0" rate of climb with hands and feet off of controls, closed cowl flap. Trim required was full right roll and full up pitch. Gear was left down for entire first flight.

Maximum speed level with this configuration was 120 MPH IND. and oil temp went up to 230 degrees F and turning 2700 RPM. I pushed over into a 140 MPH IND. dive and RPM increased to 2900. Not too happy with performance and oil temp. was now 240 degrees F. So I opened the cowl flap and throttled back to 2400 RPM and finally the oil temp, came down to 220 degrees F...SO back to full power! 2500 RPM and did a few full power stalls which occurred at 40 MPH indicated with buffet detectable at about 45 MPH IND. stall was gentle and straight ahead until full back stick was applied, then it would gently roll to the right as the nose fell through.

Pitch and roll response is excellent at all speeds and rudder response was very good even during the stall. Oil temp. went back up to 230 degrees F during full power stall tests. Flew around over the airport at reduced power to cool down the oil. In about 5 minutes the oil temp was now 215 degrees F. So I figured it was time to see if I could land the little gem. Down wind at 100 MPH turned right base for runway #30 and on final slope with 1200 RPM. I'm looking at about 90 MPH till I cross the numbers at about 80 MPH and 20 feet elevation. I ease the throttle to full idle, let the bird settle to 2 feet and about 60 MPH and she touched down in the three point attitude about 55 MPH. Landing roll was straight with no rudder inputs and with a little pressure on the brake cable she decelerated nicely to taxi speeds. The "Gypsy" drives like a Buick on the taxiways up to 35 to 40 MPH with very little rudder inputs required.

Back to the hanger and put my flight notes and impressions together for evaluation!! Aircraft was a sheer joy to fly and land and ground handling was excellent. Take off run was long and climb was nothing to brag about. RPM in the climb was low, 2500 and that was 300 RPM below static? My guess at R.O. climb was about 300-400 FPM??

011 temp was too high and opening the cowl flap didn't help much. EGT was 1050 degrees F in flight and 1150 F on the ground at max. static=2800 RPM and should be 1300-1400 F. Considering the Newsletter's many flight reports of an 8 to 10 MPH speed increase when the gear was retracted, I couldn't say at this time that I am impressed with performance numbers!!

So the long laborious process of "honing the bone" commenced. The low EGT along with a black exhaust pipe exit said the mixture was too rich and the knob on the "Zenith" Bendix float carb can only be rotated 160 degrees with an arm mounted on it in flight. So rich to lean condition is limited. I found that I had rigged the mixture knob in the rich position at 2-1/2 turns out from closed so I changed this to 1-1/4 turns out. On static run this change gave a 100 RPM increase to 2900 with 200 RPM drop in lean position, EGT increased to 1300 rich to 1350 lean.

On August 11, 1992, flight #2 gear down was made to check the new mixture condition. With the tail allowed to come up earlier on the take off run and RPM only dropping to 2600, the Gypsy took off with less distance and climbed a little better. A temporary ROC indicator had been installed for this flight and cowl flap and gear down netted about 500 FPM at 70 MPH was about all I could get! This 300 RPM drop condition became the next major condition to solve. The carb air supply is a large area filter located at the R/H rear corner of the cooling air plenum box on top of the engine which is the configuration used on a lot of general aviation and homebuilt aircraft. If designed properly, will provide about 5" of water "positive" pressure at 100 MPH. I took the air duct from the air filter to the carb heat box off and made a take off run and lifted off. I still got the 300 RPM drop by lift off and only 2500 RPM because of the hot air source. Did not fly and returned to hanger. Carb air induction was definitely not the RPM. Drop during the take off problem.

It looked like it was time to start playing propeller games and I have been through it before with my three other homebuilts. I decided to fly one more flight first and retract the gear. August 15, 1992 0630 85 degrees F OAT, took off and climbed to 5K MSL and leveled off at full throttle, gear down and cowl flap open. Maximum speed with "0" ROC the speed came to 120 MPH IND., slowed to 90

MPH and retracted the gear. For the first time in my life I was flying a "retract" aircraft. Came back up on full power at "0" ROC and the Gypsy accelerated to 145 MPH ind. then closed the cowl flap and was looking at 150 MPH ind. and 3100 RPM ind., with the 100 RPM low indicator error I was turning 3200 which Rex Taylor of HAPI Engines said on his spec sheet to be 60 HP. Came around to runway #7 and pushed over to 195 ind. down the runway at 100 ft. alt. Turning 3400 RPM ind. or true RPM of 3500. Oil temp was going through 240 degrees F so reduced power and opened the cowl flap for 10 minutes to get the oil temp back down to 215 F. Gear warning light and audio in head phones came on at 2400 RPM IND. and I had set this on the ground at 2100 so I will reset it to 1800 RPM on the ground for 2100 in flight. This warning system is a must for a retract, **AMEN.**



Landing was smooth like the others and now the Gypsy was performing beyond my wildest dreams. Your next question will probably be, how did you get from 120 MPH to 150 MPH by retracting the landing gear?

Well, back in 1979 when I was helping my boy, Bob, build up and install the gear system to the main center section spar, I decided to install 1/8" aluminum plates in the upper gear casting open window frame to strengthen them against side loads and act as "speed brakes" when landing. The plates add a lot to the flap plate area because they have no fairing but disappear when retracted. The front of the wheel well has a formed cusped lip in front to flow the air over the retracted plate and wheel well assembly. The bottom mounted cowl flap is large and opens up about 53 degrees and gives a 5 MPH increase when closed at 145 MPH. Now my biggest problem was control of oil temp. Being the hottest time of the year with day time ambient temps, to 108 F to 110 F what better time to solve this nagging problem. I removed the 2" diameter air duct system from the L/H rear air box wall

to the fiberglass airguide on top of the firewall mounted cooler and contoured a new 3" diameter duct system from the engine air box to the airguide. The system is now double the volume and better flow distribution across the entire top of the oil cooler.



The fourth test on August 19, 1992 was very successful.. At 5K MSL with 90 degrees AT, the oil temp range is rapidly controllable from 160 F to 220 F with cowl flap, throttle and airspeed variables with 90 degrees OAT so now the Gypsy is operational with 6 hours on the Hobbs meter and 34 to go to get the FAA restrictions lifted. I have had no contact with Rand Robinson during the 12 year project because of the changes I made and when you make modifications to someone else's design you have to assume the responsibility. Especially in the light of today's liability. The Gypsy was not registered as a KR-2 because of this. The designer, builder and pilot of the Gypsy is a 66 year old retiree with 50 years of active aircraft experience ranging from mechanic A & P to RPRV Avionics Tech. Worked for aircraft companies, airlines and NASA at Edwards, CA. Have now built and flown four aircraft of which two are my design and patent - "Skyjacker" lifting body type aircraft and one 160 H/P "Emeraude". Still have all aircraft in current flying condition and all are based at Mojave Airport, Mojave, CA. Rate of climb indicator is now permanent and aircraft angle of attack at 150 MPH plus 835 Ibs is a negative 5 degrees.

Reader questions? Write to:

Ralph V. Sawyer
45432 Leatherwood
Lancaster, CA 93534
805-948-9642 home
805-824-4359 Hanger #935

WARNING ON WING SKINS

Recently in our area, a KR builder/pilot experienced a phenomenon that was a little surprising to him. After a flight into the upper altitudes of the aircraft's ability to go (i.e., about 14,000') he was shocked to see that his wing skins had separated from the spar caps. Not a good thing to have happen. It could ruin your whole day.

Why did this happen? Simple physics. The builder had done such a good job in his wing lay-ups that he had a tightly sealed drum on each side of the fuselage. The pressure inside the drum increased with respect to the outside pressure as he went to altitude to a point where the skin adhesion to the spar cap could no longer hold.

The moral of the story is that any sealed space in a composite construction needs a pressure balancing port to preclude ballooning and as we've seen, eventual rupture. Taking a lesson from the GLASAIR manual, each such compartment in wing, aileron, flap and horizontal stabilizer is provided with a hole or holes so that the pressure can balance out. These holes are seldom any larger than .188" in diameter and are placed such that they provide two functions, pressure balancing and moisture weep holes.

On the subject of moisture collection, another phenomenon called "pumping" is considered by the aero and aerospace designer. It is this: An enclosed space will "breathe" (or should be allowed to breathe to balance the pressures) as one goes up and down in altitude. Consider the case of the aircraft that is flying at 18,000'. There are only half as many molecules of air at that altitude as at sea level where he lands. In the process of coming down, the compartment's compliment of air molecules doubles. But that is not all. Along with the second set of air molecules comes a healthy slug of invisible moisture. Now the aircraft takes on fuel, passengers or whatever and goes back to altitude. In doing so it passes from a relatively warm, moist atmosphere into a colder atmosphere and through the "dew point" and the moisture in the compartment condenses into water. (Temperature decreases at the rate of 3.5 degrees F per thousand feet of ascent.)

After a series of these actions, the compartment "pumps" in an incredible amount of water and it doesn't evaporate

NOSE GEAR NOTICE FROM DAN DIEHL

This is to inform all the KR builders using our nose gear that we are now shipping the retrofit parts. All nose wheel forks and pivots need to be returned to me. The modification is extensive enough that machining jigs and fixtures are required for the modifications. We can return the exchange parts quickly now.

Most main gear axle mounts have now been traded out. We still have a few to replace and are doing so as fast as our fabricator supplies them to us.

Also, we have one other thing that has come up. Nearly all tri-gear KR's seem to drop into the nose wheel at touchdown. Apparently everyone has been locating the axle to far back on the CG. We have traded out two of the KR's main gear struts and moved the axle 2" forward. This lets the pilot carry the nose wheel off the ground longer during roll out. Any tri gear (Diehl) builder can also trade main struts with us at no cost. Simply return your struts to us and we'll send you two more. This is not a requirement but will make your KR even better. Those who have already installed your gear, I'll trade also. Call me and we can talk about whether you want to trade the complete gear castings and all or only the struts.

I've included a picture of Calvin Campbell's KR with the new nose gear parts installed. You will notice the wheel pant fairing we are sending to the tri builders. This fairs in the pant and strut and helps in mounting. Hope all KR people have a great Holiday season. Best wishes!

MORE FROM DAN _____

We finally tore down my 2600cc Type IV engine. The crank broke at 45 degrees under the cam and distributor drive gears. The crack obviously started in the corner of the cam gear key way. The Force One hub and bearing kept this prop running straight and the snap ring kept the end of the crank from pulling out of the case.

I feel that the cause of the problem was in the harmonic vibration at 2800-2950 RPM. I continually ran in this range due to the slower KR's I was flying with. At 3100-3200 the engine would purr like a kitten. I made several comments to the other KR pilots that I wish they had a little more power so I could up my RPM a little. It didn't dawn on me that I was

slowly destroying my \$1,000 crank shaft. Anyway, Type IV pilots beware of the RPM range of 2800-2950.

Mike Latigo has taken over that engine and has had a special crank made at SCAT. Steve Bennett has worked out a new key way that will eliminate the stress point that broke my crank. I still think the Type IV engine will prove to be a solid, reliable powerplant. For now, I'm going back to my old 2180. Just for your information the old reliable has over 400 hours since the last teardown and about seven years. I recently took it apart to look inside and convert it to dual ignition. All bearings, rings and case looked perfect. I'll go back with new standard bearings, rings and gasket set. With the total seal rings now \$100 per set, my total overhaul cost will be around \$150. Not too bad for 400 hours. About 75 of these hours were put on by Martin Roberts in his KR and we all know the damage he can do to an engine (just kidding Marty...sorta).

Dan Diehl
1855 North Elm
Jenks, OK 74037
918-299-4444

Cont'd from page 5 WARNING ON WING SKINS

but just stays there unless there are weep holes for it to drain out. The results are self-defining. I have seen aircraft "Black Boxes" opened and an ounce of water run out. One would think the aircraft had gone through a rainstorm but it hadn't. I do black boxes for the Navy and they are very specific in requiring designers to avoid moisture pockets. The big issue here is not only water, but salty water, with it's inherent corrosion capability. Aircraft builders along the sea coasts need to be as alert as the Navy to this eventuality.

Neil D. Bingham
P. O. Box 16884, NV Sta.
Salt Lake City, UT 84116
801-298-4074

NEW NOSE GEAR AND WHEEL PANT COVER

Here is a picture of the new nose gear and wheel pant cover. I think they look really great together and it dresses out the airplane pretty jazzy.



The airspeed improves somewhere around 7 to 10 miles an hour. I can notice a significant constant speed on my airspeed indicator. Prior to running the wheel pant it would show about 150 tops. Now it shows a good constant 160 and once in awhile 165. The pant really helps.

Ground handling is very good. I never notice any resistance to turning, even when I handle a crosswind it just works great. Currently I have about 8 landings with 2 mile crosswind and have never had any shimmy I was aware of.

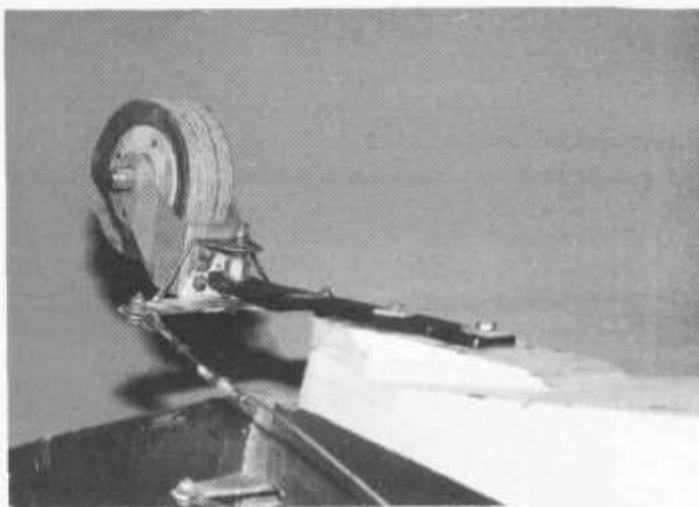
I believe our problems are solved it is a good design and should work well even in a worn out tire situation.

Calvin Campbell
P. O. Box 55178
Tulsa, OK 74155
918-299-4445

KR TAILWHEEL AND SPRING

Just a couple of hints about the KR tailwheel and spring that may be of interest to some readers. I have broken two springs and worn out two tail wheels in the 450 hours on my KR-2. I fly off a dirt strip and that is pretty hard on both springs and wheels, especially with a passenger on board.

The straight portion of a carpenter's flat spring-type nail puller makes a good tailwheel spring. It is strong with a bit less spring than the original but adequate and is readily available. Be sure to get one marked "spring temper" or equivalent, as the cheap ones will bend. A carbide cutoff saw or high speed grinder will cut it to length and cobalt or other hard bits (not high speed steel) will drill it readily.



The wheel pictured in the photograph is made from three layers of conveyor belting rough cut with a knife and turned round on a lathe. Cut the center holes in each individual layer with a flycutter in a drill press, then slip the layers onto a mandril and true them together on a lathe. The nylon hair that is pulled out by the cutting tools will wear off with use. A two piece aluminum hub turned on lathe telescopes so that bolts through the flanges clamp the layers of belting together. Sealed bearings are fitted into each side of the hub.

This wheel and spring set-up has been very successful through many landings on a dirt strip.

Al Ross
P. O. Box 474
Rimrock, AZ 85335
602-567-5527



**EXPERIMENTAL
AIRCRAFT
ASSOCIATION**

WITTMAN AIRFIELD, OSHKOSH, WI 54903-3086
PHONE: 414/426-4800

FOR SALE

KR-2 N1055A flown through 1988. 1918cc
140 MPH 75% power 3.4 GPH. Under
reconstruction with Diehl fixed tri-
gear, Clevelands, turtledeck and nose
redone for new canopy, new panel
instruments not mounted, engine
unmounted and canopy not done. \$7,300.
Leave message, lost medical.

Ken Wanagas
11907 Maple Ave., Box 572
Hebron, IL 60034
Leave Message: 815-648-2715

FOR SALE

One piece Rand landing gear bar. New
never used, no holes. \$200.00 plus
shipping.

Al Ross
P. O. Box 474
Rimrock, AZ 86335
602-567-5527

THANKS ! !

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR - U.S., \$25.00 PER
YEAR - CANADA AND \$30.00 PER YEAR -
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

THANKS TO ALL OF YOU FOR YOUR SUPPORT OF
THE NEWSLETTER WITH ARTICLES AND
SUBSCRIPTIONS. JUDY AND I WISH YOU ALL A
PROSPEROUS AND SAFE NEW YEAR!!

Earl Judy

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 187 DECEMBER, 1992



KR NEWSLETTER

ISSUE NO. 188

JANUARY 1993



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in **the construction** of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. **Responsibility for application** of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



STEVE ALDERMAN'S N5276J, LONGMONT, COLORADO

Pulled by a Continental C-85-8 with an O-200 crank, Steve's plane is one of the fastest KR-2s in the country. With a speed of 193.48 MPH Steve won the Sun N¹ Fun 1992 air race in the 99 or less horsepower class. He said he would have been over 200 MPH but his engine developed a cylinder problem and almost seized during the race. Steve beefed-up the firewall and balanced all the wing surfaces to handle the higher performance of the C-85.

BUILDER'S REPORT ON N911TB

These two articles were submitted by Tom Bagnetto last June, 1992. His plane was featured on the cover of Issue 185. Tom's bird won "Best KR-1 Award" at Covington '92.

June 7, 1992

After four years, Nine-Eleven Taco Bell is finished. Now begins the perpetual wait for the FAA guy to get here. In the meantime, I thought I'd fill you in on the newest arrival in KR-1 land.

In July of 1988, I thought "I'll have this piece of cake finished in a year... 18 months top!" Boy, was I wrong. But if I had spent as much time building as thinking about building I might have been right. Anyway, here is the result: A fixed gear, hydraulic brake, 550 lb, 2600cc Type IV engine, 56 x 60 prop hot rod. With the exception of these items the plane was built according to the plans. Of course, there were some different techniques used along the way, but nothing major.

The turtle deck was made with 1/4 inch Clarkfoam glassed on one side, scored on the other, bent and glued to foam formers above the longerons. When the glue cured, the turtle deck was cut off the fuselage and glassed on the inside. The result was extremely strong, light and produced a lot less foam dust than carving it out of foam planks like the plans suggest. The canopy was constructed using the same method.

Using a Type IV engine wasn't anticipated but for added strength the inside of the fuselage forward of the main spar was sheeted with plywood. Good thing, because after hearing Steve Bennett talk about his Type IV conversions at Covington, I returned home to find an ad in the local newspaper offering a complete Porsche 914 engine for \$200. After a quick inspection of the engine and a couple of calls to Steve, I was admiring a greasy pile of baffling, plumbing and assorted hardware sitting on the garage floor. The engine was disassembled and the major components sent to Steve. After a "little" machine work and taking time to answer my repeated phone calls, Steve returned a 2600cc Top Bug fitted with a Force One hub, Diehl Supercase, 20 amp. alternator and engine driven fuel pump.

Steve suggested we add a round bottom keyway to the forged crank and as it turned out that was very good advice. More on that later. Once back home, a Slick mag and Ellison EFS-2 were installed. Steve's intake manifold was designed for the KR-2 and was just too wide for my single seater, I had to build one to fit. While I was at it, I made up the exhaust stacks and since space was limited, just ran them straight out the cowling ala P-51. An electric fuel pump was installed as a safety measure.

Ed Sterba provided the prop, a 52 x 60 with leading edge protection and straight blades. Those with the swept back leading edges may be quieter, just as efficient and turn up higher RPM but they just look funny. Allow me to give Ed a little plug. His props are a piece of art. Even the box it was shipped in was pretty.

The first time the engine was started the airplane was far from complete, no canopy, turtledeck or wings... in other words, super light. I thought it was going to jump off the ground. The vibration, noise, wind blast and power surge was totally unexpected. The neighbors were unimpressed.

Several weeks later, it was during one of these engine runs that Steve's suggestion about the round bottom keyway proved worthwhile. The gear collapsed! Besides my beautiful prop, I was afraid my expensive crankshaft was ruined. The shaft measured straight with no wobble and an inspection of the keyway showed no signs of distortion or stress. Once I convinced myself the crank was OK, I set about to eliminate the possibility of repeating that experience. By the way, pieces of the prop flew as far as 75 feet. Judging from the debris pattern, the safest place for spectators is to the left rear of the plane.

A fixed gear is the only way to go. More calls to Bennett. This time a 60 inch long 5/8" aluminum bar was used. The bar was cut to a taper, bent to 45 degrees at the fuselage and 47 degrees at the axle. Quarter inch 4130 steel was selected for the mounting brackets. The steel was drilled to mate up with the existing holes in the spar before it was welded. Axles were fabricated out of AN10 bolts and Bennett's No-Fade hydraulic

brakes handle the stopping chores. The whole conversion took only a couple of weeks once the parts were fabricated. Closing in the wheelwell cutouts proved to be the most time consuming chore. I may have gone a bit overboard and used heavier than required materials but I don't worry about the landing gear anymore. Actually the complete assembly weighs the same as the retractable unit.

The gear legs were designed longer to elevate the nose some 6 or 7 inches so when Sterba built the new prop we increased the length to 56 inches. In a level attitude prop clearance is now about nine inches. With a 52 incher and the retracts it was fi and a half.



The panel is, in a word, basic! Nothing fancy here. Airspeed, altitude and rate of climb (VVI for military types) comprise the flight gauges. A tach, CRT, EGT, oil pressure and temp keep tabs on the boiler room. A King KX-99 strapped to my leg allows me to communicate with the outside world. It would be nice to have all the latest gadgets but let's face it, Ken Rand designed a small sportplane. All the high tech stuff takes up space, weight and money.

Paint is Sherwin-Williams Akrylid. That's acrylic enamel, Orville! It's less toxic than Imron, has more pigment and can be repaired easily when you pick up a ding. Oh yeah, it costs a lot less. Mixed 8 parts paint, 6 parts reducer and 1 part hardener it goes on easily and is dust free in 30 minutes. One bit of advice here, don't rush your paint job and use good equipment. Guys and gals that really know about building airplanes might be impressed with your workmanship but everybody is going to see the paint.

The little plane is at the airport now, my wife has her garage back and the neighbors have almost quit referring to me as "the nut with the plane". By the time the 40 hours are flown off, things should be back to normal. You know, it kinda resembles a P-51. If I stretched the fuselage a bit, added a belly scoop, got a Porsche 944...I'll have more to report after the inspection and some time in the air.

June 24, 1992

N911TB has been certified by the FAA and flown. Thought your readers might be interested in some of the details.

June 10, 1992. It's 9:00 a.m. and I see the FAA Inspector coming down the ramp. At least he's prompt, after all our appoint was for 9. I've been here since 7, removing the cowlings and inspection hatch cover, wondering if I forgot anything and pacing. A brief handshake and he wants to know if this is the plane he's driven 2-1/2 hours to see. About this time some friends show up, one has a video camera and asks the inspector if he can tape the inspection. The inspector looks puzzled and says "why?". After he is assured that he isn't being no-noticed he agrees and attacks the plane armed with FARs, checklists and Advisory Circulars that would overgross a KingAir. It's like getting a Class 1 physical, he says very little, mumbles when he does, looks at the checklist, looks at the plane, looks at the FAR, makes a note and I pace.

More friends began to show up. I guess the word is out. Finally, after an hour of inspecting and an hour of paperwork, the inspector smiles and hands me the pink form. All kidding aside, try to keep the spectators away during the inspection. It's tough enough and neither you nor the inspector need the distraction. Have some conversations ahead of time with the inspectors at the office that will be doing the inspection. These guys really are interested in your project and they want to help. Ask for Advisory Circular 20-27D. It contains everything you will need to know in preparation for the inspection. Read it thoroughly and follow exactly what it says. I would like to thank everyone at MIDO-42 that was so helpful, especially the manager, Allan Griggs and the inspector Tyrone Millard.

After the inspection, the gallery will demand you "take'er up", make excuses, lie but don't do it. You have had enough anxiety for one day whether you realize it or not. By the way, the FAA seems to be concentrating on proper placarding of the panel right now. The inspector had four "suggestions" regarding mine. No big deal, he's going to find something, it might as well be placards.

June 13, 1992. It's just turning light, the weather is clear, the wind is calm and I'm on the way to the airport. Only my wife and one friend know what's about to happen. The friend went through this several years ago with his Starlight and knows exactly what I'm experiencing. We rehearsed this flight many times in the last six weeks. He is to standby with a portable radio and copy temperatures and pressures after I get airborne, I'll have my hands full. He'll also be available for suggestions if things start to get out of hand. The traffic is non-existent and I've run out of excuses so....it's showtime!

Now remember, this is a 550 Ib KR-1 with a 2600cc. Type 4 engine. From the taxi testing I know it's not going to behave like a 172. I decided some time ago that I'd do some high speed taxi runs just to get the feel of things, so down the runway with the tail in the air one more time. Taxi back and do it again. But this time things just feel right and I don't reduce the power. Gobs of torque keep it straight, a little left wing down. IT FLYS, WILBUR!!!! 90 MPH in the climb, a little down elevator trim, quick glance at the gauges, 1000 FPM???? WOW!!! End of the runway coming up, a gentle left turn to a downwind heading just in case something goes wrong, gauges still OK, report the readings to my buddy on the ground for confirmation. Hey, there's 3000 ft, level off and accelerate to 130. A little elevator trim and reduce the power to maintain 130. At this point, I realize that I haven't exceeded 2500 RPM yet, that includes the takeoff.

I turn out of the traffic pattern and head for a remote area to the southwest about five miles from the airport to do the airwork. Trim it for hands off (to my

astonishment it requires no aileron trim, good thing, I don't have any!), airspeed 130, 2000 RPM, 325 CT, 1275 EGT, 40 OP, 175 OT. OK, let's try some stalls, power in to 2500 RPM, climb to 4000 ft, power on first. At 4000 ft keep the nose up and reduce power to 2000 RPM. A little rudder to keep the heading, it doesn't want to slow down. Finally at 50 MPH, it takes a lot of rudder to counteract the torque and I abandon the stall out of fear it might try to spin. I still have full aileron control and just a hint of a buffet. Now lower the nose and pick up a bit of speed and let's try a power off stall.

At 90 MPH, reduce the throttle to idle and bring the nose up, boy it sure loses airspeed fast now, there's 60, 50, 45. At 40 I still have the nose up, ailerons are very mushy but controllable and a good buffet. Enough of that, nobody needs to fly at 40 MPH.

About this time, the headset crackles "experimental 911 Tango Bravo, are you up here?" Damn, they found out I was going to fly and they're up here waiting on me! Sure 'nuf, it's another buddy in his T-18, so he joins on my wing. Aw what the hell, I've finished my flight plan. He comes in close to look things over and in retrospect that should have been in my plans anyway. He confirms my airspeed and altitude and we just have some fun admiring each other. A quick check of the fuel remaining (I took off with 8 gallons) and we head for home.

Back in the pattern it's downwind at 90, base at 80 and 70 on final for a planned low approach to about 50 ft. Over the threshold, the T-18 breaks off and circles to land. I continue to the end of the runway at 50 ft fighting back the urge to pull up into a Thunderbird type pattern. One more low approach to 25 ft. then we'll see if the KR is as squirrely on the ground as they say. This time around power to idle a little earlier than before but remember how fast it loses airspeed during the power off stall. I decide to keep an extra 200 RPM on final to avoid that sinking feeling. Don't flare much, just hold it off... Hey! What's all that noise? I had forgotten how loud the tailwheel can be on the ground. Keep it straight, full up

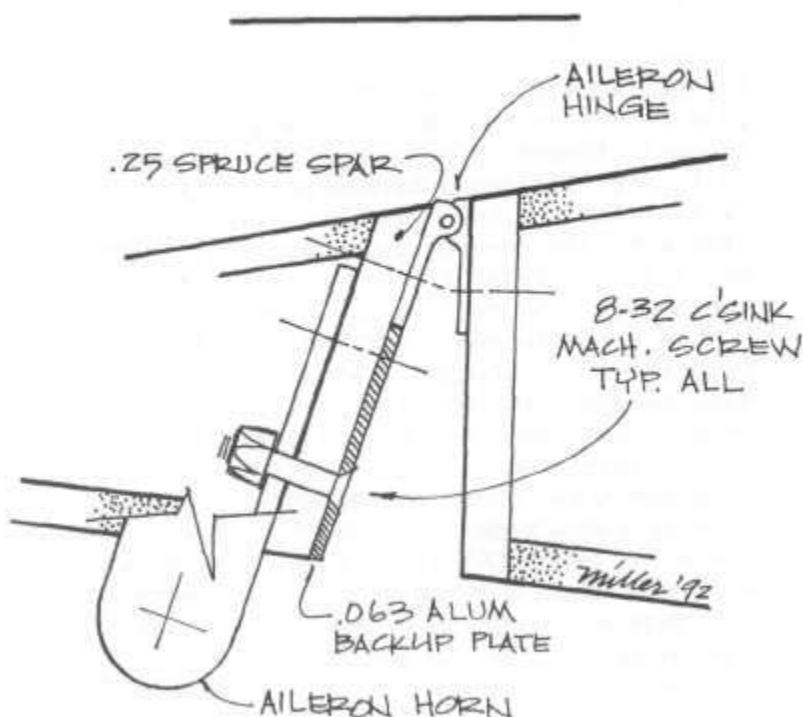
elevator, not too much rudder and now a little brakes. I bet I could make the first turnoff, naw, don't want to use too much brakes and risk standing it on the nose.

On the taxiway, I remember to breathe again and experience the greatest rush of emotions of all time. Switches off and just sit there for minute. Believe me, the knees just don't work for at least 60 seconds. Kiss the wife and smile, by this time even the lineboy has a camera. Later in the day, I'll remove the cowl and inspect everything, making sure things are as they should be.

Okay, there has to be a moral here somewhere. Plan the first flight down to the smallest detail and don't deviate at all. This is a real test flight. Get someone to help, they may catch something you've overlooked and it's a big comfort to have somebody to talk to during the test.

Last time I totaled it up I have around 4000 hours in everything from a 325,000 Ib C-141 to a Helio-courier. The KR has to be the biggest thrill of them all. Ken Rand, you did one hell of a job!

Tom Bagnetto
4817 Reginal
Wichita Falls, TX 76308
817-691-1902



AILERON FITTINGS

The KR aircraft, constructed and flown as conceived by Ken Rand, does not need any additional "beefing-up". It's a well proven design just the way it is. Now, with that thought still fresh in your mind, I'd like to offer a modification to the aileron hardware installation that will result in a more secure attachment. Beefed up, so to speak.

Drawing 71 in the builder's manual shows an aileron control horn attach machine screw countersunk directly into the quarter-inch thick spruce aileron spar. Although there's scant information on securing the aileron counterbalance arm, it's similar in installation.

On my KR-2, I was concerned about the machine screws crushing into the spar and weakening it or the possibility of control surface movement ultimately causing this attachment method to be less than fully secure. As the sketch shows, a simple .063 aluminum backup plate was fitted and countersunk to accept the machine screw heads. The plate, being the same thickness as the hinge strip, does not interfere with full surface deflection. (I still can't understand the purpose of that little spruce back-up block behind the aileron horn in drawing 71. Any ideas?)

The aileron counterbalance arm received a similar back-up plate along with a three inch long 3/32 plywood reinforcement epoxied to the spar's interior face. Three pounds of lead on a relatively long moment arm is exerting a lot of muscle on that thin spruce spar.

Current thinking by many KR builders is to use countersunk 8-32 machine screws to attach the aileron hinge rather than the pan-head screws called out in the plans. Screw head interference of aileron movement is the primary reason.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871

USING THE PRE PREFORMED CANOPY FRAME

If you want to use the RRE supplied KR-2 canopy and premolded frame, you first need to have a good plan. Since the manual is a little vague about getting from floppy plastic to finished, rigid, tight fitting canopy, here is my experience of what worked for me.

1. Frame rails and canopy frame trimmed

After finished my kit turtleneck and forward deck, I then cut a left and right canopy frame rail to match the shape of the top longeron out of 1/4 inch plywood. The canopy frame is taped to the rails for a test fit and trimmed as needed for a snug fit.

2. Hinge placement

I used a square to make sure that my hinge was placed 90 degrees to the front of the turtleneck. I found that due to the curve of the fuselage that I could only use an 11 inches of the recommended 15 inch hinge without hanging the ends of it out in the breeze. This short piece of hinge was then secured towards the front of the right canopy rail as close to the edge of the longeron as possible but still keeping the hinge line inside the canopy frame for esthetics. Don't cut that hinge pin yet as the canopy will have come off and back on frequently to finish the job.

3. Attach canopy frame to canopy rails

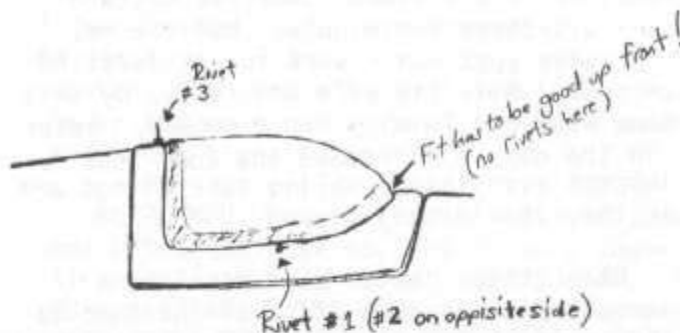
I duct taped the tops of longerons to keep the resin from sticking. The left side rail was pinned at two places forward and aft per the plans with rounded off AN-3 bolts and then clamped to the longeron. The right canopy rail was attached by the hinge with only 4 bolts to leave room to glass. The canopy frame was duct taped to the plywood to hold the curve of the rails and after sanding, fiberglassed in place with three layers of glass and polyester resin. The canopy is polyester resin so this sticks the best.

4. Cut down that plexiglass bubble to fit in the frame

I used a rotary cut-off tool in my hand drill to cut (more like melt through the plexiglass) and then roughed out edges with my 6 inch fixed sanding disk. The problem is to leave enough material to glass to inside the canopy frame and leave clear the turtleneck lip overhang and front deck too.

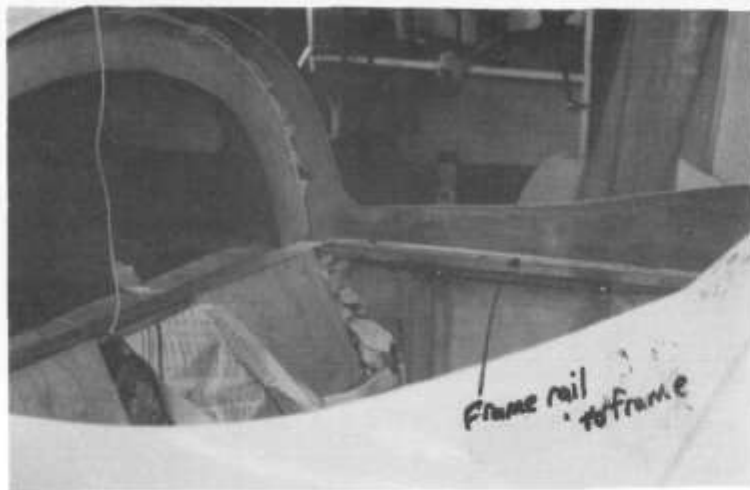
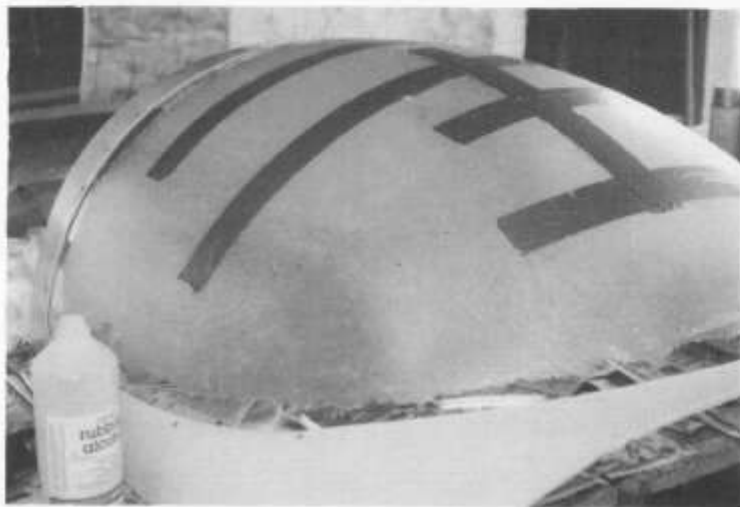
5. Attach the plexiglass bubble to the frame

I tried glassing the plexiglass bubble to the canopy frame off of the plane using all kinds of clamps and braces to hold alignment. Unfortunately, this resulted in a warped and ugly fit. I cut loose the plexiglass for another try with a new plan.



First, I put the canopy frame back on the plane. I then placed the plexiglass canopy into position holding it in place with duct tape and internal props for a perfect fit. I then placed a 3/16 inch hole (drilled through frame and plexiglass both) on one side of the canopy about at the middle. Be sure to use a drill bit ground for plexiglass (it should melt as much as drill through). I paced an aluminum poprivet with a 1/2 inch grip through the hole and snugged up the rivet gently until the plexiglass was up flush with the frame (DON'T OVERTIGHTEN POPRIVET, NEVER TRY TO "POP" OR YOU WILL CRACK THE PLEXIGLASS). I then put a hole and rivet on the other side. With these two in place, I could remove most braces and props that could warp the final outcome.

Then I placed the next hole at the top rear of the canopy frame. This gives three points of clamping, if correctly placed the front of plexiglass should not be pulled away from the front of the canopy frame. If this checks out keep adding a hole at a time to each side working down from the top, place a rivet and snug up plexiglass to the frame and then do to the other side. I used a lot of duct tape on the plexiglass to give me a grip and allow me to pull the plexiglass out to the frame while I drilled the holes.



When you are done the plexiglass will be snug to the frame all around but have rivets sticking out of all around too. The geometry of the frame and plexiglass up front precludes placing rivets there. Now take the canopy off the plane and proceed in stages to glass the canopy frame to the plexiglass. Add some polyester resin and fiberglass layers in the areas between the rivets. Before the resin starts to set up, place the canopy back on the plane and tape in place as

needed until cured. When the canopy plexiglass is finally fiberglassed solidly all around you can remove the poprivets. Remove the rivets by grinding off the inside. When hot from grinding, the stub pulls out right through the plexiglass and frame. Fill the holes with flox. This "position, fix and cure in place technique" gave me a nice fitting canopy.

Robert Pearson
7552 1/2 11th St.
Buena Park, CA 90621
714-522-6974 (home)
714-761-4800 (work)

THANKS TO SPORT AVIATION!

The January, 1993 issue of SPORT AVIATION contains a wonderful five page article about David Carroll's KR-2 that was also featured in the November '92 issue of the KR Newsletter.

The SPORT AVIATION article also included some fantastic aerial photographs of David's plane taken by EAA staff photographer, Jim Koepnick along with photos by David himself.

It's been quite awhile since the KR has been featured in SPORT AVIATION. We would like to extend our sincere appreciation to Jack Cox, Editor-in-Chief of SPORT AVIATION, as well as it's publisher, Tom Poberezny, for this excellent article.

Also a very special thanks to David Carroll for taking the time and effort to write and submit his article to SPORT AVIATION.

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVL R 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

FOR SALE

Firewall forward! 1834cc 5 hrs T.T. Dual ignition (slick & 09). Posa carb, Diehl ace. case with starter and alt. Full flow oil filter, wide mount. New 3 blade warp drive prop. Cowling, baffling & spinner. Motor is disassembled due to minor prop strike during taxi testing. Crank checked okay but will not be sold with engine. New gaskets and bearings. Everything to fly except crank and prop hub. All for \$2,500. Call...

Duane Cleghorn (in central Ohio)
8753 TR 457
Loudonville, OH 44842
419-994-4605

FOR SALE

KR-2 New 1835 HAPI engine, Diehl tri gear, Loran transponder encoder. Many extras. Gorgeous! Call...

Matt
818-989-1518

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 188 JANUARY, 1993

WANTED

Pre-moulded turtledeck canopy frame, fuel tank, cowling, tail wheel and canopy for KR-2 that I have slowly been working on for the past eight years. Have finally decided to complete my project and need the above items at reasonable cost.

Erwin O. Cruz
3206 Gee's Mill Rd.
Conyers, Georgia 30208
404-922-8362 leave message

WANTED

Well-built KR-2 with good engine, basic VFR and com radio. Call...

Greg Horrall
3081 Pemberly Cts.
West Lafayette, IN 47906
317-497-2106 evenings



KR NEWSLETTER

ISSUE NO. 189

FEBRUARY 1993



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



DAN DIEHL'S "OL¹ BLUE" N4DD, JENKS, OKLAHOMA

Built in 1975, Dan Diehl's 01' Blue is supposedly the oldest flying KR-2. Dan estimates he has approximately 1400 hours on the plane. Recently powered by a 2600 VW engine that developed a broken crank at Oshkosh, Dan has decided to keep it simple and return to a 2180 VW that he had in the plane originally. Dan's plane weighs in at 601 lbs. Dan mentioned that they have exchanged all of the axle castings with the new steel version. If you have the original aluminum version, contact Dan for replacement (918-299-4444).

Throughout the years Dan Diehl has helped countless individuals with his building and flying expertise, as well as his wing skins and landing gear products. I'd like to take this opportunity to say thanks from all of us who have been helped by him!

THE ARITHMETIC OF SPEED

IT IS VERY TEMPTING TO CHALLENGE THE SPEC SHEETS FROM SEVERAL OF THE KIT SUPPLIERS IN REGARDS TO THEIR CLAIM FOR TOP SPEED. BUT I WON'T DO THAT. LET'S JUST SAY THAT IT IS PART OF THE FICTION WRITTEN INTO THE PROCESS OF DOING BUSINESS, AND LET IT GO AT THAT. SOME OF THE EARLY ONES OUT INFLATED CERTAIN NUMBERS (THAT WERE HARD TO PROVE WITH HARD DATA) IN ORDER TO SELL KITS. OTHERS HAVE FOLLOWED SUIT. IF A BUILDER WAS TO GET LESS THAN THE SPEC SHEET NUMBER, WHO WAS TO SAY HE BUILT THE KIT RIGHT?

NO REAL HARM DONE, I GUESS; JUST THE SAME DISEASE THAT HAS INFLICTED THE AUTO CONVERSION PEDDLERS. IF ONE SAID A 3.8 LITRE FORD V-6 WOULD PUMP OUT 272 HP AT 4,400 RPM HE COULD SELL A LOT MORE CONVERSION INSTRUCTION MANUALS AND REDUCTION DRIVES THAN IF HE TOLD THE TRUTH AND SAID IT ONLY PUT OUT ABOUT WHAT A PEAK-TUNED 0-320 WOULD. BY THE TIME ENOUGH BUILDERS HAD DISCOVERED HIS RUSE, HE'D BE LONG GONE AND RICHER. THE EXPERIMENTAL MOVEMENT HAS REWARDED SEVERAL SUCH GUYS. ONE GUY I KNOW WHO STICKS WITH REALISTIC NUMBERS IS DICK VAN GRUENSVEN, THE GENERAL OF THE RV-3, 4 AND 6 AIRFORCE. HE HAS TO BE RESPECTED FOR HIS "NO HYPE" APPROACH; A VALUED ENGINEER IN A FIELD OF FANTASY.

THE QUESTION: "WHAT IS IT THAT HAS THE GREATEST EFFECT ON TOP SPEED?" IS BEST ANSWERED BY POINTING OUT WHAT DOESN'T. THAT, SURPRIZINGLY, IS HORSEPOWER.

A CLASSICAL MATHEMATICAL FORMULA FOR CALCULATING TOP SPEED IS:

$$V_{A_w}$$

WHERE: HP = MAX ENGINE BRAKE HORSEPOWER
A_w = TOTAL WING AREA IN FT²
V_{MAX} = TOP SPEED IN MPH
K = A FACTOR WHICH EMBODIES AERODYNAMIC DESIGN
INCLUDING PARASITIC AND INDUCED DRAG

SOME TYPICAL K FACTORS FOR VARIOUS AIRCRAFT ARE;

CESSNA 152/172	-	145
KR-2	=	175
GLASAIR RG	-	192
LANCAIR 235		194
P-51 MUSTANG	=	200

THE FORMULA ABOVE DEALS WITH WHAT IS CALLED THE "HORSEPOWER CUBED" RULE ALONG WITH THE "CLIP-WING" PROPOSITION. THAT IS, INCREASING THE HP OR LOWERING THE WING AREA (CLIPPING THE WINGS) INCREASES THE TOP SPEED BUT NOT AS MUCH AS CLEANING UP THE PARASITIC DRAG AND/OR CHOOSING AN AIRFOIL THAT IS MORE CONSERVATIVE OF LIFT AT HIGHER SPEEDS. THE LATTER AT THE EXPENSE OF LONGER TAKE-OFF ROLL AND HIGHER LANDING SPEED. NOTICE THAT HP AND WING AREA ARE INSIDE THE RADICAL AND AFFECT SPEED ONLY BY THE CUBE ROOT, WHILE THE K FACTOR IS OUTSIDE THE RADICAL AND HAS FULL ONE TIMES EFFECT ON SPEED.

TO SHOW WHAT CLEANING UP DRAG CAN DO, CONSIDER THE VENERABLE CESSNA 152 WITH THE SAME ENGINE AS THE LANCAIR 235, THE O-235L2C AT 118 HP. THE K FACTOR FOR THE C-152 IS 145 WHILE THAT OF THE LANCAIR IS 194. THE 100 MPH DIFFERENCE IN TOP SPEEDS IS LARGELY REALIZED THROUGH AERODYNAMIC DESIGN. THE C-152 IS A "DIRTY" AIRPLANE, THE LANCAIR, "CLEAN" AS A SHARK'S TOOTH.

LET'S CONSIDER THE FOLLOWING SCENARIO: BUILDER ARCHIE GETS HIS KR DONE. IT FLIES GREAT AND HE LIKES IT, BUT ALL HE CAN GET OUT OF IT IS 166 MPH, FLAT OUT, STRAIGHT-AND-LEVEL. WE COULD HAVE TOLD HIM THAT EVEN BEFORE HE STARTED BUILDING:

$$V = 175 \sqrt[3]{\frac{65}{78}} = 164.7 \text{ MPH}$$

NOW ARCHIE LIKES HIS KR BUT KEEPS GETTING "RUN OVER" BY THIS RV-3! HE DECIDES HE HAS TO DO SOMETHING. SO HE GETS HOLD OF THIS ENGINEER FRIEND OF HIS AND SAYS, "WHAT DO I HAVE TO DO TO GO 200"? "I'LL GET A BIGGER ENGINE, BUT I DON'T KNOW HOW BIG 'BIGGER' IS." THE ENGINEER GETS OUT HIS CALCULATOR AND INTRODUCES ARCHIE TO ANOTHER "HP CUBED" FORMULA AND THE REAL WORLD:

(V_A)

WHERE : HP_B = THE NEW HP REQUIRED TO GO 200 MPH
 HP_A = THE PRESENT 65 HP IN ARCHIE'S KR
 V_B = ARCHIE'S DREAM SPEED OF 200 MPH
 V_A = WHAT ARCHIE'S KR GETS NOW ON 65 HP

PLUG AND CRANK:

$$HP_B = 65 / (V_A / V_B)^3 = 113.7 \text{ HP !!!}$$

1166J

"HOLY DRAG-WIRE, I CAN'T HANG A MILL LIKE AN O-235 ON THE NOSE OF MY ALREADY OVERWEIGHT KR!" "WHAT CAN I GET WITH 'SCAT' HEADS AND A TURBO ON MY 'V-DUB'?"

"OK, ARCHIE, LET'S SEE." "THAT OUGHTA NET YOU ABOUT 10 HP." "I'LL RUN IT."

$$V_{MAX} = 175 \sqrt[3]{\frac{113.7}{78}} = 172.7 \text{ MPH}$$

NEEDLESS TO SAY, ARCHIE DIDN'T. BUT HE WAS ONE OF THE LUCKY ONES WHO RAN THE NUMBERS BEFORE HE BOUGHT THE PARTS AND MADE THE CONVERSION. OTHERS HAVE FOUND OUT THE HARD WAY THAT THEY BOUGHT A LOT OF TROUBLE FOR A MEASLY SEVEN MPH, OR LESS.

NEIL D. BINGHAM

P.O. Box 16894, Mesa, AZ 85216

Dear KR Newsletter,

I'm presently working on the construction of the BOAT of my KR2, and was faced with the challenge of hand sanding all those critical scarf joints on the 3/32" plywood skin. Working with sheets of 4'x4' plywood from WICKS I would have had to sand a total of 12 scarf joints just to finish the skin.

Enclosed are the drawings of a simple jig I designed and built for my router table. It took me about 30 min. to construct the jig from scrap stock in my shop. I had all the scarf joints cut in another 30 minutes. They were perfect! With the 9 degree angle of the jig face in relation to the router bit you wind up with a scarf joint which is exactly 1/2" in width.

Once the jig was built, I used C-Clamps to clamp it to the router table surface. It is important to bring the jig face up until it just touches the router bit cutting edge. This will ensure a nice smooth feather edge. Once the jig was clamped to the table, I laid the table on its side on my workbench with the jig face and bit facing up. This allowed me to keep the stock horizontal while cutting. I then clamped the router table to the surface of my workbench so it wouldn't creep while I was feeding the stock into the bit. If you have a stationary router table just keep the stock vertical while feeding it into the bit.

The following are a few tips which I found helpful when working with this jig:

1. Wear eye protection.
2. Use a sharp router bit (Carbide is best).
3. Bottom edge of jig face and router bit should just touch. This gives you a perfect feather edge on the plywood skin.
4. Direction of feed should be with, not against, the rotation of the router bit. Feeding against the rotation of the cutting edge of the router bit will cause the skin to shatter.
5. Keep the skin FLAT against the jig face and firmly against the router table surface. If the skin rides up on the router table surface it will gouge the scarf joint.
6. Feed the skin into the router bit slowly and smoothly.
7. Since you will have to remove any blade guards from the table, please be careful of the bit. It's very easy to get absorbed in keeping the skin flat while pushing it through and not pay attention to the bit. It will produce a rather nasty scarf joint on your fingers if you are careless!
8. Do several practice cuts on some strips of scrap skin to get a feel for the necessary pressure required to feed the skin. I found this to be very helpful.

If you have trouble, or some of this isn't clear, feel free to call. Good luck!

Steve Horn
9733 Mixon Street
Dallas, TX 75220
(214) 350-8703

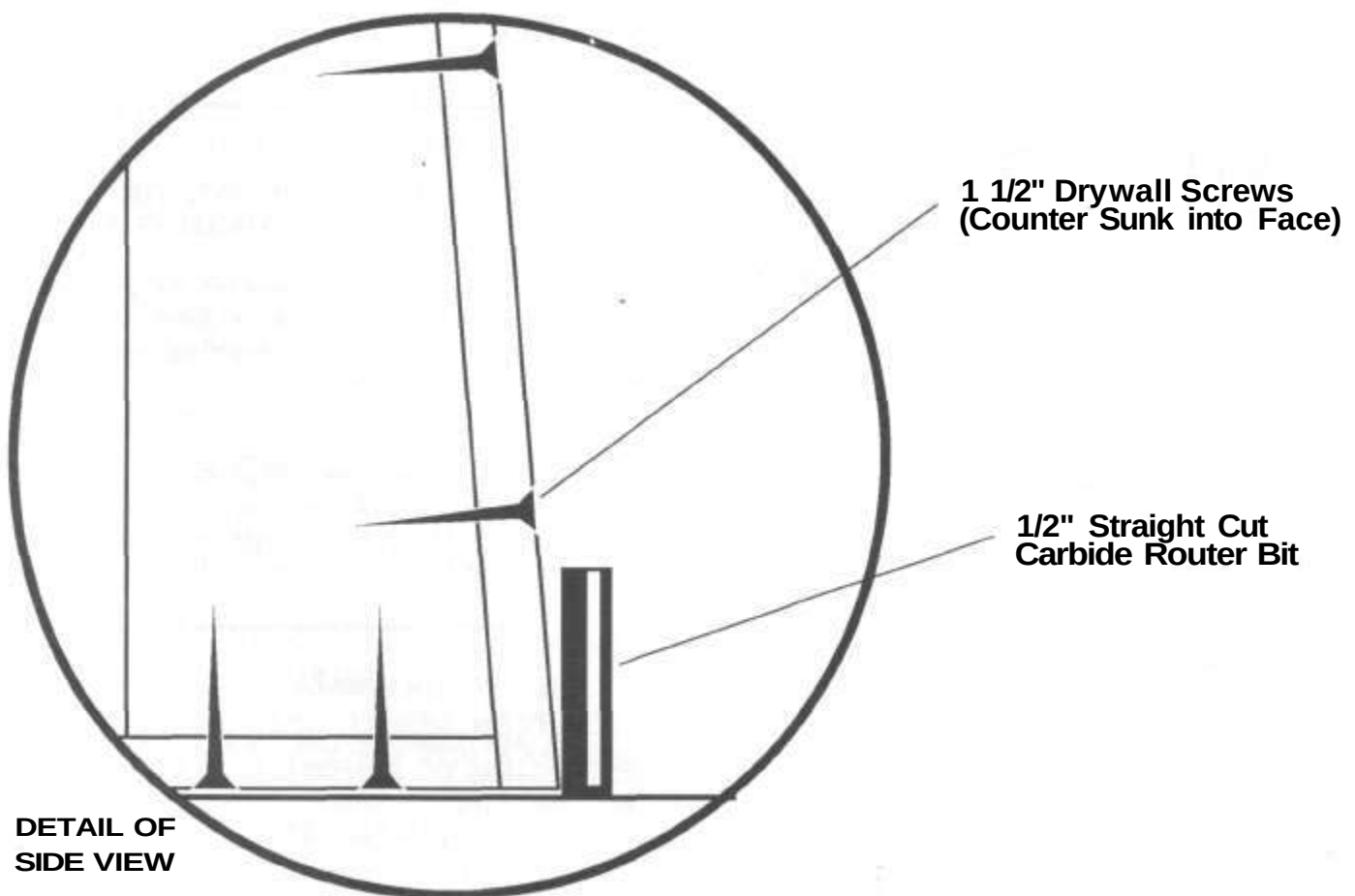
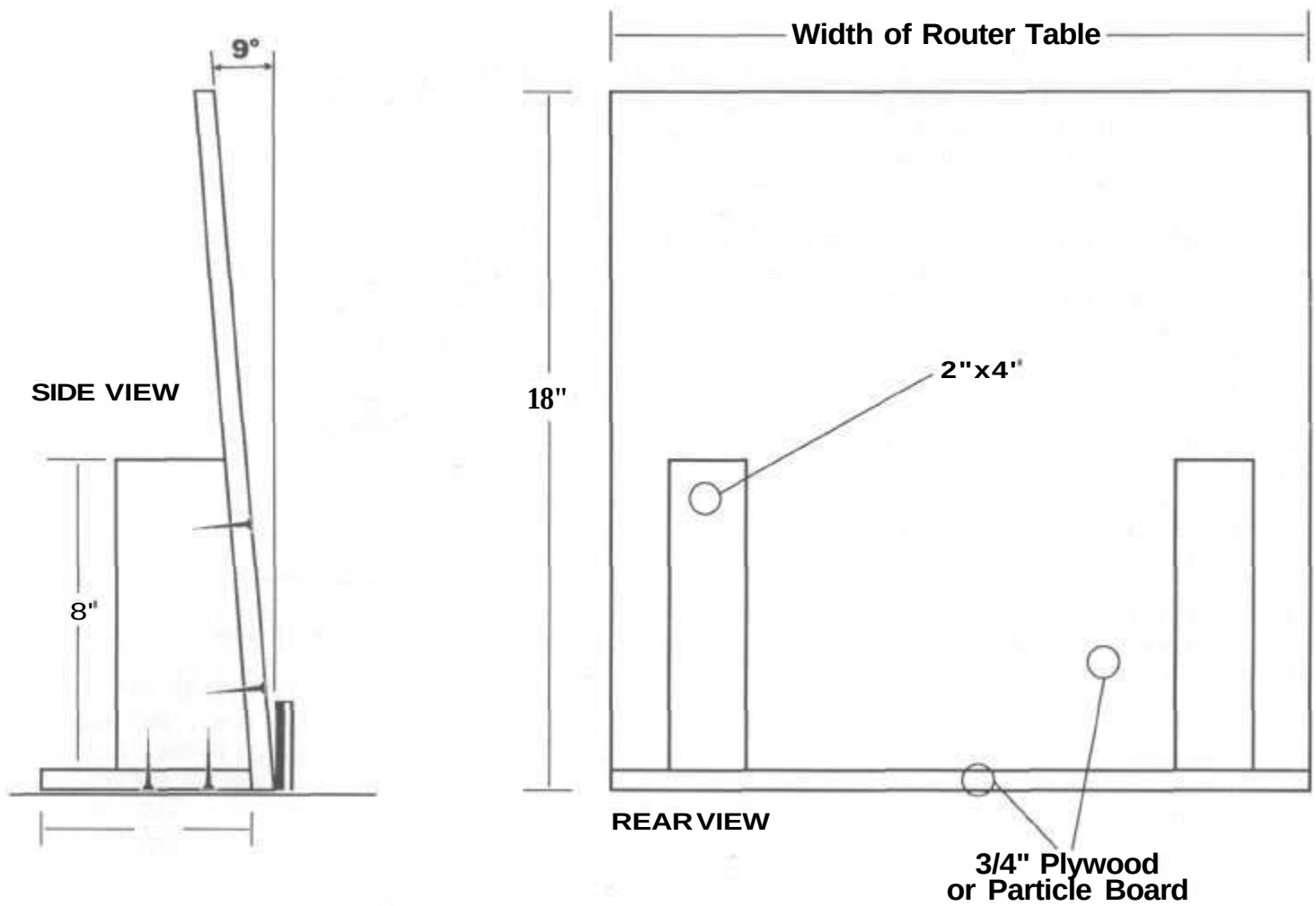
THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-1215 - EVENINGS AND WEEKENDS.
EDITOR. EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER TOO) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

FOR SALE

KR_2 project. 75% complete. Dual control,
retract, instruments, wheels, tires, motor
mount, instruments, hidden antennas, etc.
Mak. offer.

Jack Messer
9555 Columbia Hwy
Eaton Rapids MI 48827
517-322-5462 days
(517-663-4551



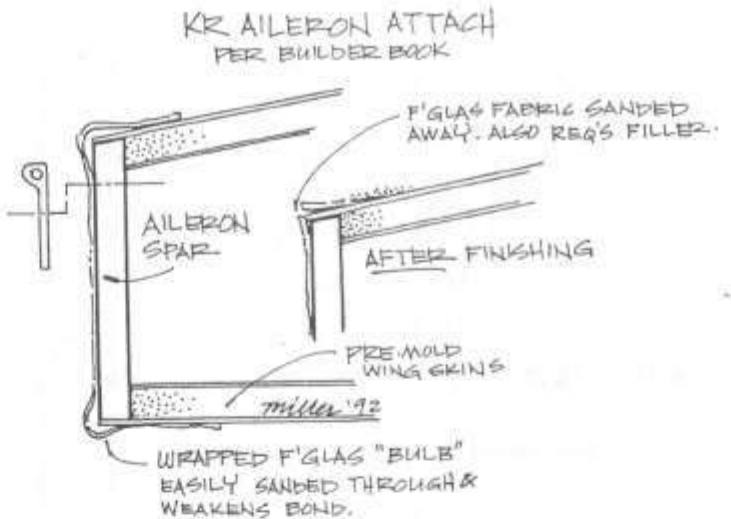
AILERON SPAR INSTALLATION

I can't stand to sand fiberglass layups, especially vinylester resin... it clogs sandpaper and is slow going. I held off doing the aileron spar installation in the premolded wing skins simply because of my dislike of sanding. Finally came up with an alternative installation technique that is easier and stronger.

During aileron fabrication, the manual has the builder wrap the aileron sub spars with fiberglass and then feather sand and blend the layup into the existing wing skin. The builder's manual is a bit vague through this section so it's necessary to read between a few lines.

The sketches should explain all. I even used a mill file to dress the trimmed out fiberglass edges and eliminated sanding completely. This doesn't save you from shaping the leading edge tapes. Can't escape sanding entirely.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871



1993 SUN 'N FUN

The 1993 Sun 'N Fun KR dinner will be held on April 20 at 7:00 p.m., Holiday Inn South, Lakeland, Florida. Dinner options are: Roast beef, baked ham or chicken at a cost of \$12.25/per person. Sign up at the Wicks Booth. For more info, contact:

Virgil Salisbury
5445 SW 89 Place
Miami, FL 33165
305-271-3608

THANKS KITPLANES!

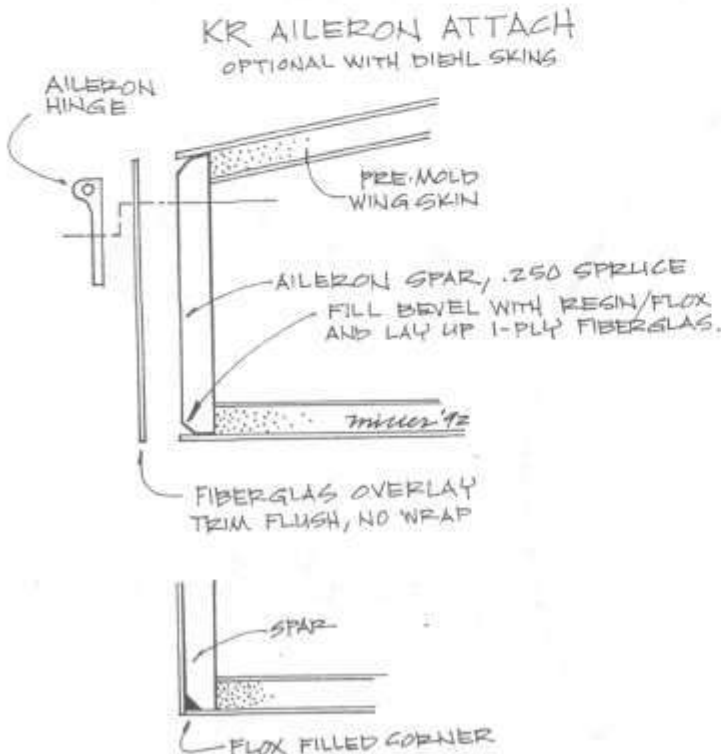
INEXPENSIVE BUILDING AND FAST, FUN FLYING, MAKE THE RAND ROBINSON KR-1 A BUILDER FAVORITE.

That's how the March issue of Kitplanes began a five page spread on KR-1 aircraft written by Don Downie. Highlighted with excellent color photos are Sam Bailey, Richard Shirley, Jim Evans, Ken Cottle and Tom Bagnetto.

Next month's issue of Kitplanes will highlight KR-2s. A very special thanks from all of us to Kitplanes and Don Downie for this wonderful and positive exposure!!

HELP!!

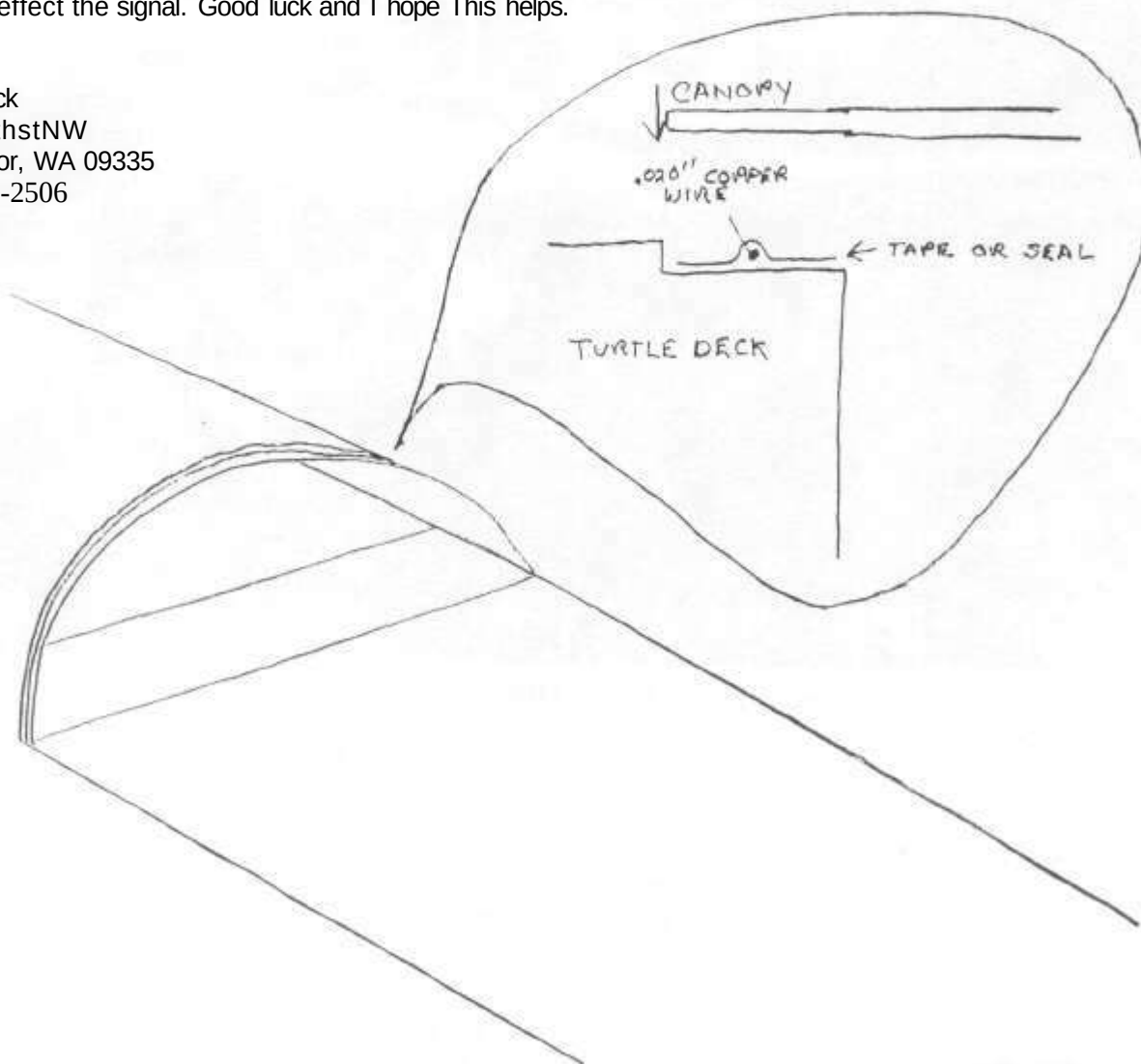
WE ARE RUNNING LOW ON PHOTOS AND DESCRIPTIONS OF FINISHED PROJECTS! PLEASE TAKE THE TIME TO SHARE YOUR SUCCESS STORY WITH ALL OF US!



Dear Earl

I am responding to your request for a functional, hidden loran antenna. I have tried many different antennas and internal locations in my KR2 (N13UG) without success. I discovered that the antennas worked fine until I tried to put them inside the fuselage. I even tried connecting to the rudder cables thinking that this is a long ungrounded wire loop and it may work. Nope. Everything I tried seemed to result in an unusable signal when installed hidden. I finally removed the loran from the panel, hooked up the preamp and then connected a piece of .020" bare copper wire, about 5' long, in place of the antenna. I then carried the loran out into the middle of the yard and watched the signal readout. I was surprised to see a very strong signal. The next step was to lay the wire outside, down the length of the turtle deck on my KR. I temporarily held it in place with small strips of tape. The signal was still showing very strong. Great I was getting warmer. I then put the wire inside the turtle deck and the signal dropped to unusable. Mmmm. It seemed that any time the wire got close to any other metal (seatbelt anchor cables, rudder cables, elevator cables) the signal is blocked. I next tried laying the wire back outside the turtle deck but this time I stretched it across from side to side just aft of the cabin opening. The signal was again very strong. The final solution was to lay the copper wire down in the channel where the canopy meets the turtle deck and cover it with a thin strip of duct tape or canopy seal. When the canopy is closed it is completely "hidden" and works perfectly. The length and curve of the wire do not seem to effect the signal. Good luck and I hope This helps.

Larry Buck
721386thstNW
Gig Harbor, WA 09335
(206)851-2506



FOR SALE

Large box foam (unopened), turtledeck, unpainted cowling (grey) aluminum fuel tank. Small wheels, tube, tires and mechanical brakes. Make offer.

Fred Baldwin
1245 Meadow Way Circle
Holiston, CA 95023
408-637-2747 After 5:30 Pacific Time
Anytime on weekend

FOR SALE

KR-2 LICENSED, Hapi engine 1830 cu. in. approx. 130 hours, retractable gear. Featured in KR Newsletter No. 152, Jan '90. Lost medical. \$8,500.

Richard Johnson
E 5080 Hwy 106
Union, WA 98592
206-898-2255

FOR SALE

Parting out KR-2. Continental engine, mount and control system. \$250/OBO

Mike Ashura
Box 4682
Camp Verde, AZ 86322
602-567-6570

FOR SALE

2400cc Type IV engine, 20 hours smoh and Great Plains hub. Strong runner, dual ignition, complete firewall forward package, incl. prop. Remove from flying KR-2. \$4,100.00 (neg)

Steve Makish
407-482-5385

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 189 FEBRUARY, 1993



KR NEWSLETTER

ISSUE NO. 190

MARCH 1993



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



TERRY MAXFIELD'S, KR-2 N991TM, WATERLOO, IOWA

Well, It finally happened! KR-2 N991TM finally made -it out on Sunday, February 14, 1993. Empty weight came in at 699 pounds and the weight and balance came out perfect.

N991TM is a totally plans built project, except for the wheel pants and engine cowling. I started the project back in September of 1991. Hence the N991TM. The project consumed about 1000 hours, over an eighteen month period of time. The lower fuselage is all yellow poplar (which is an FAA approved wood and can be purchased locally at well under half the price of spruce) and aircraft grade, 3.5mm birch plywood. The powerplant is a 1835 VW conversion. I assembled the engine myself with the help of many phone calls to Steve Bennet. Believe me, when Steve says not to cut corners at this stage of the game, believe him. The landing gear is Dan Diehl's fixed tri.

(cont'd page 2)

The instrument panel consists of the following:

Altimeter, VSI, T & B, ASI, DG, CHT, oil temp, oil pressure, Sky Sports fuel indicator, CHT, Hobbs, ammeter, digital oat, Hamilton vertical compass card.

Avionics include: Sigtronics intercom, dual David Clark headsets, King K x 145 Nav com w/vor head, limorrow 612 Loran, transponder w/mode C.



Stopping this little bird is no problem with the Cleveland 500 x 5.00 brakes I installed.

I made many changes in the appearance over the plans but did nothing with structure of the airplane except beef the corner gussets up a bit.

The interior is very plush, but lightweight. All cushions and panels are very easily removeable.

The exterior painting was done by myself with the use of Duponts' Centari Acrylic enamel with hardener. The striping is 3M's pinstriping.

The FAA is supposed to inspect this plane March 17. So I hope to have a first flight report for you shortly.

All taxi tests have gone well so far.

In closing on this article, I wish to extend my deepest gratitude to the following people who have helped me in various ways with the project.

Very special thanks go to Steve Bennet and Dan Diehl for all of their help over the phone and their patience.

I would like to thank Marty Roberts for my first ride in a KR-2.

I would also like to thank George Toth for the advice he has also given me.

Last, but not least, i would like to thank my wife, Kara, for all of her support during the last 18 months. Kara never begrudged me any time or money during this project. That, gentlemen, is half of the battle of being a homebuilder.

Any builders with any questions, please feel free to contact me and, if I can help, I would be more than glad to... after all this is what makes the KR group so special.

Safe flying and I hope to meet and see all of you at Oshkosh in '93.

Terry Maxfield
1504 Grandview
Waterloo, Iowa
319-236-1954

ONE MAN WINGSKINS

I decided early in the construction of my plane to use Diehl wing skins. I drove to Jenks, Oklahoma last year to purchase them and visit with Dan.

Upon my return to Texas, I read the instructions which accompany the wingskins several times to see if there was some way for one man to assemble them. I usually don't have time to round up three to four friends when I want to work on my plane and the wingskins would require three people to help me for at least two days.

I found that one man can build the wings and do a good job with a little planning.

Follow the instructions up to the point of installing the first bottom skin then stop. Construct two holding fixtures which will hold the spars at the correct dihedral angle and use them to hold the spars while you set the proper washout (follow Dan's instructions here and they will be set perfectly).

Next, get a sufficient number of clamps and blocks ready and lay them out under the wing skin. Use sisal rope instead of tape to tighten the clamps, it holds better and is easier to adjust. Do several trial fittings of the bottom skin to get the feel of placing the clamps and holding fixtures under the skin. When you are satisfied with the fit, mark down the side of both spars with a black marker so that you will be certain of where to place your resin-flox. Now, lay the wing skin under the spar and put a generous amount of flox where the spars will contact the skins. Don't skimp on the resin here, you

want it to ooze out when you clamp the skin to the spar. It also helps to use a little less MEKP than called for in order to slow down the set time.

Use one holding fixture under the wing near the stub wing and one about three quarters outboard. The fixtures will hold the skin about an inch below the spars. Now start clamping just like the instructions say to. Make sure that your black marks line up with the spars and everything should be straight, but check it again just to make sure.

After this has dried, install ribs, wiring, tanks or whatever in the wings and let them set. Follow Dan's instructions for the ribs and profiling of the spars. I can't stress how important it is to make several trial fittings of the skins prior to mixing any resin. This will save you time and trouble.

Now for the fun part, with your ribs trimmed and the top skin ready to install, coat the spars and ribs ONLY with a generous amount of resin-flow. Again,



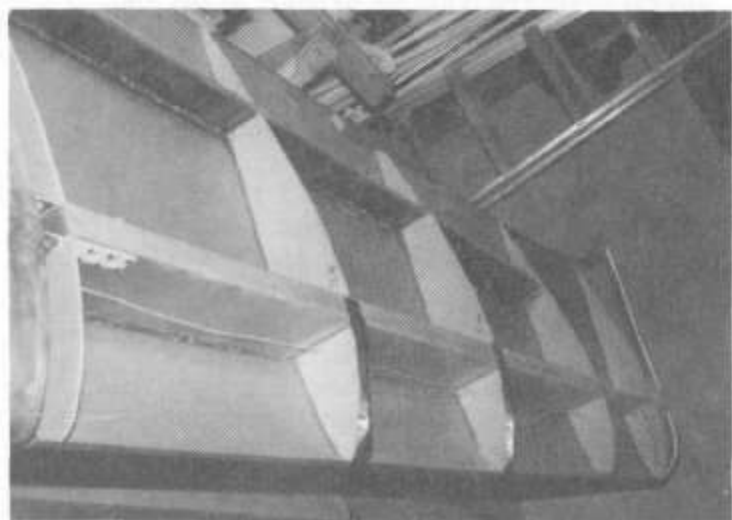
TOP SKIN CLAMPED IN PLACE



ON THE PLANE



BOTTOM SKIN IN PLACE



RIBS & WIRING IN PLACE

don't skip here. You want to see the resin squeezed out when you clamp, this way you know you have good spar-skin contact. Pick the top skin up, align it on the spars and clamp in place. Don't overdo the clamping pressure, its not necessary.

Leave the leading edge, trailing edge and wing tips for later. There is plenty of slack in the skins to force them open and trowel in floc in all three places once the top skin has dried sufficiently, about 24 hours should do it.

I used strapping tape to hold the wing tips and leading edges in place when I glassed them. I used two very straight boards to hold the trailing edge in place and C-clamped them.

Each wing took me three days to complete, allowing for drying time. It was easy and I didn't have to take Monte away from his project to help.

If you have any questions about the process I used, please call or write:

Reece Daniel
5576 Squires
The Colony, TX 75056
214-625-7619 after 6 pm

FEATHERFILL FANTASIES

Believe it, the day will arrive when it's time to shoot some primer and begin the final finishing on your project. Note that I say "final finishing" • the initial finish on your project began months, even years ago, as you carefully shaped and fiberglassed the polyurethane foam and bonded on all those timesaving premolded parts. The critical pains you took to insure smooth, true surfaces will now pay off.

Throughout this discussion on primer/filler, we'll be referring to and using a product known as Featherfill. Available from most any auto refinishing supplier, the stuff is neither lightweight, as the name might imply, nor cheap. At about \$55-60 per gallon, you'll learn to use it properly very quickly or go broke trying. It will definitely do a good job filling the coarse fiberglass weave pattern and at the same time being sanded to a nice feather edge...hence the name. As mentioned before, Featherfill is very heavy and every attempt should be made to sand most of it onto the shop floor. It reminds me of pre-washing the dishes before loading them into the dishwasher...spray it on and sand it off. Blow it out the door. Bye, bye, money, sigh.

An article in a previous KR NEWSLETTER came from a builder who had had real problems with Featherfill. Seems large areas did not stick and caused quite a bit of grief for him. Bet he set a new distance record for throwing gallon paint cans. An unfortunate, but preventable, incident. Here's how to avoid the adhesion problem...

Surface preparation is very important. Things left undone will remain so forever. Kinda like not taking your bride out to dinner after spending all weekend working on your project; you're gonna pay a higher price further down the road. So don't cheat yourself at this point.

The wood surfaces will do well with a light sanding to clean up soiled areas and remove any glaze remaining from the manufacturing process. Staple holes should be filled and sanded smooth along with any nicks or gouges (ouch!!).

Premolded parts, even though advertised as ready for paint, will end up getting some of the Featherfill treatment along joint lines and overlapping fiberglass. I like to use some 220 grit for an overall

sanding, if for no other reason than to clean and scuff the outer gel coat in preparation for spraying.

The cured fiberglass tailfeathers and wing center section f'glass (and whatever else you've got) will need to be cleaned before spraying with primer.

Those low spots within the cloth's weave pattern will hold dust, preventing the primer from bonding. Not good. A once over with T00 grit will scuff the fiberglass. Vacuum the surfaces to remove the deep dirt.

The type of soil spots on your aircraft will determine the type of pre-cleaner you will use...glass cleaner works for many dirty spots, from finger prints to fly specks. MEK is handy for spot cleaning oily areas. Test it first and use with care. Just prior to spraying, use a real, store-bought tack rag to wipe down the airframe.

The idea behind all this labor is, obviously, to get the airframe as clean as possible to insure that the primer will stick.

Featherfill requires a catalyst be added just before application. Not a problem, unless you forget it! The thick primer needs to be stirred before use. It is so heavy that you'll need to use one of those drill motor powered swizzle sticks. If necessary, up to ten percent lacquer thinner can be added to help smooth out the mixture. Add the thinner before mixing in the catalyst.

Pick up the little info book that comes with the Featherfill and read it. One of the gems you'll find deals with application. A thin, wet coat is sprayed on, allowed to flash off for about ten minutes and is then followed by a full, wet coat. This procedure and a clean surface is the key to proper adhesion.

Your spray equipment should have tip opening of a least 70 thousandths. Anything smaller will cause unnecessary problems. Again, follow the guide book as the answers are all there.

The filled surfaces will be ready to sand before you've finished cleaning the semi-cured primer out of the spray equipment. Now comes the really fun part...SANDING. From just sprayed Featherfill to final finish coat will require a variety of sandpaper grades, beginning with 60-100 grit and working up to a 220 finish before applying the UV barrier primer coat. Yep... two different primers are required along with two

complete sanding procedures. The reasoning behind using progressively finer sandpaper is that you really cannot sand out 100 grit scratches with 400 grit paper, you'll only polish the scratches. The 220 grit paper will produce a good substrate for spraying the final primer coats. The UV primer should be sanded out through 400 grit (or finer, If you can stand it) before going to the color coat.

Try not to rush the Featherfill sanding process. Granted, there's only so much sanding within a person; the idea is to take advantage of available energy and get as much done within the shortest time. One way to do this is to use good, sharp sandpaper. Skip the cheap flint stuff. The aluminum oxide papers hold their edge much longer. When a sheet begins to lose its cutting ability, change it immediately. Burning yourself out sanding with tired paper is false economy.

Sand off as much featherfill as possible, stopping only when you begin to expose the very top of the fiberglass weave pattern. The F'fill can be used to effect very small contour changes, but you really should have handled this back when the foam was being shaped prior to glassing.

There really aren't any great secrets to getting a nice finish on your aircraft. It simply takes time and a sequence of steps, each one completed before beginning the next.

As to specific details on my particular KR-2, I used one of the big Wagner airless sprayers with a wide-angle tip to apply the Featherfill. Worked great. Used a little over six quarts and sanded off about five. Looking at it another way, I sprayed only ninety bucks worth and sanded off seventy-five. Told my wife, "There's only fifteen dollars worth of primer on the bird, Honey. See it's not so expensive".

A quarter-sheet palm sander works wonders if you're careful with the little electric rascal. Finish up with the hand block. A leaf blower cleans out the shop quickly but I still end up washing two cars no matter where I park them.

Wear a good dust mask and eye protection. Sure, it's sweaty and awkward but you'll be better off in the long run. Wipe your feet and your butt before going in for a beer.

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871

MODEL A FORD CARB

I am flying a KR-1 (1700cc) which has about 400 hours on it. The last 40 hours or so it has been running very smoothly at all rpms with a Model A Ford carburetor. Many others have used this carb on their VW aero engine but I haven't heard it mentioned lately. This carb has a nice mixture control but I haven't hooked it up for cockpit use as yet. Those who have flown with the POSA and lack the coins for an Ellison would be the first to be impressed by this old reliable float type carb. Perhaps you know some antique car buffs who have a few laying around. If you don't, I know at least one source (my neighbor had a catalog):

Old Time Auto Parts
2741 Highway N Rt. 1
Cottage Grove, WI 53527

Their Model A Ford Catalog use to be \$4.00 in 1989. The overhaul kits for this Zenith carb were listed as \$14.95.

Ed Janssen
601 Heinze Dr.
Rock Falls, IL 61071
815-625-4898

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD, OSHKOSH WI 54903-3086
PHONE 414/426-4800

A FEW NOTES ON USING AEROLITE GLUE

I had read that the Mosquito bomber of World War II was built with Aerolite glue and it is specified for construction of the Volksplanes. Aerolite is a form of urea-formaldehyde adhesive, made by the Ciba Company in England and Canada. It consists of a powdered resin and liquid hardener. The powder is mixed with water when you are ready to use it. The mixed resin will keep for about two weeks. In powder form, it stays stable for years, as does the liquid hardener.

While the KR-2 construction manual specifies epoxy for gluing the wood parts together, I opted to use Aerolite. Some of my reasoning for this was memories of using epoxy to build a few radio-controlled models. I always either ran out of mixed epoxy one joint short or I would complete the assembly with a large amount of epoxy going to waste. I also remembered the sticky mess of epoxy on hands, table, other parts, clothing and bath towels (a sure way to guarantee spousal disapproval of your hobby!). I had also been reading reports on epoxy allergies and I had seen the result of either out-of-date or poorly mixed epoxy making a poor joint. Aerolite, on the other hand, seemed custom designed to overcome these problems. The resin is water based, the hardener is basically strong vinegar. You can mix it up a week in advance, just use what you need and put the rest away! What could be easier?

I called Jeannette Rand and asked her opinion about using Aerolite and she said neither yes or no, only that some builders had used it and some had it come out ok and others less so. I asked a visiting KR builder but he had never heard of it. My EAA designee said if I could get an acceptable strength glue joint, it would be ok. Since I couldn't find anyone to say, "No, don't do that!", I went on with my plan.

To use Aerolite, you paint one part with (mixed) resin, the other with the hardener, then just press the parts together. You don't even have to use a lot of clamping pressure... just enough to hold the parts together! In making test joints with scrap wood, I found a thick glue line (about 1/32 inch) worked much better than using a lot of clamp pressure and squeezing the glue out of the joint. As I said before, just enough pressure to hold the parts together. I also found that the joint must cure at least a week

before it will develop full strength. Sounds pretty easy, huh? Don't reach for your checkbook because, as with everything in life, all is not as it seems at first!

My first difficulty with Aerolite was gluing the fuselage side framing. This presented a strategic problem with what parts get coated with hardener and which with resin! I also committed a tactical blunder here. My EAA designee suggested using plastic under each joint cluster, instead of wax paper, to prevent gluing the fuselage to the worktable. His concern was the wax paper leaving a residue which would interfere with future glue bonds. So, being the recycling kind of guy I am (as in "scrounge") I cut empty bread bags into neat little squares to fit under each joint. If you do this, put the label side down. The paint/ink on the former bread sack transferred to my framework under the influence of excess hardener, so I had a bunch of "Wonder Bread" to sand off my woodwork! (At the next EAA meeting, I poured a cup of coffee in the designee's pocket.)

My next learning experience with Aerolite came with laminating the main spar blanks. I assembled my laminations with the glue joint vertical and left it that way. Apparently the resin gets real runny sometime during the curing process. The Aerolite ran out of the joint in some places, leaving a gap. Something you don't want in a spar. I had to rip it apart and try again... this time placing the glue line horizontal while it cured. This worked better, although I had the same thing happen on another spar blank, even with the glue line horizontal.

Finally, remember my concern about epoxy allergy? Would you believe I developed a sensitivity to some component of the Aerolite? After cleaning up from a particularly messy session with the fuselage, my hands looked as though they were sunburned and were sore for about three days thereafter. From then on, I wore rubber gloves when I used Aerolite.

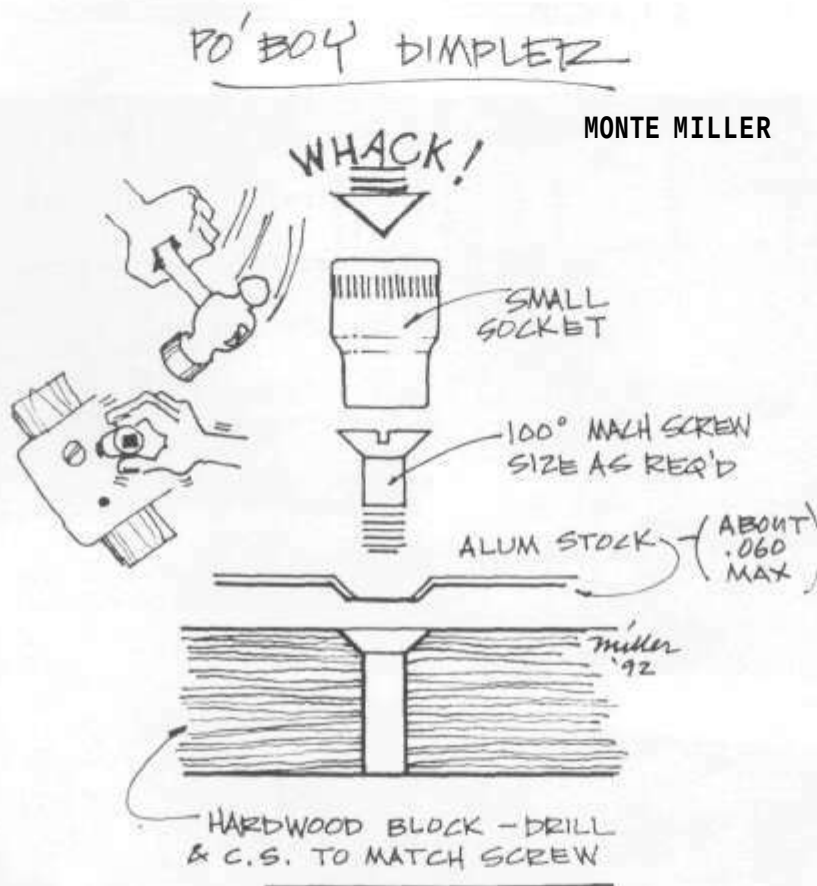
I'm using epoxy to finish my KR-2. Aerolite is fine stuff. It does exactly as advertised and using it was a good learning experience for me. The structure of the KR-2 makes Aerolite difficult to use and there is no advantage to it. Since I started using Hexcell Structural Adhesive, I have had no problem with waste or running out short. I have found that a little epoxy goes a long way and after awhile you get a feel for how much work you can do with a given lot of epoxy. As

far as glue on tables, dogs and bath towels, that is my fault, not the adhesive being used. Work carefully and these problems will minimize themselves!

Edwin Gossert
6227 N. Litchfield Rd., #40
Litchfield Park, AZ 85340

HELP!!

WE ARE RUNNING LOW ON PHOTOS AND DESCRIPTIONS OF FINISHED PROJECTS! PLEASE TAKE THE TIME TO SHARE YOUR SUCCESS STORY WITH ALL OF US!



13TH ANNUAL KR GATHERING SEPTEMBER 17, 18 & 19TH COVINGTON, TN

Talks will be given by some of the KR pilots and there will be a question and answer session. There will be lots of flying, a spot landing contest and maybe some rides given. An awards dinner will be held Saturday evening.

For motel reservations, contact:

Best Western Inn
873 Highway 51 North
Covington, TN 38019
901-476-8561

Mention that you are attending the KR Gathering and they will give you a discounted rate of \$38.00 one bed and \$43.00 for two beds. There is no charge for extra persons in the room. Make reservations prior to August 17 and you need to pay for one night with the reservations. Camping allowed at airport with no hookups.

A more detailed letter will be mailed out to all people on our current "KR list" in a couple of weeks. For any additional information, you can write or call me at:

Max Calkin
Rt. 1, Box 149A
Omaha, AR 72662
501-426-5307

FOR SALE

Type 4 Porch- replace VW Type 1 \$200.00
EA82 Subaru - low mileage \$500.00
VW 1835cc 65 Hp 300 hrs
Dual electronic ignition
Oil filter system
Now flying in Dragonfly MKII. Changing
out for larger engine.
Firewall forward prop & carb
U.S. \$ 1,400.00

Reg Clarke
4813 57 Ave.
Wetaskiwin, AB T9A186
403-352-5001

WANTED

KR-2 plans in a computer aided design
(CAD) file for IBM computer. Write:

Mark Banus
1305 Harris Rd.
Virginia Beach, VA 23452

FOR SALE

1/2" Aluminum landing gear plus mechanical
brakes and wheels. Came off Sonerai II.
Gear slightly bent. Retractable KR-2 gear
and mechanical brakes, installed but never
used. Make offer.

Kelvin Anderson
8 Monterosa Ct.
Sacramento, CA 95823
916-427-5202

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 190 MARCH, 1993



KR NEWSLETTER

ISSUE NO. 191

APRIL 1993



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



WAYNE HEISLER'S KR2-S, FT. MYERS BEACH, FL

Wayne sent us this picture of his plane in progress (last picture of his plane was in the October 1992, Issue 185). The KR2-S is the new stretched version of the KR-2 that Rand Robinson is now selling. The KR-2S also 16" more fuselage length, 2.3' more span and 10% more wing area. This version incorporates a sleeker canopy design. Wayne's plane has a EA82 Subaru engine, Diehl tri gear, Ross Planetary drive, dual ignition and fuel injection. We will try to keep you updated on the progress of Wayne's plane.

CENTRAL WYOMING
EXPERIMENTAL AMCBtAFT ASSOCIATION
CHAPTER #420

KR Newsletter
P.O. Box 579
Lakeville, MN 55044

Dear Sir:

I want to tell you about one of our Wyoming aircraft builders, Mr. Dan Croy. Dan was recently nominated to the Wyoming Aviation Hall of Fame and will be inducted this summer at the Central Wyoming Cowboy Fly-In. The Cowboy Fly-In will be held July 24th and 25th. I would like to take this opportunity to invite all KR builders enroute to Oshkosh to attend and see their fellow KR builder inducted. Enclosed is an article that appeared in the most recent addition of WYOMING PILOT.

The Central Wyoming Experimental Aircraft Association is hosting the Cowboy Fly-In, July 24th and 25th at Good Warbirds Hanger #1, Casper Airport, Casper, Wyoming.

Sincerely,

Tom Jones

Tom Jones
President, EAA Chapter #420



Aviator without wings

BY SANDI WEAVER

Dan Croy might seem like an unlikely candidate for the Wyoming Aviation Hall of Fame, but he will be in the first group to be inducted this summer. "I'm not a pilot. I've never been a pilot," Croy says. Yet in May 1982, Croy founded the Gillette chapter of the Experimental Aircraft Association, and his developments on the popular KRII (experimental) have caught the attention of many a seasoned pilot during the years since he began building the plane.

Croy's childhood was filled with building exploits of one sort or another. He built airplane models, hot rods, custom cars and jeeps. Years later, he was in North Dakota, working for H.C. Smith as a heavy equipment maintenance superintendent, while his family was in Cheyenne. Although Croy was responsible for the maintenance of 500 pieces of equipment and supervision of 80 employees, he still found he had some spare time on his hands. So he decided he might as well build an airplane.

Croy ordered his first KRII, but on the day the kit arrived, Dan and Barb were in Gillette burying their oldest son, who had died in an accident on the highway. Croy lost all interest in building the airplane.

After the company sent Croy to Missouri, he suffered a heart attack. "They told me, well, in six weeks I'd be back to work," he says, "and I'm still waiting. But I came back up to Wyoming and had four bypasses put in. Three of 'em went bad in 90 days. And I was just literally climbing the walls... going crazy. You know, I'd gotten used to working an awful lot of hours on the line, mind and hands both. I'd always worked hard on my job. There was no sitting around to it.

"So we dug the airplane out and I started working on it here in Gillette. When I first started, I wasn't too sure which end of the airplane to put the prop on. You know, I'd flown a little bit, with different people, but had no desire to fly, but I always had a desire to build a plane."

On the first airplane, the plans consisted of a quarter-inch thick brochure with a few photos in it, with one sheet giving the dimensions of the fuselage. Croy asked experts for help, but found that his best sources of workable ideas were the people who had built and flown the KR planes.

Working with the information he gathered, and his own instinctive ideas about the construction of a safe and flight worthy plane, Croy put a tricycle retract gear and a modified canopy on his first plane, but the rest of it was close to stock.

He found that, in building the plane, he had so many ideas that he decided to incorporate them into a second plane.

Because of his heart surgery, Croy couldn't fly the plane himself, so his wife, Barb, and their daughter, Jana, obtained their pilots' licenses. Jana was the test pilot on Croy's latest KRII, and is still the only person who has ever flown it. According to Croy, "I haven't even had a ride in it yet!"

After minor renovations following a gear-up landing, "Croy

Toy" should be ready for the sky again in April. Until then, Dan and Barb Croy will be busy with fiberglass work and other details. Barb did all the painting and interior work on the plane. The aircraft is 4" wider than the stock KRII, planned for comfort on long flights.

"It's been quite a learning experience for me," Croy says, "I didn't know anything about airplane building when I started. Of course, there's still a lot I don't know about, and never will. But I've gotten more self-satisfaction out



Dan Croy with his "Croy Toy"

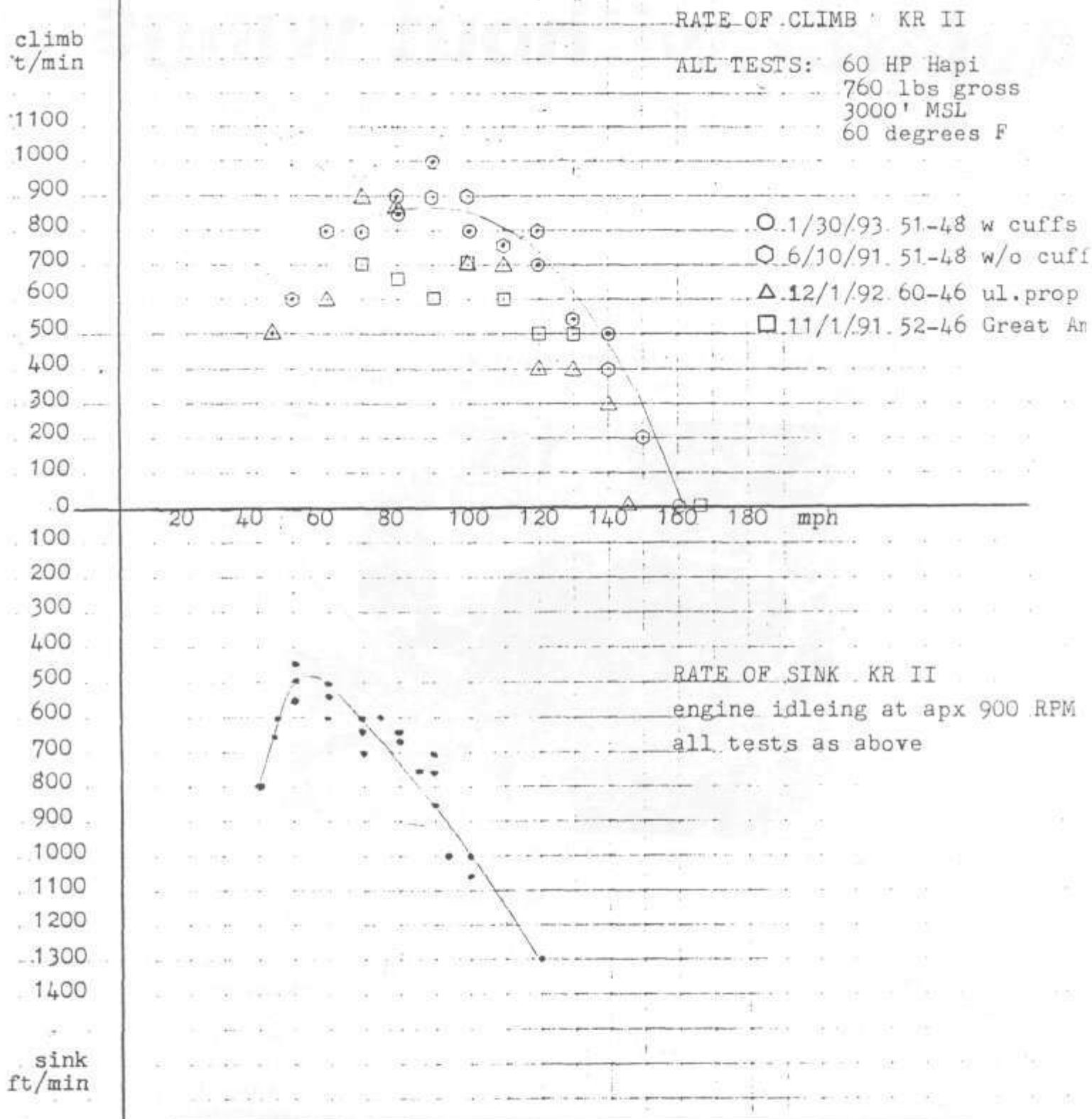
of this than anything I've ever done."

Since the EAA's inception, Dan and Barb Croy have been involved in association activities. They worked on several air shows, a few years back, and enjoyed the excitement of putting together events that would draw people to Gillette, and interest them in flying.

But Croy's crowning achievement happened last year, at the EAA national convention in Oshkosh, Wis. Dan's plane was awarded the Ken Rand Memorial Award for "Best KRII", and was chosen from among 19 planes entered in the competition.

Though he doesn't have a license to fly, he has obviously needed no license to dream, and the result is a plane that's sleek, aerodynamically sound, and every inch a byproduct of imagination and determination.

Although Croy can't obtain a pilot's license, he can fly the ultralight planes, and that's his next project, somewhere down the road. Meanwhile, his wife and daughter can take to the air in "Croy Toy", and he has the satisfaction of knowing that he put together the craft that keeps his family and his dreams aloft.



WANTED

FOR SALE

VW engine mount and clear canopy for KR-2.
Call or write:

Bob Qulnn
28 Parker St.
Charlestown, MA 02129
617-242-3123

Fixed landing gear package (spring bar and castings). New In box. R-R price, \$530.00, sell for \$480. With this, I'll Include a free tall wheel, NIB and new tall wheel spring. I am installing the Trl-gear set.

I purchased a KR-2 years ago for its efficiency. I haven't been disappointed. In the process of trying to improve it, I've tested its performance with each major change. Although I haven't generated much improvement, I have learned a few things and have made the accompanying graph (SEE NEXT PAGE). All tests were made by using a calibrated airspeed indicator and by timing vertical change for thirty or sixty seconds.

The airplane was well-designed and carefully built, then sold to a second owner who made some changes. Although he did no formal testing, he felt the dual port heads were better than single. He also cut down the original prop to a swept prop "in the style of Ed Sterba". He felt that the resulting 51-46 prop was better throughout the performance range. I agree. Most pilots however, observe "that prop's too small". It turns 3000 rpm static (due to slippage?) yet turns 3200 rpm at 160 mph. The larger more conventional props turn 2500 static and have a much longer ground roll. This cut down prop also has the help of a large spinner which looks good but I doubt does much for performance.

The airplane has been tested with and without wheel cuffs which hinge back to cover the gaping hole in the wing forward of the retracted gear. I expected these cuffs to make a major performance improvement but doubt if they were worth the effort.

One odd observation: Sink rate seems to be the same engine stopped or engine idling, except that it goes way up when the prop is stopped in a horizontal position. Apparently it disturbs the airflow to the wings. Keep this in mind when trying to stretch the glide on a dead engine but don't break the prop on landing.

Gary Sack
Box 6082
Eureka, CA 95502
707-444-9493

THANKS!! KITPLANES

Thanks to Don Downie for the May issue that contains a nine page spread on KR-2s. The positive press is greatly appreciated!

Sticker shock. We've all experienced it in one form or another; the "You've gotta be kidding" glassy-eyed stare after checking out new car prices or maybe having to write another semester's tuition check for your first born.

After purchasing a bare bones minimum nav/com system and intercom for my KR-2. I've got that same ol' feeling. This is supposed to be a budget project.

My KR-2 is a simple, daylight VFR, non-electric hot rod. As such, the total communication and navigation package had to be self-powered, as light as possible, removable (for security) and budget priced. Careful shopping and a little bit of luck made it happen. It still cost a chunk of change by my standards but I'm pleased with the package.

There's no way to tell you what's in the system without naming names...so I will. This is in no way meant as a commercial endorsement, there's lots of good equipment available and you're free to spend your hard-earned frog skin anyway you choose. Nuff said.

After reading and checking out what other completed projects were using, I bought a pair of Flightcom 4DX headsets, the Flightcom two-place, battery powered intercom, their PTT switch and a neat bag to carry it all in. Had fun for a couple of nights wearing the headsets at the dinner table..."ah, experimental ninety-two Lima Mike to Cobra Leader. Wud ya pass them taters? Over."

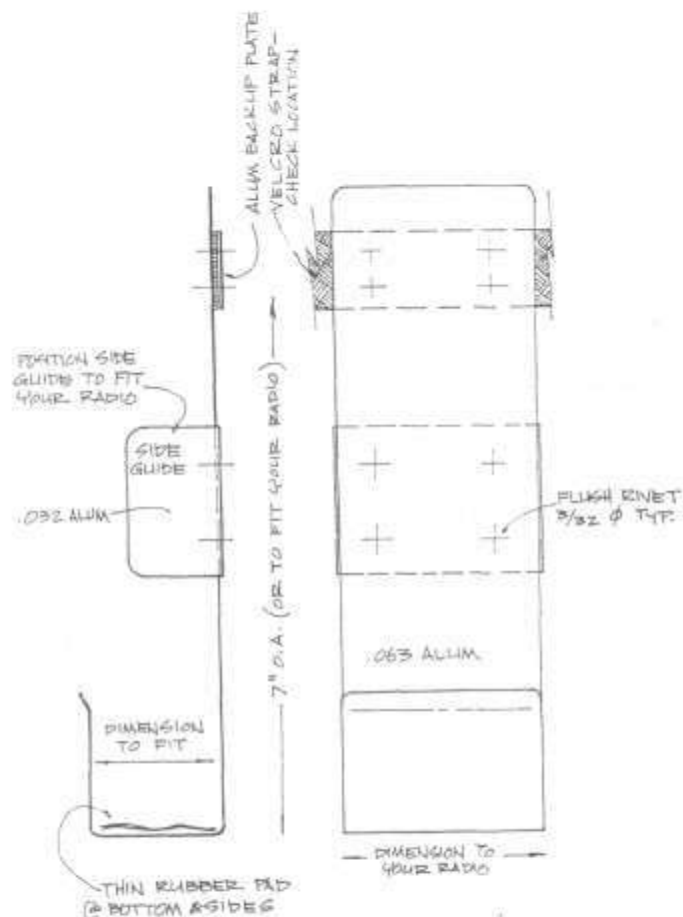
The Flightcom equipment is of very good quality. The intercom rates excellent with several local RV fliers utilizing them and the prices are competitive. Shop around but plan on about three hundred dollars for the items mentioned.

Now for a hand-held Nav/Com radio. Many to choose from and really not a bad one in the lot. The key is to select a radio that will interface with your choice of headsets and intercom/PTT switch. Some units require an adaptor cord at additional cost or even a modification of your existing wiring. I was all set to spring for a particular hand-held when I found out from the local distributor that I would need to kick in an extra sixty dollars for an adaptor cord! Back to square one because I had already taken delivery of the headset system.

The best choice for my needs turned out to be a King-Bendix KX99. Here's where the luck came in. A Dallas classified ad

turned up a brand new daddy all In the same ad. Half price sounded great...for the radio, not the kiddo. The King has the required interface feature and was actually less money - list vs list - than my first choice of radios.

After all, the pieces were on hand, it was time for a trial installation inside the KR's cockpit. Jeez! All those wires and coils strung everywhere looked like some snake pit.



To clean up the interior, I installed the portable intercom on the aft cockpit shelf using a Velcro pad. Both headset cables now remain behind you instead of strung across your lap. The leads from the intercom are routed along the lower starboard longeron and tie into the PTT cable plugs near the main spar/fuselage uprights junction. The PTT leads are routed in front of the main spar; no problem with a fixed gear KR. All cables meet at the hand held which is mounted near the instrument panel on the passenger side of the cockpit. With my long arms, the location is no problem and the radio system leads no longer clutter the interior.

A sketch shows the aluminum bracket that securely holds the radio yet allows the entire system to be removed for safe storage. Spruce blocks are beveled and epoxied to the fuselage sidewall permitting the radio to be angled for best viewing.

The short rubber-ducky antenna on the radio works OK but you might consider some hidden antennas for improved performance. Homebuilt antennas belong on homebuilt aircraft.

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871

FOR SALE

New Micro-Softie Parachute (22' conical) \$650, Slick 4216 Mag w/harness 20 hrs \$350, geared starter with solenoid \$125, Ellison EFS-2 with air box, filter, linkage, ready to install (10 hrs) \$350. Mac serve + switches \$75. All excellent condition.

Maurice E. Simard
25 Jennings Lane
Windham, CT 06280
203-440-5111 days 8-4:30 EST
203-456-1674 after 5:30 p.m.

EAA CHAPTER #1011 FLY-IN

The Piedmont Foothills EAA Chapter 1011 fly-in will be May 29 & 30, 1993 in Toccoa, Georgia. All airplanes are welcome. For more info, contact:

R. W. Moore
P. O. Box 297
Toccoa, GA 30577-0622

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

ROUTING WIRES IN COCKPIT

This sketch shows how I routed my coax wires around the cockpit area. This idea came to me after riding in another KR in which my knees were constantly bumping his wiring and shorted out the Navigation Equipment. The tubing is completely inside the wing fillet and rigid enough to push 3 coax and electric wires through.

Hope this can be of use to some others building a KR.

Sam Sayer
6621 Foxmoor Dr. 33541
Zephyrhills, FL
813-782-3302

SELECT PLASTIC
TUBING LARGEST
ENOUGH FOR COAX
& ELECTRIC WIRES.

WING FILLET
OUTLINE

Top View

Side View

S. AYER
-24-93

FOR SALE

KR-2 Retractable landing gear with heel
brakes, pedals and cables, mounts.
\$150.00

Larry Weigt
3936 Allentown Rd.
Lima, OH 45807

FOR SALE

KR-2 95 hours T/T, fixed gear w/wheel
farrings, wing tanks, gull wing door
canopy, 155 mph cruise. \$7,500.00

Lloyd Buckner
619-447-0295

FOR SALE

KR-2 with very low time, has a 2180 Great
Plains engine, retract gear, dual stick
and rudder pedals. Built for easy
serviceability. \$12,500 invested, make
reasonable offer.

James Rawlings
741 Woodbriar Lane
St Charles, MO 63303
314-441-7517

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 191 APRIL, 1993

FOR SALE

KR-2 Project in boat stage. Someone to
finish my husband's dream. Has molded gas
tank, hardware, fixed landing gear.
Includes foam, fabric, epoxy, sprs,
brackets. Engine bracket is already
mounted. Must see to appreciate all the
fine work done the last 4 years. Many
extras include tail, wheel bracket. Have
engine that needs to be assembled.
Everything to go... Asking \$3,000.00

Mrs. Russell Boettcher
66960 Keeler Ct.
Dowagiac, MI 49047
616-424-3662 after 4 p.m.

FOR SALE

Set of KR-2 plans with the Rand Robinson
"Stretch" mod and promotional video for
sale. They cost in excess of \$225 and I
am asking \$175 for them.

Barry Fogerty
12 Oak Hollow Rd.
Shawnee, OK 74801
405-275-2362 (call collect after 6 p.m.
weekdays)



KR NEWSLETTER

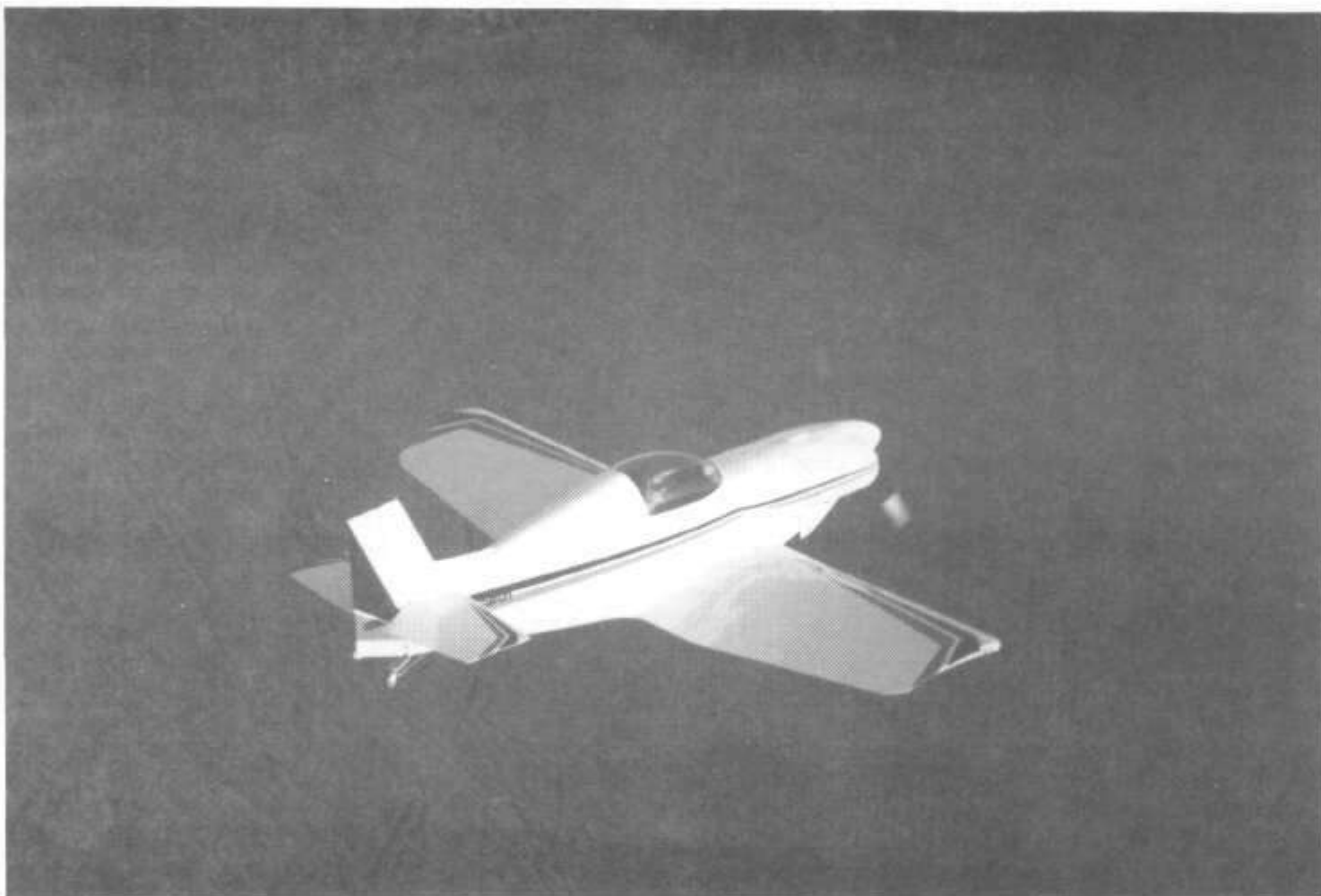
ISSUE NO. 192

MAY 1993



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



TERRY WARNER'S KR-1, CENTERBURG, OHIO

My KR-1 is powered by an 1835 VW engine and has fixed gear. I have about 110 hours total time. Very honest airplane and great fun to fly. We live on a grass field and with the fixed gear, I have had no problems. If I can help anybody in my area, I would be happy to.

Terry Warner
3357 Columbus Rd.
Centerburg, OH 43011
614-625-6356

PAINT THAT BIRD

All during the building process, I fussed and worried about painting my plane. I didn't want to load it on a trailer and haul it to a paint booth and I really thought I could do the job despite the fact that I have about as much artistic ability as a pet rock.

Take my word for it, not only can you paint it, you can probably do a job that will make you proud. I painted mine and even though it is not perfect, it looks very nice.

The key to a successful paint job is preparation. Read everything you can find on surface preparation and painting. Pick a paint manufacturer and stick with them. Don't mix brands, you are asking for problems if you do.

I spent a lot of time trying to get as smooth a surface as I could, then I tried Featherfill as a weave filler. I did not like the Featherfill, so I sanded most of it off. At that point I decided to use Dupont 131S primer filler. It is thinned with 3608S lacquer thinner. In my opinion, it filled better than Featherfill and sands very easily. The 131S can be used to fill small imperfections and should be sanded back progressively from 80 grit to about 320 grit sandpaper. Take your time here and lay a good foundation for your paint job.

When I was satisfied with the filling and finish of the 131S, I shot the entire plane with Dupont 1986 Velvaseal dark gray acrylic sealer. This sealer comes ready to shoot and goes on much like the top coat. This gives you a chance to practice your painting technique. There is no need to sand the Velvaseal. I allowed it to dry for two days before I shot the color on, but this is not necessary. I did it because I was busy with a home project at the time.

For a color top coat, I used Dupont Centari 817A General Motors white, thinned with 8093S acrylic enamel reducer. To this I added Dupont 739S gloss hardener. When you shoot the color on, don't be so afraid of runs, that you spray on dry coats. This will cause you to have a non glossy surface. I made this mistake at first until I learned to shoot a good wet glossy coat. Allow it to flash off slightly and then shoot another coat. Watch your finish as you shoot, you will be able to see if your coats are wet enough to shine when they are dry.



After allowing my plane to dry and cure for three months, I learned another lesson. I tried to wax the plane with plain old Turtle Wax and was rewarded with a dull, dull, finish.

I talked with a few auto paint shops and invariably they recommended Meguiars Mirror Glaze fine cut cleaner and Meguiars Deep Crystal Carnuba Wax. I used both and my plane now has that deep wet look we all want.

Monte Miller is cutting my striping kit, which included my trim and N number and we are going to install -it next week. I decided to use a striping kit to save hours or days of masking and painting. The striping on my 88 Mazda looks as good as it did the day I bought it so I think it will hold up as well on my airplane.

Don't let the prospect of painting your plane overpower you. Do your research, talk to people who paint cars for a living and use one paint system. I have about four hundred dollars invested in my paint job (if you don't count the compressor which I convinced Sandy that I could use to air up her tires).

If all goes as planned, I will have my interior in and be ready to move N723RD to the airport by June 1. Maybe I can talk Monte into bringing the beer for the first flight.

The included photo shows my finished paint job, along with my best helper, my son B.J.

Reece Daniel
5576 Squires
The Colony, TX 75056
214-625-7619 after 6 pm

FIRST FLIGHT REPORT

Wow, There Is no other word which can describe a first flight. N991TM made its maiden voyage on Wednesday, April 21, 1993, at 0000. Wind was 30 at 9. Active runway 30. After getting clearance to taxi to the active, I proceeded down the taxiway. Sitting down at the runup pad of 30 a lot of things were going through my mind. Did I tighten that bolt tight enough, are all linkages adjusted right, etc... I had done 4 or 5 full power runups and contacted tower and told them that I was ready for take-off.

Full power, left rudder to keep her straight, 65 mph indicated, and slow, gentle back pressure. About 500-600 feet, liftoff! At this point every emotion you can think of, you experience! My main concern at this time was to get enough altitude, in case of any problems I could glide back to the airport. On climb out I was indicating 80 to 85 mph and 500-600 fpm. Boy, were my knees shaking. Once I was at 2500 ft agl, my knees quit shaking and tower cleared me to land. I replied "no thanks, I'd like to go to the practice site and fly the plane a bit". About 30 minutes later, I called up approach and told them I was ready to come in and attempt my first landing.

Out on the end of 30, I set up a 500 fpm descent. At about 1800 rpm, lined her up on the centerline and proceeded to make my first landing in my very own homebuilt KR-2. Everything went perfect, I set the plane on the runway just like I knew what I was doing. After my rollout, tower asked, "experimental 1 Tango Mike, what would you like to do"? I told them that this was my maiden voyage and that I would like to taxi to the ramp and settle down a bit. After clearing me to taxi to the ramp he said "I know I feel a lot better".

The second flight was on April 26, 1993. One thing that I tried new on this flight was a little up trim on takeoff. My first takeoff I had a few oscillations. This seemed to solve the problem.

Now for some strong advice. The plane received its airworthiness on March 17, 1993. There were no hitches in the inspection. By the way, this was also my 32nd birthday. That evening about 2100 I headed out to the airport...only to do some high speed taxis. Boy did I screw up! I suddenly found myself about 25 to 30 feet above the runway! Now this was a cold day. With winds gusting straight down the runway. In a panic, I shoved the

stick forward and inadvertently crashed my precious airplane. I had not flown for about 5 months and I am sure this factor contributed to the mishap. The crash separated the firewall from the aircraft, broke the prop and numerous other damage. Fortunately, I was not hurt in the accident. The next day I called Steve Bennet and told him what happened and ordered a new crank and prop hub, just to be sure. Rebuild time from the time of crash was just three weeks! The moral of the story is, just be patient, there are plenty of good flying days in the year, so plan your days well (very little, if any wind and straight down the runway).

I know in reading the KR Newsletter, I would always look for some first flight report to give me a boost to get this bird done. For those of you who are at this point, keep trudging on, the final outcome is well worth every dollar and ounce of sweat you put into your airplane—and for those of you who are contemplating building a KR. Do it!!! This plane is a sheer joy to fly. Safe and happy flying.

Terry Maxfield
1504 Grandview
Waterloo, IA 50703
319-236-1954 or 235-6633 FAX 236-1954

Editors note: I received the following ad from Terry a few days after the above flight report.

FOR SALE

Due to a landing rollout incident, I will be selling my KR-2 N991TM. This plane was featured on the cover of the March, 1993 issue #190 of the KR Newsletter. This plane, I feel is one of the nicer KR-2 's. The plane has a current airworthiness and has flown. I have close to \$10,000 in the airplane but to be realistic, I will be selling the whole thing with many extra engine parts for \$5,800. The areas of damage in need of repair are: Canopy frame, vertical stabilizer and nose gear. The airframe is in excellent shape and will require no work. An average builder should be able to have the plane back to flying condition before Oshkosh! I would be glad to send pictures to interested buyers. For details on the plane, refer to the March Newsletter, or call (number in above article).

Dear Earl,

I received my set of back issues last week and have very much enjoyed finding out what is going on with KR's. My -2S is almost at the boat stage; upside down on the table with part of the bottom skin on. This, together with stabilizer spars and scratch built tail hinges, represents about 140 hours over the last nine weeks. Making the six hinges took at least twenty hours just learning how to accurately bend 0.125 aluminum. The scrap pile is already large.

I believe that I found a better way to put together the fuselage trusses; I know that none of the newsletter issues discussed this method.

I used small wooden wedges to provide all of the clamping pressure for the truss structure. In order to use this method, I did the following:

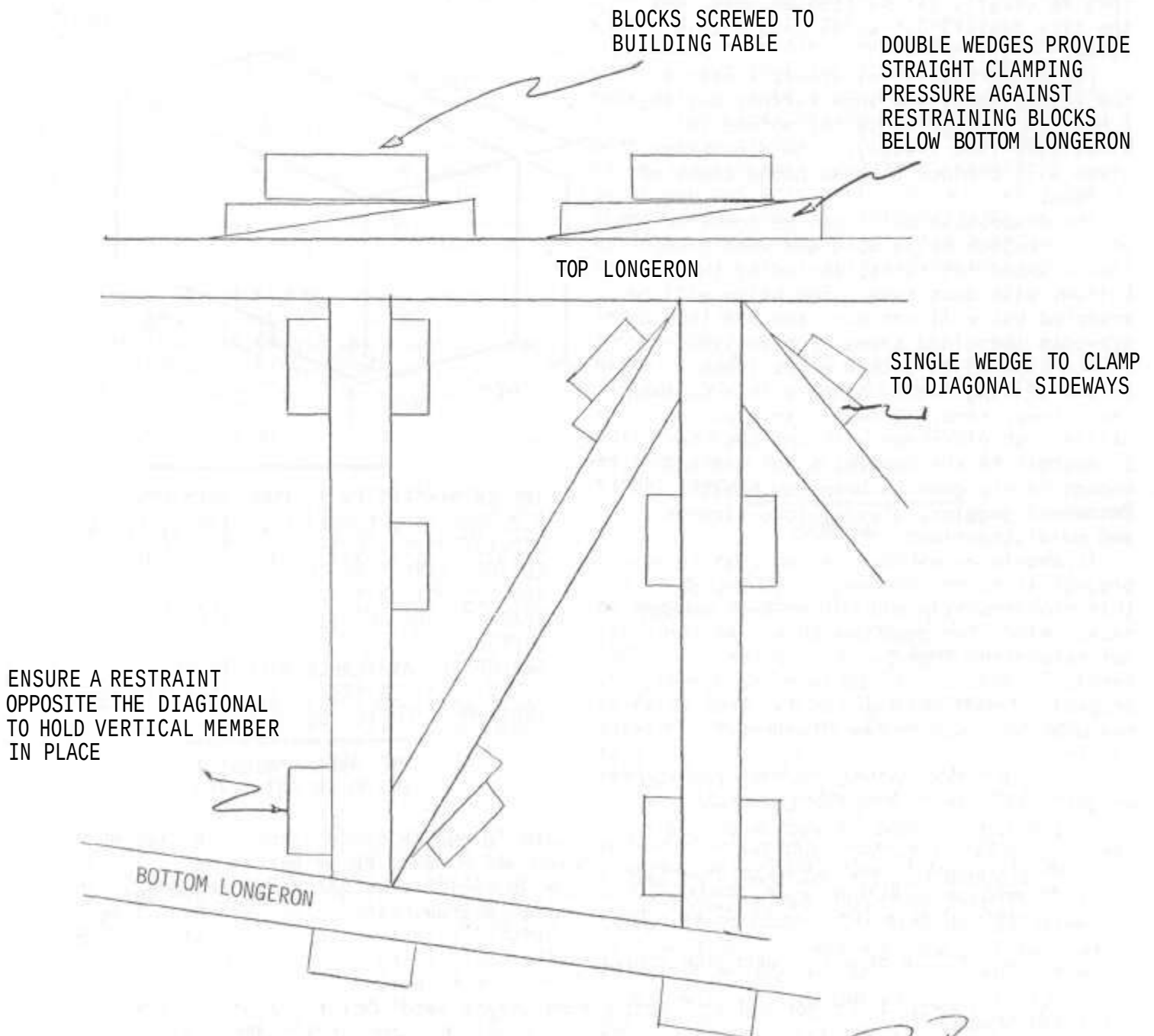
1. Lay out on the table several long pieces of 1 X 1 to define the top longeron. It should be straight and slightly longer than the fuselage length. Attach these to the table with any reasonable sized self-tapping wood screws (short drywall screws are excellent).
2. From this reference line, lay out the points that define the bottom longeron with a carpenter's square. At each of the six points that define the bottom surface, attach a small wooden block with a single screw. This block should be allowed to rotate slightly as the bottom longeron is bent into shape.
3. Bend the lower longeron into shape, adding additional blocks of wood as necessary to maintain the proper curve. When this is finished, there should be one restraining block directly below the location of each vertical. These blocks should be thinner than the 5/8 truss material. This will allow easier measurements later.
4. With the top longeron against the reference, begin cutting and fitting the vertical pieces of the truss. Attach blocks of wood as necessary to insure that these pieces are restrained. The attached sketch shows a suggestion of the placement. These blocks serve to hold the truss pieces, provide a positive placement for the next fuselage side, and provide a bearing surface for the clamping that will come later.
5. After all the vertical pieces have been fit, cut and fit the diagonals. There should be a gap between these pieces and the wooden blocks as shown on the sketch. This gap will allow a small wedge to provide the necessary clamping pressure.
6. Now remove the long reference pieces that you installed in Step 1. Mark them for the proper location and set them aside. You will re-install them later for the second side.
7. Directly above each vertical piece of the truss, attach another wooden block about 1/2 inch from the top longeron. Two wedges will fit in this gap to provide all the clamping pressure needed.
8. Prepare enough wedges to fit in all of the necessary places. I used about 40 for my layout. They should be about 2-3 inches long and about 1/2 inch thick.
9. Set all wedges in place and clamp the structure as a test. Make all necessary adjustments at this time.
10. One at a time, remove the vertical and diagonal members of the truss and glue them in place (don't forget the waxed paper). When all of the pieces are glued, insert the wedges. Tap them in place gently with a small hammer. With this setup, you can obtain anywhere from a few ounces of pressure up to many pounds.
11. Repeat from Step 1 to build your second side.

On my project, I did not add the reinforcement gussets until after the plywood sides were on. In this way, I believe that there is less excess glue to clean up from the joints.

This layout method was reasonable quick, very cheap, and extremely accurate.

As one last building tip, I discovered a good way to save the mixing tube from my T88 epoxy gun for later use. One of the attachments that came with a small electric tire pump is a fitting intended to be used for inflating beach balls and inflatable toys. It just fits inside the end of the T88 mixing tube. I use the electric tire pump and this attachment to blow the excess epoxy out of the tube. Put the tube in a plastic baggie and store it in your freezer. The small amount of leftover epoxy does not harden and you don't have to contend with the tube full of fro/cn glue the next time you want to use it.

Donald Reid
Rt 2 Box 3275
Bumpass, Va 23024



Don Reid

CASTING KR KOUNTERBALANCE WEIGHTS

After building the KR ailerons, it's necessary to bolt on about three pounds of lead to the counterbalance arm and static balance the entire assembly. It's also necessary to chop a hole in the bottom wing skin to allow travel of this trotline anchor.

Buying lead shot at the local arms dealer makes for very expensive KR parts. Before hauling your billfold up to Joe Bob's recreational firepower emporium, consider stopping by the place you buy your tires. Most shops will be happy to let you haul off six or seven pounds of used tire weights for little or nothing. They're usually filthy (the weights, not the tire dealer) but we'll handle this later.

For my particular ailerons, I needed the weight about one inch further out than I had arm length, hence the molded in place step (see sketch). The dimensions given will produce a three pound chunk of KR part.

The disposable molds can be constructed of eighth-inch balsa wood and wood glue, then wrapped two turns, including the bottom, with duct tape. The balsa will be scorched but will not burn and the tape prevents the glued seams from failing.

You'll need to gather a few items before melting lead. Along with a Coleman camp stove, secure a small, iron pot or skillet, an old spoon with the bowl bent 90 degrees to the handle, a hot pad and enough safety gear to keep you healthy. **Recommend goggles, gloves, long sleeves and no distractions.**

It should go without saying that this project is to be done outdoors, so, do this chore outside and not on your wooded deck. Also, for good health's sake, do not return the iron pot to kitchen service. And, as it was in my case, it's probably a good idea not to let your wife see what happened to her "favorite" serving spoon.

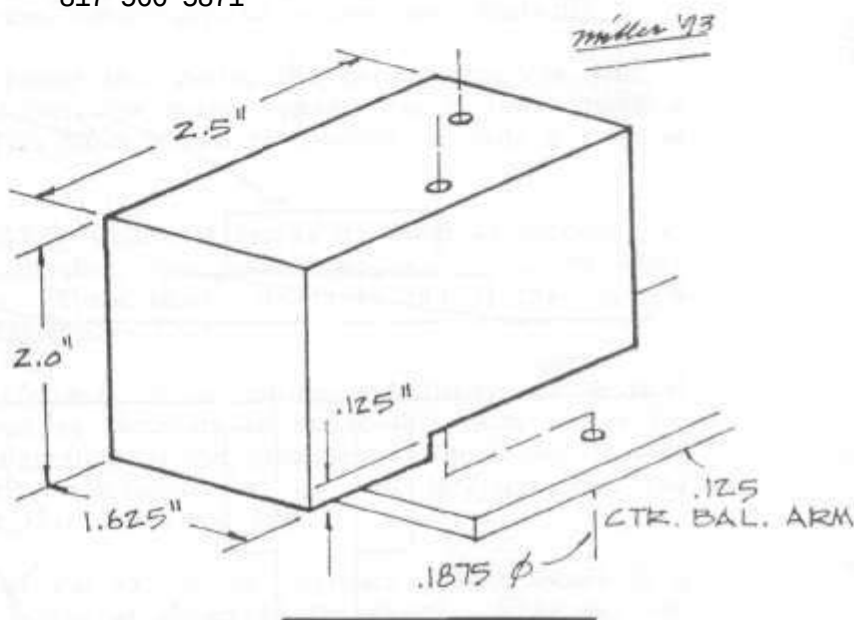
Put enough lead in the skillet for two weights, allowing extra for the wheel clips and some excess. I was surprised to have molten metal in 5-7 minutes!

Use the spoon to pick out the clips and to skim off dirt and crud. Be cautious. Any moisture, perspiration, lawn sprinkler or rain will cause your heart to skip as the molten metal pops and splatters. A coffee can is a good container for the hot clips and trash.

Pour the metal into the molds and allow to cool. I taped the molds inside an empty pizza box to prevent them from tipping over and to catch any spills. Was a good idea.

Two AN-3 bolts were used to attach the weights to the arms. If you plan any streamlining, remember that the lead shaved off or drilled out will alter the overall weight and could upset the balance. Perhaps a bit of shaped foam and fiberglass would work as a fairing.

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871



THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

2ND ANNUAL MIDWEST TOLEDO KR GATHERING

The Toledo KR Group is hosting the 2nd Annual Midwest KR Gathering in conjunction with EAA Chapter 582's Fly-in on July 10-11. Awards, banquet on Saturday, July 10. Special rates and shuttle available from the Comfort Inn South (419-666-2600, mention KR Gathering). Metcalf Airport (TDZ), Toledo, Ohio.

For more information, contact:

Ron Smolinski
419-882-8478

FOR PLACEMENT ON DOOR TO KR WORKSHOP

SUBMITTED BY CALVIN CAMPBELL

KR2 WORKSHOP
WARNING / PRECAUTION

This is a public notice to all who enter here. It is common courtesy to notify of hazards related to work areas.

This Workshop contains the following Hazards:

1. KR2 pilots with true stories of unbelievable moments.
2. Tales of building and flying oversized toy aircraft.
3. Harsh working environments ranging from activities associated with the following:
 - a. Cutting and grinding of Steel and Sheet Metal
 - b. Sawing and sanding of wood materials
 - c. Mixing and sniffing of glues and resins
 - d. Striping and painting of various parts
 - e. Assembly of items involving grease, oil, and adhesives
 - f. Testing and breaking of engines, aircraft and tools
 - g. Swearing and other harsh language describing certain specific events.
 - h. Borrowing and usage of anything attached, not bolted on, laying around, or needed from other aircraft, without regard to ownership.

Disclaimer

It is not the intent of the builders or pilots to spread this type of infliction to other unsuspecting victims, however, the inhabitants herein have become accustomed to these daily activities and are not aware of their abusive nature.

In fact they are so immune to the problems associated with this particular illness that after hours of indulgence they no longer recognize the habitual life style it has created.

The participants are known to talk very flowery of this behavioral life style as though to influence other persons towards its unescapable grasp. The unsuspecting inquirers have sometimes traveled for miles to see this rare phenomena and were unable to escape the relentless fever contacted here.

The activities of the inflicted victims produce the following side effects for which no cure has been discovered:

- a. Annual trips to Oshkosh Wisconsin to attend EAA sponsored activities and events.
- b. Annual trips to a KII2 flyin which changes locations each year for whatever the reasons may be.
- c. Excessive usage of family finances, aircraft fuel and time, in ferrying aircraft to various airshow activities.
- d. These victims will be identified by their continual appearance at this facility.

ENTER AT YOUR OWN RISK !!!

FOR SALE

KR-2 N24TC \$7,900.00. Built by Tom Criss
220 T.T., 2100D Revmaster, stock gear
flaps, 22 gal fuel, 570 lbs empty. It's
the KR-2 Rand Robinson used for It's ads.
Flies great but too small for me.

Hep Porter
Box 3147
Gardnerville, NV 89410
702-782-4276 h
702-782-2884 w

WANTED

VW engine mount and clear canopy for KR-1.
Call or write:

Bob Quinn
28 Parker St.
Charlestown, MA 02129
617-242-3123

FOR SALE

KR-2 flown 1981 through 1988, 1918 cc,
trl gear, needs canopy work and some
finish work \$6,200. Contact:

Ken Wanagus
P. O. Box 99
Hebron, IL 60034
815-648-2834 evenings/weekends

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 192 MAY, 1993

FOR SALE

KR-1, 275 t.t. built by A.M.E. (aircraft
maintenance engineer). Flies hands off.
Engine removed. No engine mount. 52 x
52" Sterba propeller with 35:00 t.t.
available for \$150.00. EGT-CHT oil
pressure and temp, gauges, no radios.
Always hangared, no damage history. Price
\$5,000 U.S. Ready for engine
installation. Will ship anywhere in
Canada or U.S. Airplane located in
Montreal. Call:

Richard Roberts
514-457-4643

WANTED

I would like to hire someone to build my
wings and tail for me on my KR-2. All
woodwork is done on the fuselage and tail
and spars are done. I don't do good
fiberglass or foam work and would like to
have someone else help me with that part.
I am looking for someone within reasonable
driving distance of Chicago area where I
live. I can deliver and pick up with no
problem.

Bruce Krist
16955 Lincoln Ave.
Hazel Crest, IL 60429
708-335-0820 work
708-335-0829 home





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



WAYNE HEISLER'S KR-2S, FT. MYERS BEACH, FL

Wayne Heisler's KR-2 Stretch drew a big crowd and a great amount of interest at this year's Sun N'Fun Gathering. The 1993 Sun N'Fun was a huge success with about 70 people showing up to enjoy the food, fun and fellowship. Many door prizes were passed out. Steve Alderman from Colorado won this year's Sun 100 air race in his class with a speed of 205 mph.

Cont'd page 2

Steve broke a crankshaft on his Continental C-85 on his way home. He landed safely and left his plane along side a road near Pine Bluff, Arkansas. He planned to go back with a new short block and fly it out (even Continental's have troubles).

Martin Roberts, past winner of the Sun 100 race, blew a cylinder on his KR-2 and had to set down at the airport so was not able to race.

A big thanks to goes to Virgil Salisbury for all his efforts! Thanks to James Gochnauer and Dan Diehl for supplying info along with additional pictures of this gathering.



**STEVE MAKISH, FT LAUDERDALE, FL
N841SM, KR-2 TYPE 4 POWERED**



MARTIN ROBERTS, TULSA, OK, N191MR KR-2

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

1993 KR GATHERING

The 1993 KR Gathering in Covington, Tennessee will be September 17, 18 and 19. The host hotel is the Best Western Inn, 873 Highway 51 North, Covington, TN 38019. 901-476-8561. Make sure to tell them you are attending the KR Gathering and they will give you a reduced rate of \$38.00 one bed or \$43.00 for two beds. Make reservations by August 17.

The awards dinner will be Saturday night at 6:30. You should sign up for the dinner at the registration table no later than Saturday morning at 10 a.m. For more info, contact:

Max Calkin
501-426-5307

or Chuck Grammer
601-686-4491

**L TO R- KATHI SOBEK, DAUGHTER OF JEANNETTE
RAND, DAVE MARTIN, KITPLANES EDITOR,
JEANNETTE RAND, VIRGIL SALISBURY,
ORGANIZER OF THE KR DINNER IN LAKELAND**

Tuning Is Everything

How to time the magneto in your VW sky motor

By Richard Kunc

Man, there's an ever-growing gang of nifty Hying machines out there sporting VW-based engines. Over the years, the tough little VeeDub has come a long way. A decade ago, "smart guys" with typewriters were sanctimoniously poo-pooing the gutsy little mill, warning us that death and destruction awaiting all who dared leave the planet behind anything but a certified engine (whatever *that* means). AH ye will now bow reverently to the almighty high-priced brand. These days, the well-made VW aero engine has a very respectable record of high reliability and long, faithful service.

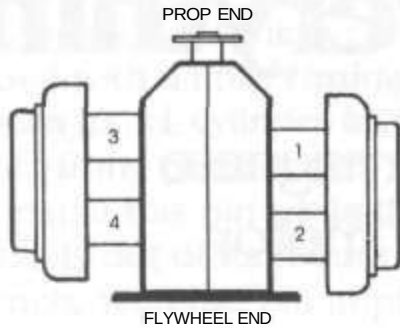
The mighty Teutonic four-banger needs proper setting up and intelligent maintenance, just like the big ones. One of the best ways to shorten your VW's life to practically zilch is to run it with the wrong ignition timing, especially *too much* advance.

You may see more RPM on a dyno by goosing the ignition timing ahead, but you'll pay for it in higher spark plug temperatures accompanied by detonation and quite probably pre-ignition, too. Translation: broken metal and dollars in the dumper. But no sweat. This article deals with the **Slick 4016, 4216, or 4316**, but the same basic ideas apply to other magnetos, too.

The starting point

The first thing you have to do is accurately determine where the **Top Dead Center** position of your crankshaft is. And before you can do that, you have to know **which cylinder is #1**. Sound just too basic for words? Well, over the years, various "makers" of various VW conversions have used various cylinder numbering systems for various reasons. We're gonna use the pattern shown because it allows you assign the magneto's #1 plug

CONT'D PAGE 4



lead (marked on the harness cap) to a plug that allows the magneto to sit pretty much upright on its mount, with the right-length wires going to the proper plugs. VW car manuals use a different cylinder number assignment, but it makes no difference in performance.

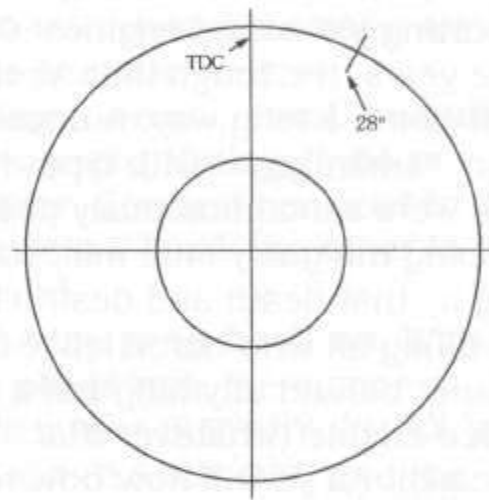
Remove the spark plugs. It makes the engine easier to turn over. **Remove the prop, too.**

Now bring piston #1 to TDC (Top Dead Center) by finding the highest position during its **power** stroke, the stroke with both valves shut. Put your thumb over the spark plug hole. When you feel compression, it means the piston is coming up on its compression stroke. To find the *exact* TDC, use a plastic pen or something to feel the movement of the piston through the plug hole. Don't use anything metal. You can ballpark TDC within a few degrees that way, or you can use a fancy dial indicator to get REALLY close.

The timing template

Now you need to mark your prop hub with two important points: TDC and your optimum timing advance mark. For the VW, it's generally agreed that 28° TDC is about right. These points are easily determined with a simple template made from a manila file folder.

Draw a circle the same diameter as the outside of your prop



hub, usually 5". Then draw an inner circle the size of your hub's pilot flange, usually 2". Draw one straight line vertically through the exact center. This will represent TDC (and, incidentally, BDC). Now use a protractor or your flight computer or a plotter to locate the 28° BTDC position. Remember, the venerable Vee-Dub turns *clockwise* as viewed from the front. Cut out the inner circle, then the outer circle until

you end up with a manila doughnut with two lines drawn on it.

Now let's mark the hub

Double-check that your #1 piston is still right at TDC. We use the engine case split line as a reference. See the little rectangular tab at the split line, right at the top center of the case? This is a good place to clamp a mat knife blade or something similar so the cutting edge rests on the outer edge of the hub.

With the crank right at TDC, tap the knife blade with a hammer to make a mark on the edge of the hub, indicating the official TDC position. Now slip your manila template over the prop hub's pilot flange and secure it to the hub face with scotch tape, carefully aligning its TDC mark with the one you just made on the prop hub.

Now rotate the crankshaft counterclockwise until the 28° mark on the template is right under the knife blade. Mark the hub as you did with the TDC position. Once you're certain these two marks are in the correct locations, use a fine file to deepen the marks. A little clear plastic or nail polish will keep them from rusting.

Slick Basics

The *Slick* 4000 series of magnetos for VW-based engines have been the mainstay for years. They're excellent little guys with a great track record.

Since the VW-based aircraft engine turns its prop in the opposite direction from props on "other" engines, the magneto also turns funny.

Also remember that the *Slick* is *geared* inside. This is important to understand. It means that, **standing behind your engine** and looking at the magneto's harness cap, the distribution of spark follows a clockwise pattern as the prop turns counterclockwise. It *also* means that each time the crankshaft turns 360° the magneto's distributor turns only 180°.

With the harness cap right-side-up, notice the number (D next to the top right spark plug wire at about 1:30. Using the standard *Slick* M2266 harness, this wire will go to the #1 plug, at the prop end on the distributor hole side of the engine. Plug #2, just behind #1, is fired next by the wire at 4:30; then #3 (prop end, other side) by the wire at 7:30; and finally #4 by the wire at 10:30. Simple, huh?

OK, Time to time

The *Slick* VW magneto comes equipped with a little **timing pin** that locks its #1 cylinder terminal at its firing position. It's easiest to install this pin while the magneto is out of its mount, on the bench. With the pin in place, you need only reinstall the magneto to get the timing pretty darn close. Here's the drill.

Remove the wiring harness cap from the back of the magneto, and locate the two timing pin holes inside, marked "L" at 12 o'clock and "R" at 6 o'clock. **Since the mag turns "right," insert the pin into the "R" hole.** Rotate the magneto's coupler backwards to avoid engaging the impulse coupler. Since it takes two turns of the coupler to turn the distributor one turn, you may have to go round and round until the pin finds the hole. Be gentle. Ease the pin in. If you meet resistance, twist the coupler back and forth just a bit until the pin slips in further. All of the thinnest part of the pin's shaft should go home. Now the #1 terminal is locked at its firing position. Leave the pin in.

Reinstall the magneto in its mount, being sure all parts of the coupling mechanism interlock correctly. Gently rotate the magneto clockwise just a snicker

until you feel all the slack taken out of the coupling. Turn the hold-down bolts finger tight.

NOW REMOVE THE TIMING PIN FROM THE MAGNETO! Boy, will you ever hate yourself if you forget THIS little step!

Fine-tune & double-check

By golly, doing the timing pin business will put the timing pretty close to bang-on, but now you're gonna tweak it to a fare-thee-well. Just remember, we tune because we care.

Beg, borrow, steal, or build a magneto timing light or buzzer. Connect one lead to the magneto P-Lead, the other to ground.

Put the **prop back on**. With the **plugs out**, the magneto switch "on" BUT ANY OTHER IGNITION SYSTEM OFF, and the timing light or *buzzer* hooked up, rotate the the prop slowly until it JUST passes the point at which the impulse coupler releases. You'll hear a big loud "clack" when it lets go.

Turn the prop backwards to *just before* the 28° BTDC timing mark. Don't go back enough to reengage the impulse coupler. Piow turn the prop in the normal direction, a tiny bit at a time, until a change in your light or buzzer tells you the magneto

points have just opened. STOP!

Eyeball the 28° mark on the prop hub. Is it lined up with the case split line? Mo? Rotate the magneto a corresponding snicker and check the timing again. Do this until everything reads kosher, and then **tighten the magneto.**

Before you put the plugs back in and button things up, spin the prop through several revolutions and then recheck the timing one last time. OK? You sure? Then you're done.

Ancient history

The magneto is old-world technology, an anachronism, a dinosaur, a relic of a bygone age. One was found in the ruins of Pompeii. Alexander the Great credited the magneto with getting all those elephants across the Alps. The Marquis de Sade had an entire room devoted to strange applications of the **magneto.** never mind.

These days, electronic ignition is very much in vogue. But the old magneto will be around for a long time to come. Remember that the incorrect setting of AMY kind of ignition system will bring the same results: a hurtin' engine. And if it unravels at altitude, it'll ruin your day. 

Richard Kunc now flies the much-modified KR-1 "Spitfire" featured in *Sport Aviation* for February 1990. Before that, he had a KR-2. Over the years, Richard has contributed many articles to the aviation press. He is currently the director of communication for Preceptor Aircraft Corporation, makers of the VW-powered **N-3 Pup** and the **Ultra Pup**.

QUESTIONS

1. Which is the simpler retrofit to retractable KR-2's. The Diehl aero or R-R (both conventional).
2. What's the downside of using a long/taller tailwheel springbar to enable seeing over the nose during taxi and landing?
3. It seems installing pitot and static parts on outboard of wings would add complication to rapid removal and installation of wings. Has anyone tried other locations with and success?

Call after 6 pm weekdays or all day weekends at 909-798-4815 (CA) Gary Gable
Call collect or I'll call you right back to save you toll charges. Thanks!

FOR SALE

- 2 ea. -• 32mm Posa Supercarbs \$40.00 ea.
- 2 ea. •- NACA vents, adjustable opening
Wicks Cat.# NACA-1 New in box
w/instructions \$15.00 ea.
- 1 set - Volkswagen Type 1 cast aluminum
valve covers w/attach hardware
\$15.00 ea.
- 2 ea. - Altimeters- One has adjust knob
@ 7:00 and the other @ 10:00.
Possibly repairable. Will let go
for a long a dance plus shipping.
- 1 ea. - Slick 40 Ib magneto
Good working condition \$150.00

Mike Ladigo
6822 S. Toledo, #421
Tulsa, OK 74136-4718
918-495-3662

FOR SALE

1989 KR-2 RG, 135 TTAE, factory built
2180 cc Great Plains engine with accessory
package, Ellison throttle body carb, full
gyro panel, new Narco radio and Mode C
transponder, Diehl wing skins and super
tips. Too many options to list. New baby
forces sale! \$15 K invested. Call or
write for details:

Brad Cummings
10330 Crosscreek Ter.
Sand Diego, CA 92131
619-578-8481

WANTED

Fixed tri gear for my KR-2. Please call
or write to:

Charley Sanford
3102 Markridge Road
LaCrescenta, CA 91214
1-800-200-4867 in California
1-818-957-4283 outside call collect

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 193 JUNE, 1993



KR NEWSLETTER

ISSUE NO. 194

JULY, 1993



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



REESE DANIEL'S KR-2, N723RD, TEXAS

Three Romeo Delta took to the air for the first time at 11:10 a.m. on June 24, 1993 after about four years of construction.

I had been inspected and signed off about a week earlier, however, due to the inevitable last minute problems and a week long low pressure area, I waited to fly until all the elements were right.

Cont'd page 2

I probably made every mistake you can make on a first flight and still had a fun and successful first flight. I had not flown an aircraft for over ten months and the test flight of my KR was my first flight in a small, short coupled airplane. Believe everyone when they tell you that a KR-2 is pitch sensitive, they really are!!

My plane is a tri-gear version (Diehl Tri-Gear) with Dan's wing skins. I have an 1835 VW that I built myself from a kit supplied by Steve Bennett of Great Planes Aircraft. I have a deluxe VFR panel with a KX-170B nav-com and a Terra transponder. I used Matco brakes and master cylinders.

Enough of the background, let me tell you about the initial test flight. There is just one thing that I must say before I go into the first flight and that is "eat your heart out, Monte Miller", Monte and I have had a good-natured competition going to see who would fly first and I have to admit that I would not have been able to fly first without all of Monte's help. That's what KR building is all about. THANKS MONTE, YOU ARE A REAL FRIEND!!!

It was hot under the bubble canopy and I had been taxi testing all morning. I lined up on runway 17 at Aero-Country and said, "What the heck, it has to be cooler at 2500 feet". Firewall the throttle and try to stay lined up. Watch the airspeed indicator for rotation speed. Whoops, this baby is flying. I tried to remember to use left rudder but I was too busy with the pilot-induced oscillations and the thermals around the airport. Rate of climb was 800 FPM at 80 MPH. Lower the nose to 90 MPH and I had 500 FPM. Everything was in the green except the pilot's blood pressure, which was way past redline.

When I finally reached 2500 ft. MSL, I knew that this was a much better airplane than I was a pilot. I cruised around north of the airport and got the feel of the airplane. The only way I can describe it is, "quick and fun". I had a hard time believing that I had built this aircraft and that it was really flying. I was surprised to discover that I had been up for almost 45 minutes when I started to think about landing this thing. The take off had been a real adrenaline pumping experience so I had no reason to believe that the landing would be any different.

I cruised back to the airport at about 145 MPH and set up a pattern. I had 90 MPH on downwind and carried 80 MPH through final. Let me tell you, 80 is too fast. I put the nose down once to line-up and saw 120 MPH. Well, this approach is shot, so I went around. Smaller pilot induced oscillations this time and everything was feeling better. This time I had 90 on downwind, 80 on base and 70 on final.

My first landing in a KR was nothing to brag about except that I walked away from it and didn't damage anything. I really should get credit for three landings because I ballooned and bounced three times before I planted it.

I taxied into the FBO and gave them my best test pilot grin and opened the canopy. I am sure that they thought that I was just sitting in the plane because I was proud. They were half right, I wanted to let my legs settle down before I got out. Couldn't have old Chuck Yeager Daniel standing around on shaking legs, could we?

In retrospect, the first flight of my plane was pretty typical of all the first flights in the Newsletter. The plane is fun, fun, quick and pitch sensitive. Be ready for all of those and you should have a successful first flight.

By the way, Monte, you still owe me that beer. Thanks buddy.

Reece Daniel
5576 Squires
The Colony, TX 75056
214-625-7619 after 6 PM

FOR SALE

KR-2 project, fuselage and wing spars basically completed. Make offer.

Joel Prescott
3632 Decora Circle
San Marcos, CA 92069
619-598-0310

TIMING PROCEDURE

I was impressed by Richard Kunc's article "Timing is Everything" in the June 1993 issue of the KR Newsletter. I believe, however, that one point in his timing procedure needs some amplification. On page 4, he describes a method of locating TDC (top dead center) which I believe is unreliable. Because the crankshaft throw is traveling at a right angle to the direction of the piston travel when the piston is near the TDC position, several degrees of crankshaft rotation can occur with very little perceptible movement of the piston. Because of this geometric relationship, attempting to determine TDC by establishing the uppermost travel of the piston is impossible to do with any degree of accuracy.

The addition of a few steps will help to accurately establish TDC of any engine. First, rotate the engine so that the number 1 piston is near the BDC (Bottom Dead Center) position of its travel. Insert whatever indicating device you are going to use to determine the position of the piston. This device should be positioned so it will indicate the piston position some distance BEFORE reaching TDC.

Second, rotate the engine in one direction. I'll use a clockwise direction but either will work. Continue to rotate the engine in a clockwise direction until the indicator registers a reading that indicates the piston has reached a certain point in its upward travel. I prefer to use a dial indicator here, as any reading of the dial can be easily and accurately duplicated in the next step of this process. A temporary location mark should now be made on the flange. You can mark on tape wrapped around the edge of the hub or on a template as described in the article.

Third, rotate the engine in the OPPOSITE direction through the BDC position. This would be counter-clockwise in our example. Stop exactly on the same reading obtained in the second step above. The piston is now in exactly the same position of its travel as it was in step 2 but the crankshaft is on the opposite side of its circular path. Make a second temporary mark on the flange as you did in the preceding step.

TDC can now be accurately determined by establishing the mid point between the two temporary marks. I agree with Mr. Kunc that it is important to accurately establish TDC for proper tuning of any engine. By adding these few steps to his description you should have your engine purring with accurate ignition timing.

Dick Kenfield
11808 Crawford Road W.
Hopkins, MN 55343

1993 KR GATHERING

The 1993 KR Gathering in Covington, Tennessee will be September 17, 18 and 19. The host hotel is the Best Western Inn, 873 Highway 51 North, Covington, TN 38019. 901-476-8561. Make sure to tell them you are attending the KR Gathering and they will give you a reduced rate of \$38.00 one bed or \$43.00 for two beds. Make reservations by August 17.

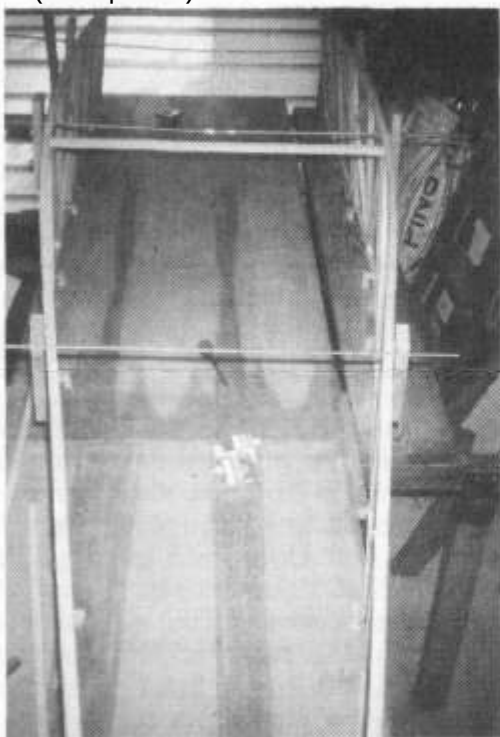
The awards dinner will be Saturday night at 6:30. You should sign up for the dinner at the registration table no later than Saturday morning at 10 a.m. For more info, contact:

Max Calkin		Chuck Grammer
501-426-5307	or	601-686-4491

WING SPARS/LONGERONS

We are building a KR-2S and are using some methods that may be of interest to other builders. Our fuselage is 90% complete and we have just closed our wing spars. Although not written anywhere, we have completely enclosed all wing spars with birch plywood webbing at Jeanette's recommendation.

We were made aware of the problem of top longerons bowing up off the table when the fuselage sides were clamped into position for gluing the bottom cross members. At the suggestion of a Chapter 240 EAA member, we clamped the top longerons very tightly to the table in six places (see photo).



The bottom fuselage was then slowly brought into position over a period of five days. Tiny plumb bobs made of fishing sinkers were hung at several places along the fuselage always with two plumb bobs opposite each other on both sides of the fuselage. At each location of the plumb bobs, a series of lines were drawn each one half inch closer to the center line. As the clamps were tightened, it was possible to know that each side was moving an equal amount toward the centerline thus maintaining a square structure. When the bottom longerons were in position the top longerons had twisted slightly and were bowed up off the table less than one half inch. One cautionary thought, however, the forces are tremendous and if the table is light plywood they will bend the table more than one half inch.

When ready to glue the bottom cross members and their gusset blocks, it appeared that clamping all of those parts sticking up in the air would be both very difficult and require either an inordinate number of clamps or take about one day for each cross member using all of the small clamps we had available. We took a different track. I drilled a # 2 hole in each gusset block from the flat unglued surface into the point. Be very careful to drill these holes straight on both axis as an off angle hole will pull the gusset block up crooked after the glue is applied. Cross members and gusset blocks were then assembled using # 2 round head wood 7/8" long screws. Hold the gusset block tight and simply screw the screw into the longeron. Screw up the wide angle gusset block first as the taper of the fuselage will keep the cross member in position. After fitting all cross members, it is time to mix glue. Disassemble each cross member and its gusset blocks, spread glue and reassemble again being careful to put wide angle gusset blocks in first. The glue is a terrific lubricant and since the parts are so slippery, it is impossible to do a good job without getting a lot of glue on your fingers. While the preparation may seem like a lot work, I was able to glue up a complete set of bottom cross members and their gusset blocks in one afternoon.

CONT'D PAGE 5

After the glue was set, I removed the screws and filled the holes with round hard wood toothpicks that are just slightly smaller in diameter than the #2 holes. To fill the gap to completely fill the screw holes I used epoxy filled with wood dust saved from sanding jobs. Flox would be equal or better.

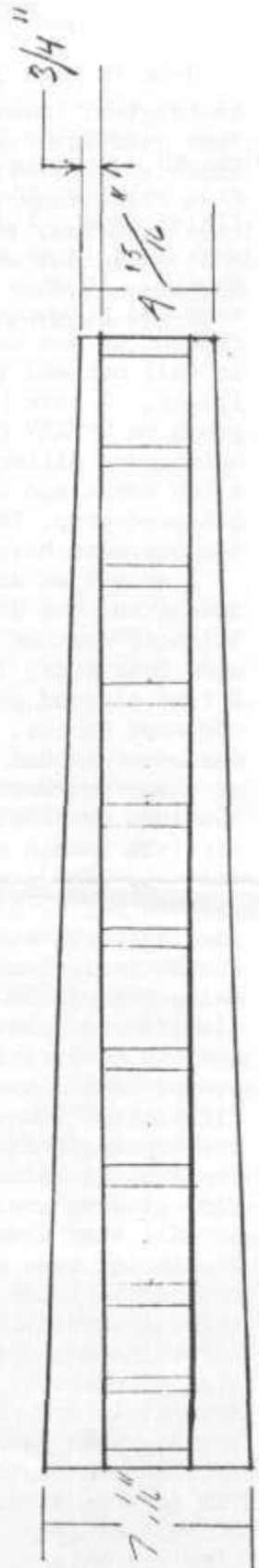
Each spacer of the outer forward wing spars will be of a different length and have a beveled cut at each end if made as drawn on page 21 of the instructions. This could be very difficult and result in a curvy spar if spacers are not the proper length. The KR-2S had either Dan Diehl's wing skins or new wing skins to be available from Rand Robinson. In either case the height of the spar tip is reduced from $5 \frac{1}{4}$ " to $4 \frac{15}{16}$ ". I calculated that if you change the $11/16$ " height of the spar cap to $3/4$ " the entire taper can be taken in the caps and all spacers are the same height ($3 \frac{7}{16}$ ") and square on the ends making it very easy to get a good fit with full contact between the spacers and the caps (see sketch) We cut the tapered caps on a table saw using a fixture almost like one shown in a newsletter for cutting the tail spar tapers.

Bob Wetzel
P. O. Box 313
Chestertown, MD 21620
410-778-5058

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

OUTER FORWARD WING SPAR



PROP BALANCER

Here in Nova Scotia we don't fly much in the winter, in fact, I don't fly at all. I use the time to do maintenance on the KR. Here is a drawing of a simple prop balancer that goes back to my model flying days. I didn't know if it would work on a large prop but thought it should. It only took me an hour or so to make and it works great. Until now I thought it was natural for your eyeballs to fall out and your teeth to chatter in flight. I have had several different props on OFKEV over the years and didn't notice any difference in the engine until a few weeks ago when I tried my newly balanced prop. The other props were all new but must have been out of balance.

I am not an artist and I hope you can understand the drawings. This balancer cost me nothing because it was made from scrap I had around the house. I find plywood good because it is straight and easy to cut. I have included measurements but you can make it any size or shape you want as long as the angle aluminum or steel at the top has a straight smooth edge for the round rod to roll on. You can place a flat piece of plywood on top of the angles and level it, in all directions, with the wood screws at the bottom. Your prop must be able to swing through 360 degrees. I used an aluminum rod that was a little too small for the center hole in the prop hub. I wrapped duct tape around the rod until it fit tight. I wasn't sure that was good engineering practice but it worked. When the prop is balanced you will be able to stop it anywhere in its 360 degree arc and it will stay there. I balanced mine first by placing tape at various places on the prop until I got it perfect. That told me where I needed to add weight or sand. I had to sand one top and add weight to one side of the hub. For weight I used several layers of fiberglass cloth and resin. When sanded and a clear coat applied you couldn't see it. It's inside the spinner anyway. BE CAREFUL YOUR PROP DOESN'T ROLL OFF THE BALANCER. Take your time and balance it perfect. Don't use paint to add weight it will just wear off.

My prop appeared to be in excellent condition and I would not have done anything with it except that I had a long winter with little to do. All kidding aside I didn't have a serious vibration problem or have to add or remove much

weight. I could not believe the difference when I first flew the plane. Next winter I will remove the prop and check it again. Everything I send in to the Newsletter I try first to make sure it works and this is no exception. I think I have solved the problem of a noisy tail wheel and stiff spring. Last summer I did a little experimenting with springs and wheels. The set up I have now works well on all surfaces and is almost silent. I want to put a few more hours on it before I submit the drawings. Again it will be simple, light and cheap to make.

(SEE DRAWING PAGE 7)

Kevin Layden
25 Pondicherry Cres.
Dartmouth, Nova Scotia
CANADA B2W-5C4
TF 902-462-5813

FOR SALE

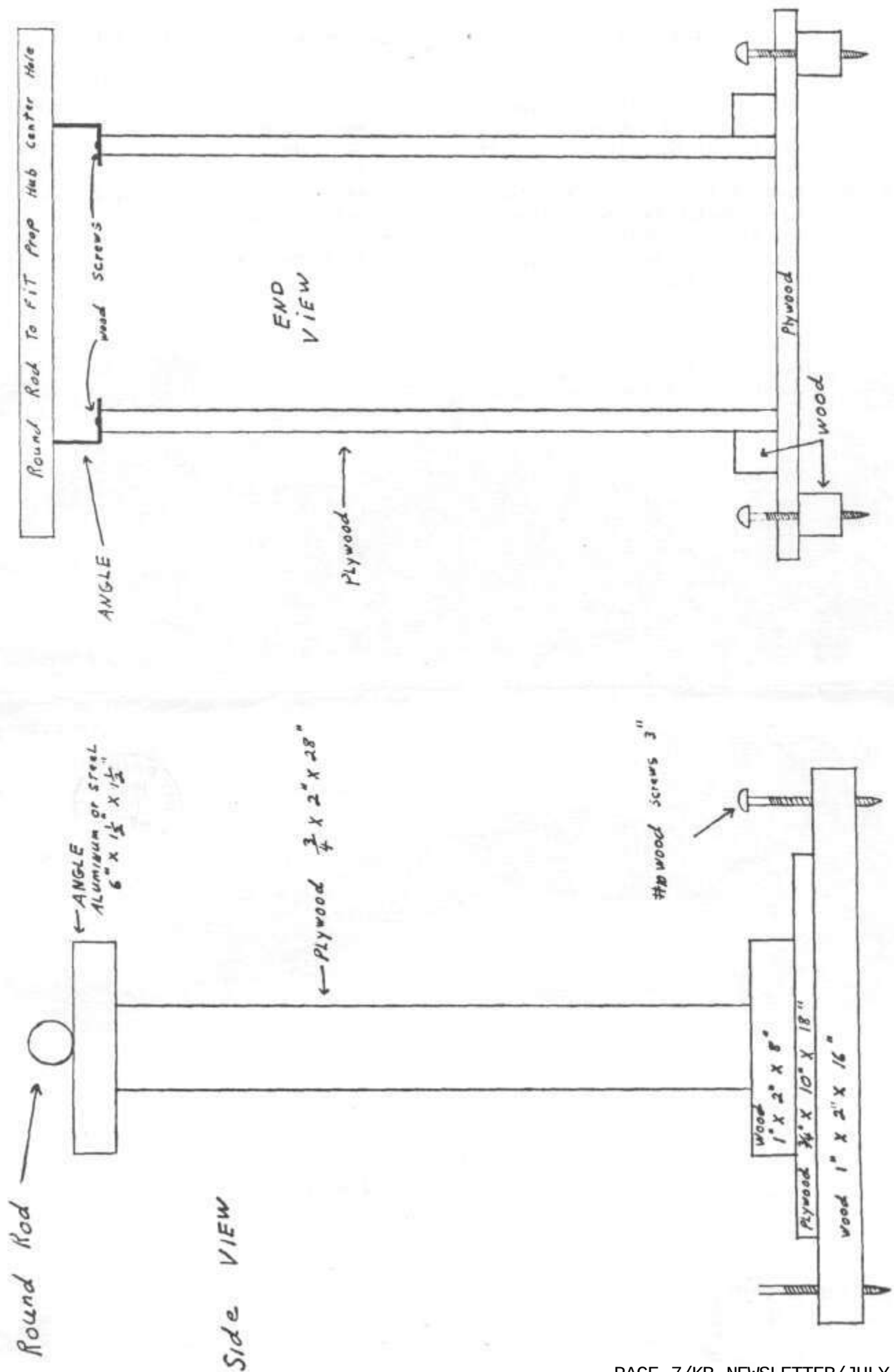
KR-2 parts, plans, newsletters, premolded engine cowl, fuel tank, wing tips, fwd and aft top decks, canopy, welded engine mount, spinner, firewall, alum, extrusion kit, wheels + brakes, etc. etc. etc.
\$995.00

Mitch Lindahl
25 Barko Parkway
Huntley, IL 60142
708-669-1718

FOR SALE

KR-2 project. About 95% complete. Traditional canopy, Diehl fixed tri-gear, hydraulic brakes, Metco wheels, Revmaster 1800, 52 x 52 prop, wings finished with wing tanks, some instruments, Rand upholstery. \$4,500.00

Chuck Singer
331 Royal St., S. E.
Palm Bay, FL 32909
407-724-9827



FOR SALE

- 1 set -- Volkswagen Type 1 cast aluminum finned valve covers w/attach hardware. \$15.00/set
- 1 ea. - Slick 4016 Magneto. Good working condition \$150.00.
- 1 set - Seat belts, lap - 2" webbing, 55" max. length, new/never installed, by "Aircraft Belts, Inc." Belt mounts solidly to aircraft structure \$20.00
- 2 sets- Seat belts, lap -- 2" webbing, 46" maximum length, like new, by "American Safety Flight Systems, Inc.", belt mounts clip onto mounting lugs for easy removal \$20.00/set

Mike Ladigo
6822 S. Toledo, #421
Tulsa, OK 74136-4718
918-495-3662

FOR SALE

KR-2 85-90% complete, 1835 conversion, Diehl wing skins, ace. case, alternator Sterba Prop, Zenith Bendix Garb, newsletters, videos, flight instruments, dual controls, 30% primed (ready to paint), spinner, firewall forward, intake manifold/exhaust + more. \$ 6,500.00

Brent Bourgeois
609 Milling
Luling, LA 70070
504-785-8299

FOR SALE

"Bill DeFreeze" style retractable tricycle gear, includes complete R/R main gear with nose gear and plans, new, never flown. \$400.00 OBO

Ken Bauman
1425 Mountain View Dr. ,
Gooding, ID 8333JD
208-934-5677

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 194 JULY, 1993



MILLER



KR NEWSLETTER

ISSUE NO. 195

August, 1993



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



CALVIN CAMPBELL'S N792BC, TULSA, OKLAHOMA

Experimental N792BC also known as "Fantasy Flyer" has acquired eighty hours of flight time. It has proven to be both a fun source of inspiration and transportation.

During the past year it has been used as a commuter vehicle in my computer contracting business and has saved me money and time in getting home on weekends to visit family and friends.

Continued page 2

It is equipped with a Volkswagen 2180cc naturally aspirated engine, built from parts I acquired from various suppliers. A dual Bendix magneto supplies the ignition to dual spark plug cylinder heads, using automotive spark plugs. An 82 millimeter forged crank from SCAT is turning 92 millimeter pistons in the cylinders. The airspeed is truing out at 160 mph using a propeller with a 52/52 length and pitch. The fuel consumption is 4 gallons per hour when running at 1200 EGT.

It does attract a lot of attention at airports where I stop for fuel, especially when the pilot next to me is taking on twice as much fuel and not flying nearly as fast to make the same trips to the same places.

Flying an experimental and understanding the actual operation of every part on the airplane enhances both the flying and ownership experience.

Airshows continue to be a main attraction for me and the airplane draws other want-to-be experimental owners. It reminds me of the KR fever that I acquired prior to starting the project.

The most frequently asked question that I am confronted with from other pilots is how much maintenance does the plane require.

The answer goes something like this: In general aviation aircraft, they follow a scheduled maintenance program according to flight time hours and are annualized each year by certified mechanics and inspectors. The experimental aircraft seems to instill an attitude in the builder to want to tinker with the plane just for fun. This tinkering promotes a frequent inspection of the airplane as close as ten hour intervals. This has a tendency to eliminate problems before they become one. The airplane is just now approaching it's first year of operation and has been inspected more times than I can remember. In flying the tricycle gear, I have learned some techniques that are helpful in steering the nose wheel. As you load the airplane with people and baggage you decrease the weight on the nose gear as the weight decreases it allows the wheel to want to track or follow grooves and cracks on hard surface runways. I have found that during rollout from a landing it is better to complete rollout with down elevator once you are firmly on the ground. This prevents shimmy that can occur from the wheel

trying to follow the rough surface.

Always land with a touchdown on the mains and carry the nose wheel until it comes down with a decrease in airspeed, then follow with down elevator to eliminate shimmy from rough surface runway conditions.

When cornering it will be easier to turn with up elevator to decrease nose wheel pressure and require less brake to turn the corner.

The main cause for nose wheel shimmy is an out-of-balance or out-of round tire. It is very easy to bolt together an AZUZA wheel and not get it in perfect alignment. If you miss the alignment it will cause an out-of round tire problem. The AZUZA wheel does have alignment dowels, you just need to pay very close attention to aligning them during assembly.

I suggest you balance the nose wheel with some form of spin balance procedure. It is the only way to assure a balanced wheel. This can be done with a drill motor to spin the tire and initially use stick on weights for balancing. After you are balanced, it will be well worth your time to build some permanent weights that bolt onto the wheel. This wheel will operate in conditions that can remove stick on weights.

Tires, wheels and brakes are probably the highest maintenance items on this experimental airplane. They are subjected to the most severe operation of any of the parts. Beware of their condition and performance and conduct inspection of them on a frequent basis.

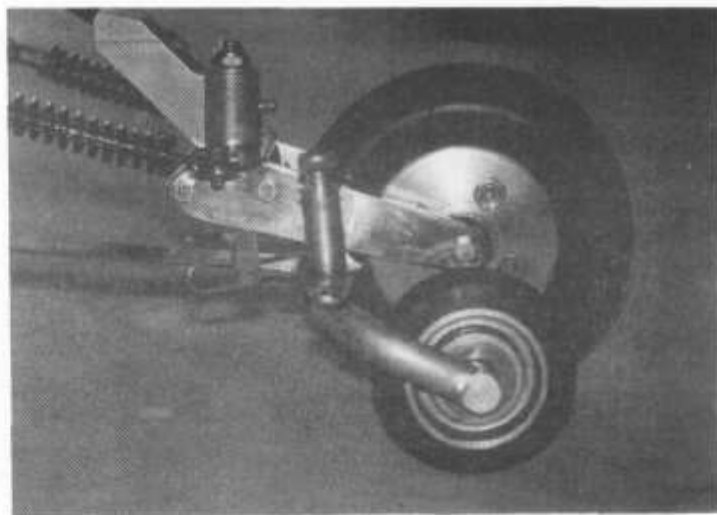
I look forward to seeing you other builders and flyers at the KR Gathering in Covington, Tennessee in September.

Calvin Campbell
P. O. Box 55178
Tulsa, OK 74155
918-299-4445

"GYPSY" N32U

This is the first of two follow-up articles I will send you concerning improvements to "Gypsy" N32U during the twelve months and 50 hours after the first flight on August 7, 1993. As I stated in the initial flight report, the aircraft has been a joy to fly with no surprises, incidents or accidents during this time. "C" mode with a Dautron (5) function and an E.L.T. have been installed to be able to go into the "big boys" airports and the engine and all sub systems have been flawless in operation except two. This article will address the most important of the two in my opinion = THE TAIL WHEEL!!

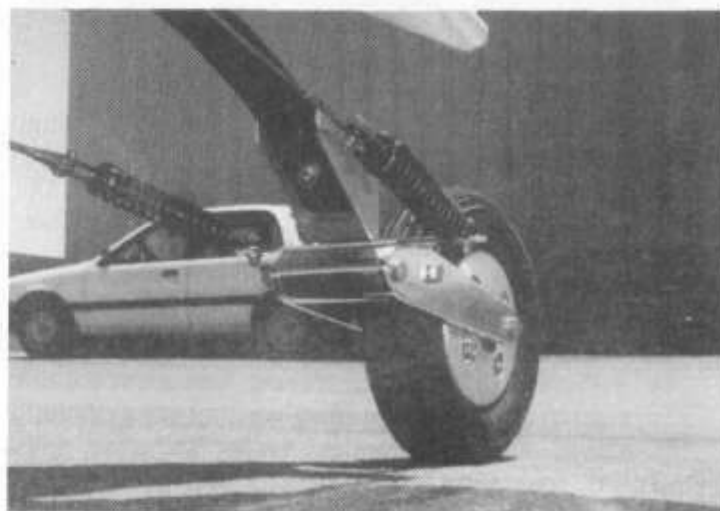
In the past two or three years I have noticed a large number of KR aircraft that have been retrofitted or built with fixed conventional or tricycle type landing gear. Some have done this to up the gross weight that the original aluminum 7075-T6 spring bar could not handle. Some have installed a thicker bar 7/8" or shortened the bar length to make it stiffer but I have read no reports that stated these changes made the taildragger KR easier to land except the tricycle type gear configuration. Both fixed gear configurations have more drag than a retractable but they do not have the spring board type shock absorbing features of the aluminum bar. This dandy little KR design is great if you can keep the empty weight under 500 lbs. and probably landings would be a Ho Hum event! But today's rules, regulations and required equipment have driven more KR-2 weights (empty) into the 600-700 lb. range where the "Gypsy" weight is. The extra 12" I built into the wings takes care of the extra weight nicely but the springboard bar reacts to the extra weight in earnest if the landing procedure is not almost perfect every time and a good cross wind can make this a real challenge. With the original 4" hard rubber tail wheel, the procedure was to hold the mains off until the tail wheel contacted first and if the mains were close enough when the tail wheel touched, a little dance on the rudder pedals and you were rolling out with a little main gear bounce and a smile but any drop on the tail and or main wheels resulted in a bounced recovery coupled with a frantic dance on the rudder pedals with wild stick inputs and hasty throttle changes as the little monster settled down and



ORIGINAL TAILWHEEL/NEW PERSPECTIVE



NOTE: COMPARE KINGPOST VERTICAL ANGLE TO HANGER CORNER VERTICAL ANGLE!!!



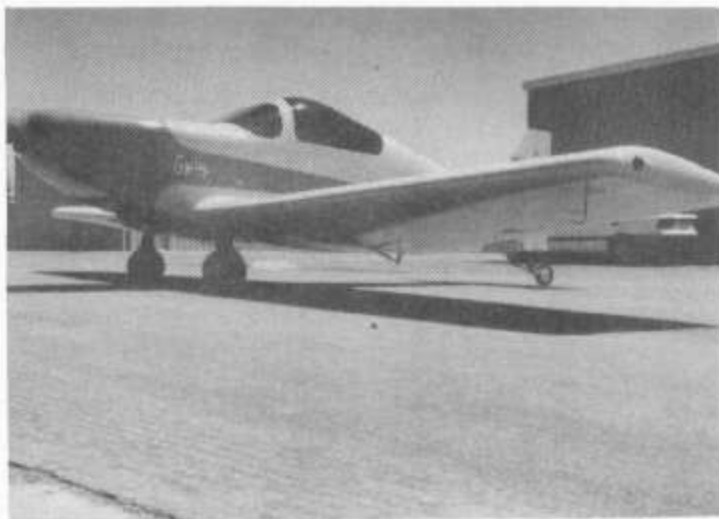
NOTE: FOOTPRINT AREA = 20 PSI & KINGPOST BLOCK

your jaw muscles start to release the 1 ton bite pressure on your teeth and your pucker factor eases off. After checking the top surface of the left center section for a new access hole, seeing no damage you may push in the throttle and go around again to see if you can get it right the next time but for some reason they seem to get worse!!

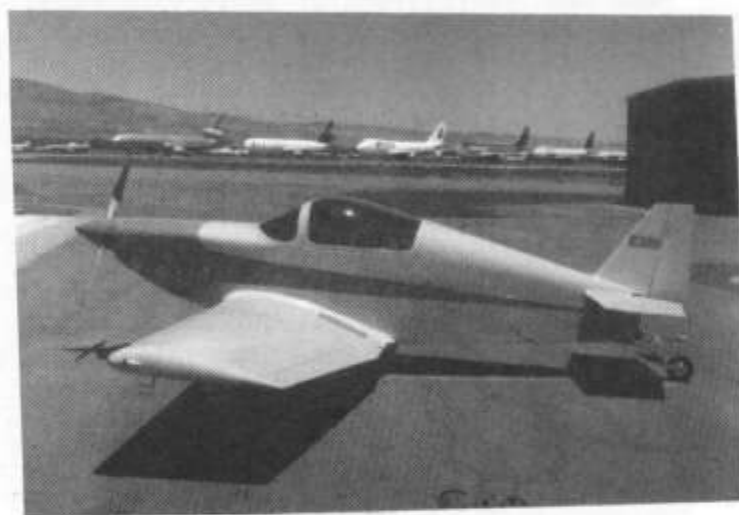
Sound familiar??

Years ago I bought a Luscombe 8-E to use as a photo chase for my skyjacker project. Having never flown a Luscombe before I took delivery at Whiteman Airport in the Burbank-Glendale area of L.A. and flew it north to my home base, Mojave, CA at 6:00 p.m. and almost dark I called Unicom and was given 60MPH winds and gusts to seventy down runway #25. Being as this was my first landing in a Luscombe, I promptly chickened out and went to another airport with dirt strips and 15 MPH winds. Landing was uneventful. Later, taking the aircraft to Mojave with blacktop runways, I noticed that a little rudder action on touchdown was required to stay ahead of the action. The 6" langtail wheel (hard rubber) was about 50% worn down and smooth. A few months later while doing some renewal details, I decided to install a Scott 3200 pneumatic tailwheel assembly. This change along with compression type "boat" tailwheel springs, made a new and different airplane out of the Luscombe. Landings and ground handling became a pure joy with no rudder dance and taxi noise. I kept that Scott tailwheel when I sold the Luscombe and put it on my newly acquired "Emeraude" project. The "Emeraude" will forgive you for a bad landing short of a controlled crash and drives like a Buick on the ground up to 40 mph indicated.

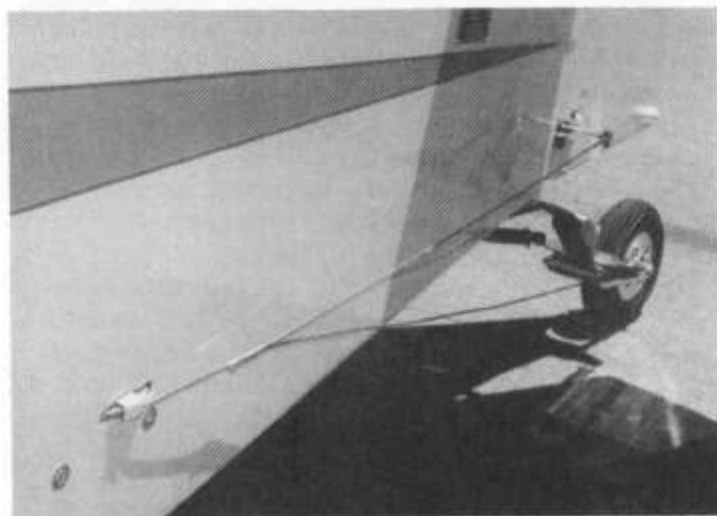
This long winded series of experiences leads up to why I decided to try one on the "Gypsy". Have you ever operated a KR aircraft with a pneumatic tailwheel? The landing scenario I described earlier disappears like magic. The aircraft tracks straight ahead at touch down and the springboard bar loses almost all of it's determination to fling the craft back in the air with insufficient flying speed. The need for the rudder dance is gone and ground handling up to 30-40 mph indicated with no noise will bring that smile back on your face. Pneumatic tail wheels for KR size taildraggers are not commercially available to my knowledge because of



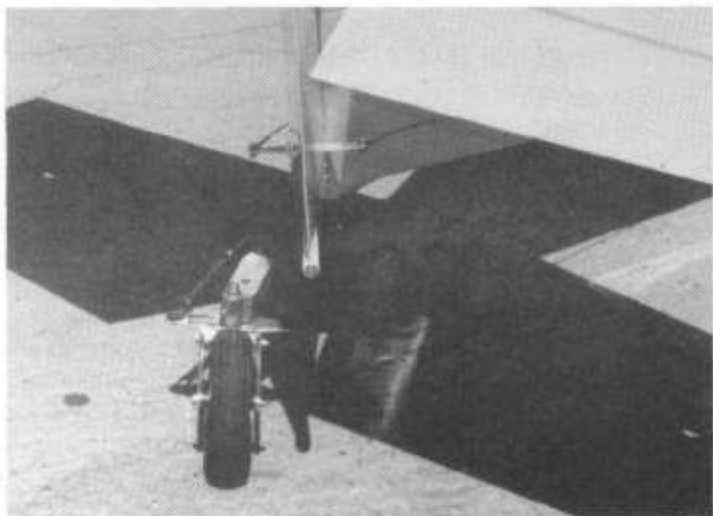
MAINS/TAILWHEEL PERSPECTIVE



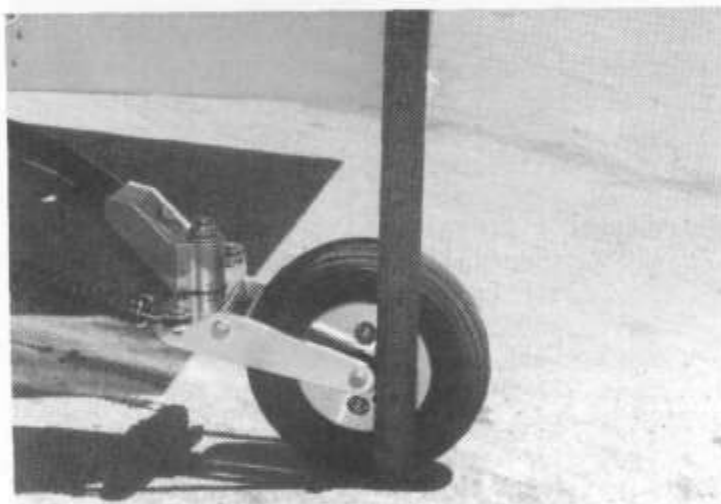
AIRCRAFT/TAILWHEEL PERSPECTIVE
NOTE: MOJAVE PARKING LOT!



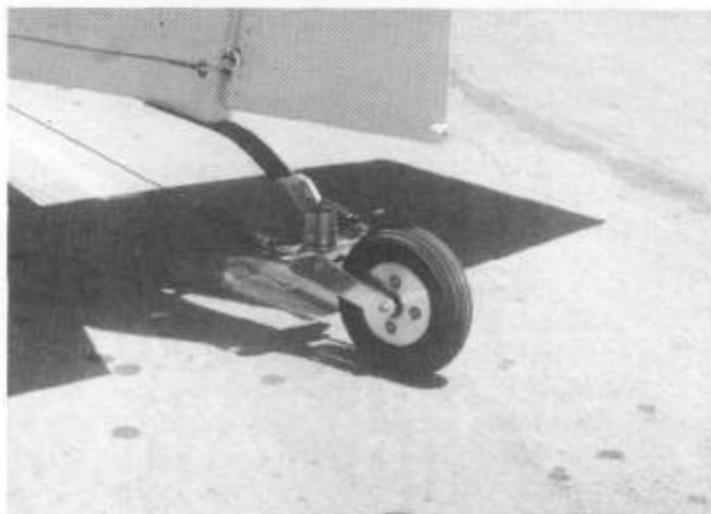
RUDDER/TAILWHEEL CABLE SPUT!
CABLE EXIT IS A DUAL PULLEY DESIGN



**NOTE: RUDDER & TAILWHEEL TRACK
BOTH HAVE 6" HORNS**



ONE PICTURE WORTH A THOUSAND WORDS!



RUDDER TO WHEEL PERSPECTIVE

demand for such a wheel small enough to look right is not commercially profitable.

I bought a "Continental" 200 x 50 tire and tube that is used as a fixed tail wheel on some sailplanes with an ABS plastic split wheel to build my tail wheel assembly. Using the plastic wheel as a pattern, I hired a machinist to duplicate it in aluminum with sealed ball bearings pressed in. Using the original tailwheel swivel mount, I duplicated the king post and pressed and pinned it into a block of aluminum to which I mounted the two fork blades and 6" center to center tiller plate.

The photos tell the visual story, the details dimensions, angles will not be given here. I am not an engineer and this is not a commercial venture. Probably a few taildragger pilots out there will believe this article and are willing to spend the time and money I have to find out the truth. A Scott 3200 tailwheel assembly now costs almost \$600.00 and I have spend about ~~\$350.00~~ for parts and machinist time. I am an A & P licensed mechanic and if I counted my labor the price of the pneumatic 7-1/4" diameter tailwheel would exceed the price of a Scott unit.

In conclusion: A self-addressed, stamped envelope and a letter requesting what information you may need to build your own and if the demand is great enough, I will produce info and spec sheets to help you. Happy Landings!!

Ralph Sawyer
45432 Leatherwood
Lancaster, CA 93534
805-948-9642

1993 KR GATHERING

The 1993 KR Gathering in Covington, Tennessee will be September 17, 18 and 19. The awards dinner will be Saturday night at 6:30 p.m. You should sign up for the dinner at the registration table no later than Saturday morning at 10 a.m. For more info, contact:

Chuck Grammer
601-686-4491

Max Calkin
501-426-5307

HELP!!

We're running low on articles and photos for the Newsletter. Please take a few minutes to share your ideas and photos with all of us. Thanks for your support!

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$20.00 PER YEAR- U.S., \$25.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS. SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN INDIVIDUAL COPIES \$2.00 EACH.



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD OSHKOSH WI 54903 3086
PHONE 414/426-4800

FUSELAGE CONST./WING ATTACH FITTING

I received my set of back issues and just finished reading them. I'm going to make a radical break with tradition and NOT send you my ideas on how to make scarf joints; however, I do have a few questions. My KR-2S is still in the "cleaning out the garage before beginning actual construction" phase but I would like other people's comments on some construction ideas I have before I try to use them. In issue #15 (Sept. 1976), Q & A section, it says that attaching the side skins after the side frames are bent to shape is satisfactory as long as you get proper glue/skin/frame contact. My idea is to build the fuselage top framework first using 3/4" top longerons, build up the framework for the sides and bottom on top of that, bevel the longerons and then skin the whole thing at once. This would require jigs to hold everything in place while building the frame but it would make the top longerons straight.

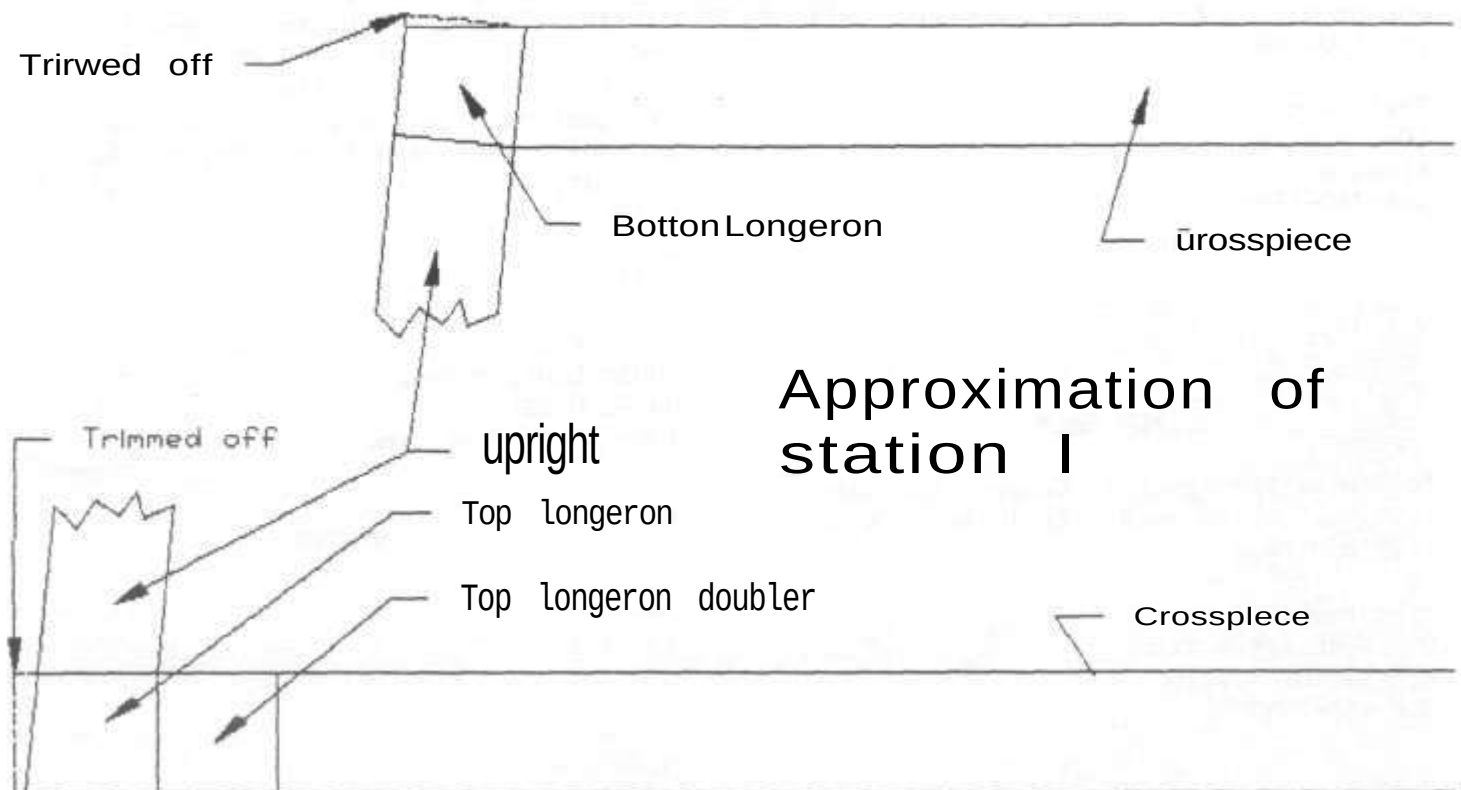
In the same issue it also says that computer stress analysis indicated that the wing attach fittings should withstand forces to 24Gs. These fittings are obviously sturdy but I am concerned about their attachment to the spar. I think that the bolt pattern in my proposed fitting would distribute the load to the wood in the spar more evenly (the lightening holes shown in the drawing are a guess based strictly on removing a similar amount of material and not on stress distribution, so please ignore them) and provide more separation between bolt holes. I have done considerable woodwork and metalwork but very little work involving both; am I overlooking something?

I would appreciate any comments on these ideas.

Joel Samuel Utz
1117 Austin Highlands Boulevard
Austin, TX 78745
512-325-3506

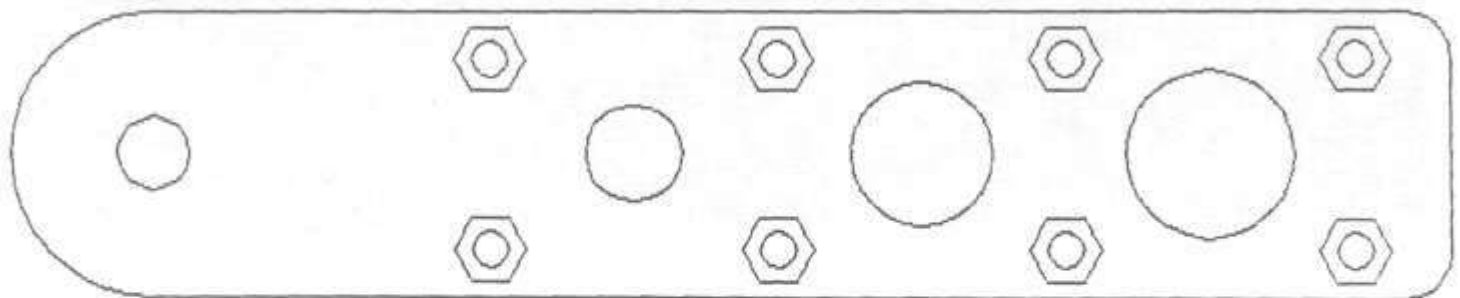
Fuselage Construction

SUBMITTED BY JOEL UTZ

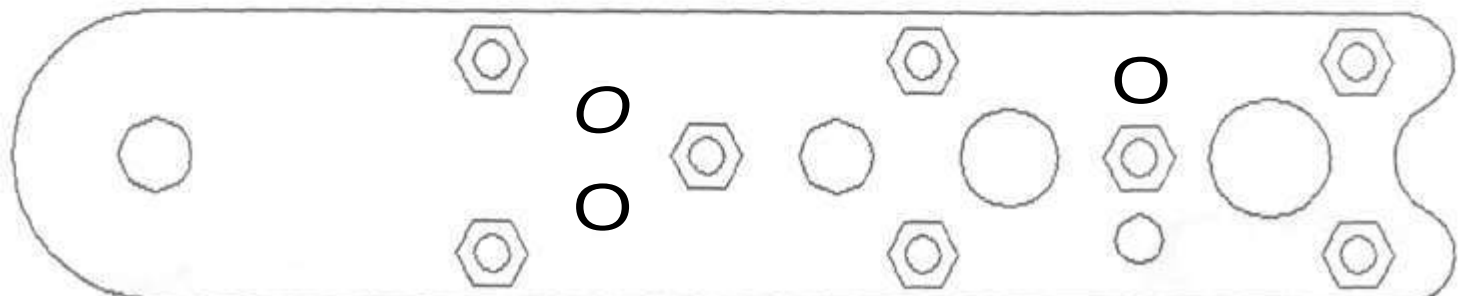


Wing Attach Fitting

R/R design.



Proposed alternative.



FOR SALE

KR-2 fuselage on wheels, wings, many parts including 2 VW crankcases with brand new heads, cylinders, rods and many more engine parts. Also includes plans. All for \$500.00.

Erwin Cruz
1080 Westwell Run
Alpharetta, GA 30202
404-740-1596

FOR SALE

Following KR-2 parts: Canopy, gas tank, cowling, engine mount, tail wheel, wing tips and more.

Mike Brusilow
997 Washington Ave.
Albany, NY 12206
518-482-7837

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 195 AUGUST, 1993

FOR SALE

KR-2 package including: Airframe built by shop teacher, fuel tank, fwd. deck, canopy, canopy frame, bolt kit, wing fittings, glass cloth, rudder pedals, cast pedals, ELT, VSI, ALT and choice of gear. R/R fixed mains and tailwheel or Diehl Tri-gear main gear only. All woodwork including spars are done. Price: \$2,200 no gear, \$2,700 tailwheel setup or \$2,500 tri-gear set-up. Sell gear alone: Tri-gear \$380 incl. ship, or R/R main & tailwheel - \$500. Call:

Bruce Krist
16955 Lincoln Ave.
Hazel Crest, IL 60429
708-335-0820 anytime

WANTED

Dan Diehl wing skins for KR-2. Would like to save on purchase and shipping costs.

John Duffy
237 Bridge Street
Bridgewater, MA 02324
508-378-3411 (h)
508-549-8274 (w)



KR NEWSLETTER

ISSUE NO. 196

September, 1993



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



PAUL MC GINLEY'S N16PM, TUCSON, ARIZONA

My aircraft is finished in "Silver Imron". I finished N16PM last June. It sure was an aggravating four years. Bubble canopy, full panel, all up gross is 702 lbs. (gas, oil, me, etc). Metal VW 10 gallon tanks. I have two wing tanks but I'm going to fly out the first 25-50 hours before I use the wing tanks.

Cont'd page 2

I had trouble with the oil system on the Revmaster...no turbo yet. I designed a positive over center up-down fully retract and enclosed gear. Also the starter adaptor plate which is attached to the case came loose and I had to put metric heli-coil on the engine.

Last but not least, the prop blade broke off at and going through 2700. That Maloof Prop is a disaster waiting to happen. I have since found the Maloof Prop Company is out of business. They have lost quite a few "props". Jim Evans had his "let go" while at altitude. I have since removed all two position prop equipment and I found I could use a Fram or Bowes screw on type filter. The monstrosity on the front R/H side is not safe. It "broke" at the threads and spewed oil all over everything before I could get it shut off.

In the picture, the engine is off because I have to put on a KR-1 engine mount. I used the KR-2 mount for test taxi. I ran this engine for 2-1/2 hours on the ground no baffles. The cowl fits very close. RPM was a continuous 3,000 no over heat problems on oil and hd temp.

I also have deleted the tail wheel cable to the rudder cable and installed two bungee springs to center tail wheel.

My brake system is fool-proof when adjusted right. Mechanical brakes are all right. I installed heel-brakes. My toes fly the rudder with judicious use of engine power, brakes and the load off the tail. The aircraft can be directed to the point of T.O. and or return. Included things that expedite maintenance are: 1/4 degree over lap and cowl, locating pins to prevent rain entering the interior. I have taken pictures of this thing since it was a boat in my living room. I'm thinking of writing a book!!

HA, HA!

Paul Me Ginley
P. O. Box 12051
Tucson, AZ 85732-2051

**THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.**

**SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.**

FINISHING THE KR-2 WHILE MAINTAINING YOUR SANITY, BY MONTE MILLER

The sawdust is swept, the fiberglass has cured and the last popsicle stick has been chipped out of epoxy grip on the workbench. It's time to paint and like me, I'll bet you're asking, "What do I do first?".

In reality, the finishing process began long ago as the wood, foam and fiberglass work was completed. The earlier effort spent on achieving a straight airframe will now pay dividends at the spraygun. However, no amount of primer is going to correct a major visual or structural flaw.

Every homebuilder is different. Each individual has within himself only so much energy and time that he's willing to expend toward the ultimate goal of project-that of flying. Keep the foregoing thought in mind as you read through this article. Adapt what you like to fit your needs.

The airframe must be clean before attempting any finish application. All wood surfaces should be fine sanded to remove construction grime, release agents on any premolds and minor hickies. Some builders will cover the plywood areas of the fuselage with a lightweight fiberglass cloth laminate. My KR has been on a strict diet from the git-go, so I did not even consider this as an option. The multitude of staple holes in the plywood skins are easily filled using any of the current latex-based wood fillers. It's far easier to fill minor imperfections at this early stage and a whole lot less aggravation than spotting them just prior to the color coat.

Pay particular attention to those areas where wood meets fiberglass premold. The glass tapes, after sanding to blend them into the airframe, will most likely have many pinholes or exposed air bubbles that resemble tiny craters. Any of the lightweight polyester fillers with microballoons will be of help and will add only an insignificant amount of weight.

The cured fiberglass will look impossibly rough. The areas of contouring and filling of irregularities using dry micro (yeck) or the much more civilized polyester fillers should be complete.

Scuff sand the surface with something close to 80 grit and then clean it thoroughly. Use caution not to cut into the fiberglass fabric, just scuff it and clean.

DuPont makes a product called Prep-Sol that does a good job and will not attack the airframe materials. Any premolded parts should be sanded with 150 grit and chemically cleaned to remove any trace of leftover mold release or contaminants such as skin oils and fly specks—don't laugh, insects can will leave their calling cards on your freshly prepped airframe.

From now on it will be necessary to exercise caution as to where you sit your beer can and popcorn bowl. A few old bedsheets can be used to cover and protect the airframe.

The goal of the initial spray finishing will be to fill the coarse weave of the fiberglass surfaces, pin holes in the various fiberglass tapes bonding the premolds to the lumber and scratches in the plywood. Automotive refinish suppliers carry a good product for this finish stage called Evercoat Feather-Fill. It is neither feather-light nor inexpensive but it does an excellent job of filling and can be sanded to a feather edge, hence the name. The Feather-Fill must be thinned considerably with lacquer thinner before it can be sprayed. An activator element, MEK Peroxide, is added just prior to application. A nice instruction booklet comes with the product. Read it twice. Spraying Feather-Fill requires a gun with a tip opening large enough to shove a #2 pencil into. Lacking that, I had excellent results using a Wagner heavy-duty airless sprayer along with the atomizer recommended for the heavier body latex paints. Buy plenty of lacquer thinner for reducing and equipment cleanup.

Feather-Fill must be sanded dry. You will need lots of paper in 100 and 150 grit. The object is to sand off as much of the filler as possible, leaving the remainder in the low portions of the glass cloth weave. You should be just exposing the very top of the glass layup and not sanding into and thereby weakening the layup. Fuselage skins should be sanded back to where they look almost free of the Feather-Fill.

A very small amount of contouring can be done during the primary filler operation, but not much. Unless you have some heavy scratches in any premold surface, you can skip the Feather-Fill application of these areas. Less weight.

Without a doubt, this is the nastiest part of the finishing operation and will generate the biggest mess in your shop, home and hair. A yard leaf blower comes in handy! My KR took two gallons of Feather-Fill but close to seven quarts went onto the floor and out the door.

Pick a finishing product line and stay with it throughout the remaining operations. It's your project, choice and money so check around. My KR is all DuPont with their Centari color coat. Talk to the store experts. Note that most of the sprayable components require the addition of a thinner/reducer along with a retarder formulated for the temperature range in which you will be working. The color coats usually have a hardener additive that must be blended just prior to application. Stay aware of the "pot life" times, including clean up.

After you have endured the Feather-Fill ordeal, you'll probably find areas that require additional work. Grit your teeth and spot these areas. Use an appropriate filler, sand and respray with the Feather-Fill. Load up the sanding block for the umpteenth time and block it down. There's no need to go past a 150 grit finish on the Feather-Fill.

The airframe will look pretty scabby when you're through with this chore but it will be remarkably smooth. Keep after it until you're satisfied or just plain ol' can't stand it anymore. Either way, you'll know when you get there. Be advised that you won't be able to respray Feather-Fill over the next primer base so get it all done now.

Composite aircraft require an ultra-violet (UV) barrier to protect the epoxy-resin fiberglass pieces parts from the nasty effects of the unwanted rays. DuPont 131S is a dark gray primer with enough carbon black to fulfill the need for protection. As noted on the label, 131S must be reduced any where from 50 to 100 percent using the appropriate thinner-retarder. Check the air pressure

required, at the gun, and set the regulator as directed. 40 PSI is about right.

Before shooting primer, again clean the airframe to the maximum and wipe it down with a tack rag. Each time I go to the paint store, I'll pick up one or two and stash them away. Stuff one in your hip pocket and get into the habit of wiping off every surface just prior to spraying. The rags are cheap, disposable insurance. They help you do a better job and before long, your buddies will start asking you questions. Works every time.

Fifty percent lacquer thinner in the 131S seemed about right for me. Spray on a medium wet coat. Don't get upset with a small sag or two as they will sand out easily. After about twenty minutes, a second coat may be applied if required. After everything, including premold, has been primed and dried properly, it's time to begin the process of wet sanding.

A side benefit of all this primer spraying is the confidence you gain in using the equipment. By the time you are ready to shoot the final color topcoat, your experience will be at a higher level and the anxious feelings will be less.

A 320 grit paper is fine for the overall primer sanding. You'll need to back up the paper with something other than your bare hand; hard and soft rubber blocks available from the paint suppliers are invaluable. Scrap blocks of urethane foam can even be utilized. Resist the urge to sand in a circular motion. Parallel strokes are preferred but you do what 'cha gotta do. Use plenty of water to flush away the debris and change paper whenever the cutting edge is lost. Save a few of the worn out sheets as they'll come in handy as you attempt to work into small corners and fillets.

Some frustrations will occur throughout the finishing process... so what else is new? Small, formerly invisible pin holes will now be obvious. Paint will not fill them so you've got to tackle this problem now. A small rubber squeegee and a tube of DuPont DFL-1 spot putty will make quick work of the offenders in your airframe. You will have to sand out the repaired spots and occasionally respray these areas

due to over sanding or uneven primer application.

Here's where my project extracted a cost in extra time and effort. Longtime KR NEWSLETTER readers and builder buddies know that I try to save weight by building light and not adding anything that, in my opinion, could be considered as an overweight extra. N93LM is a plans built, non-electric, day VFR aircraft so naturally I did not consider fibreglassing the plywood fuselage skins. In wet sanding the primer, I would occasionally hit a hard spot and expose the base plywood. The moisture contact would cause the wood fibers to swell slightly. After drying, the plywood skin would lay back down and it was the drill of prep sand, spray more 131S, cleanup and wet sand again. Granted, I did this several times and cussed louder and longer with each touchup but finally ended up with a baby's butt airframe covered with the thinnest and lightest coat of primers. Weight and balance made me forget the struggle... almost.

Wet sanding generates its own particular style of mess. By the end of the day, my bride said that I looked like I'd fallen in a bowl of chicken gravy... gray everything. The wing panels were done in the backyard under an awning that kept the runoff from flooding the shop.

The airframe should be looking pretty good by now. Still a bit splotchy but even smoother than the feather-fill. Go over everything, searching for those elusive pinholes. If you're using the Diehl wingskins and isn't just about everyone, the leading edges are good places to spot the culprits. Fill them and sand some more. It will seem to be never ending.

With all the various resins, fillers, pookies and primers on the airframe, you're well advised to next shoot a coat of DuPont 1986S Velva-Seal non-sanding surfacer-sealer on the aircraft. This material is ready to spray straight from the can although I added ten percent DuPont 8100S retarder due to high ambient temperatures inside my shop. A single gallon will cover a KR-2 and the overall middle gray color will dry to a beautiful satin sheen. Take some photos and enjoy a cold beer. Just looking at the airplane

is good for the soul. Later, go over the airframe again looking for flaws. If you're doing your job, there will be very few or none at all.

Keep the airframe covered with old bedsheets from now on and plan to shoot color as soon as possible. The Velva-Seal is not designed as an exterior weathering coat. What it will do is all but eliminate any bleed through staining from the subsurface and will help the color top coat go on easier, thereby using less of the expensive paint.

Prior to spraying the color coat, buff off any over spray or nibs on the sealer. 1200 grit can be used, lightly, but no sanding through the sealer. No sanding.. ah, music to my ears. Clean everything with the Prep-Sol and go over the surface with the tack rag. Even if this is your first attempt at using a spray rig, you should be pretty comfortable by now so don't let the anxiety level go off the scale.

If you have a small amount of touch up work remaining and would rather not drag out the spraying, consider the self-contained PREVAL sprayers available at refinish suppliers. A small glass jar attaches to a propellant can and will dispense primers or paint in small volume. Sort of a DIY spray can. Quick clean up, too.

As mentioned earlier, my KR-2 is finished with DuPont Centari with a gloss hardener additive. Use of the correct retarder/reducer is important. Check all of your equipment and supplies prior to mixing paint, remembering to tuck the tack rag in your pocket. Above all, don't forget to add the hardener. Plan your painting before starting to spray.

I like to shoot the lower surfaces first. Not only will you get the uncomfortable part over with while you're feeling fresh but the paint on the upper surfaces will burn down the amount of overspray that always seems to collect. Do not be timid with the Centari and spray it on too lightly. A full wet coat will dry just as it looks. The Centari also is good about resisting sags and runs.

Tape trim stripes may be applied after twenty four hours. Painted stripes require a week for the base coat to cure. Any sags can be sanded out after thirty days using 1000-1200 grit and a polish. Full cure requires up to ninety days before a wax can be applied.

The final finish operation on a KR is not a quick, weekend project. A workable paint booth must be fabricated, a world of supplies and equipment must be gathered and purchased, safety equipment to protect health and shop is mandatory and a plan of action must be followed. From raw fiberglass to final graphics application, my KR absorbed over one hundred hours of effort. Your mileage may vary.

KR-2 N93LM with Diehl wingskins

FINISHING MATERIALS

QTY	PRODUCT
2 Gal	Evercoat Feather-Fill
1 Gal	DuPont 131S Fill'N Sand
1 Gal	DuPont 1986S Velva-Seal
1 Qt	DuPont 8100S Retarder
1-2 Gal	DuPont 817A Centari White
1-2 Pt	DuPont 793S Gloss Hardener
2 Gal	DuPont 3608S Aery. Lacq. Thinner
1 Qt	DuPont 3919S Prep-Sol
1 Gal	DuPont 8093S Aery. Enam. Reducer
1 Tube	DuPont DFL-1 Spot Putty
As Req'd	Aluminum Oxide Sandpaper 80, 100 & 150 grit
As Req'd	Silicone Carbide Sandpaper 200 & 320 grit
2-3 Gal	Generic Lacquer Thinner for equipment cleanup
1	PREVAL Spray unit
As Req'd	Sanding blocks, masking tape, masking paper, tack rags, etc.

REFERENCES

THE SPORTPLANE BUILDER by Tony Bingelis
SPORTPLANE CONSTRUCTION TECHNIQUES
by Tony Bingelis
SPORT AVIATION Feb 82 -Finishing Composite
Aircraft by Bob Walters
AIRCRAFT PAINTING AND FINISHING from IAP,
Inc. available thru EAA

KR CONTROL SYSTEM "WEAR POINT" BUSHINGS

The KR designs have quite a number of control system bearing points where 1/8" thick extruded or sheet aluminum fabricated parts run the aluminum directly against AN3 bolt shanks.

This is not necessarily bad for light loads and/or light duty. While aluminum does not usually make a very good bearing material, the hardness values for 6061-T6 aluminum and the alloy steel in the AN bolts are far enough apart to preclude galling. But eventually the aluminum will wear and the drilled hole elongate causing "play" in the bearing. Over time, this could result in some looseness where it is not desirable.

A better way to go is to install a neat little flanged "Oilite" (sintered bronze) bushing to run against the bolt shank. This system has a number of advantages, including:

1. The "Oilite" bushing, being porous will retain a supply of oil in the pores which leeches out slowly over time maintaining a reservoir of lubricant for the bearing surface. Failing to lubricate the wear points at regular intervals is not now so serious.
2. The bore of the "Oilite" bushing is more precise and thus provides a better fit with the bolt shank than is usually obtained with a simple drilled hole.
3. Should excessive wear occur over a period of time, the bushing can be pressed out and a new one installed. Then with the replacement of the bolt the original fit is inexpensively restored.

Figure 1 shows the hole preparation required to accept the flanged "Oilite" bushing (Boston Gear Company, P/N FB 35-1). This bushing is available from most Industrial Supply houses and is also available from Aircraft Spruce and Specialty for \$0.80 each.

Figure 2 is dimensional data on the FB 35-1 bushing.

A few simple instructions are in order. Consider these:

1. In machining the prep hole in Fig. 1, it is essential that the two diameters be accurate and concentric. Drilling a pilot hole first and using that size pilot in a 3/8" dia. counterbore will bring in the required concentricity. Then the 5/16 dia. bore can be reamed. Some care should be exercised to hit the .046" c-bore depth so that the installed bushing faces will be flush with the 1/8" stock faces.
2. When the hole prep is finished, the dry bushing is pushed in place using "green" Loctite. Allow the Loctite to cure for a day or so before using the part.
3. When the fabricated part is painted and ready for use, take a small container of quality 30 weight lube oil and bring it up to about 150-180 degrees F and "soak" the installed bushing until the oil is back to room temperature. This will draw oil into the bushing's pores. If the oil is put in the bushing before it is installed in the part, the Loctite may not hold and the bushing might work loose during use.

A caution: Don't ream the bushing bore after installation. This will "smear" the bore surface and close the pores. Might as well use a solid bushing then, for the "Oilite" feature will be destroyed. This says don't tinker with the .3125" dia. prep hole to get a press fit instead of using the green Loctite or the bushing will be squashed and will have to be reamed to accept the bolt. The bushings squash rather easily, being like a metal sponge.

Neil D. Bingham
P. O. Box 1825
Borrego Springs, CA 92004

FOR SALE

KR-2S Plans, instruction book and updates. Also all the material necessary to build the complete tail assemblies. Best offer.

John Sherly
10904 So. AV. B.
Chicago, IL 60617
312-221-3399 (evenings & weekends)

DIAGRAM BY NEIL BINGHAM

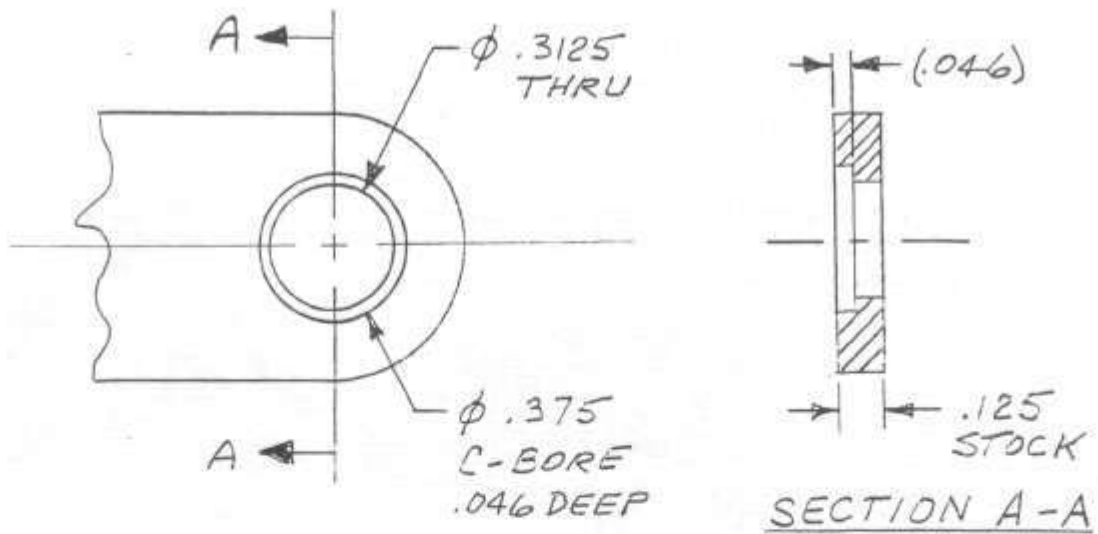


FIG. 1
HOLE PREP FOR "OILITE" BUSHING

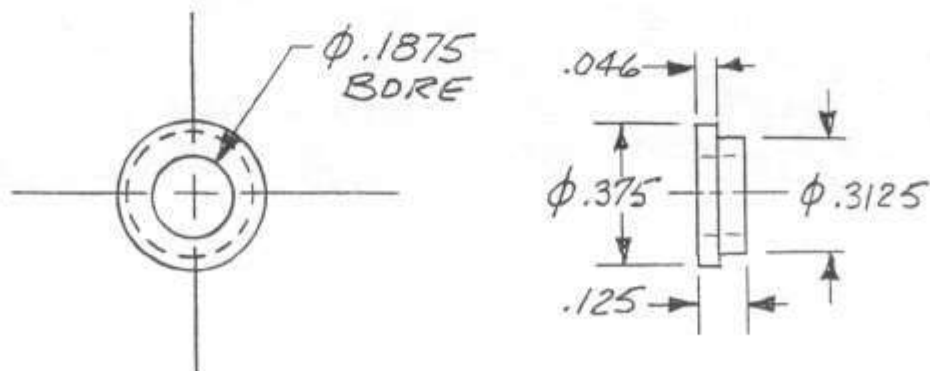


FIG. 2

WITH GREAT SADNESS...

I must report the fatal crash of Gene Darst of Beaumont, Texas. Gene was returning from Oshkosh on August 5 when witnesses said his plane started to porpoise and crashed in a farm field just south of Rockford, Illinois.

The FAA is conducting an investigation. Gene was a frequent contributor to the KR Newsletter and was always available to anyone who needed help. He was a EAA Technical Counselor and would give building seminars at Oshkosh each year. We will miss him.

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 196 SEPTEMBER, 1993



KR NEWSLETTER

ISSUE NO. 197

October, 1993



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



BOBBY MUSE'S N122B, FRANKLIN, TENNESSEE
WON "BEST KR-2 AWARD" AT COVINGTON '93

We had 21 KR's fly in and one was trailered in for static display by "Russ's Toy" won the Peoples Choice Award. This very nice trophy was donated by Keith James (last year's chairman). As far as I know, this is the most KR's ever assembled in one place. We had around 120 people at the awards dinner held at the Veranda Restaurant. The Best Western motel set aside 20 rooms for us but at one count had 48 rooms that we had taken and they were sold out two months in advance.

Cont'd page 2



N28RM, BOB MUSE SR., MARIETTA, GA



N119RH, TERRY WARNER, CENTERBURG, OH



BOB AND BOBBY MUSE, FATHER/SON TEAM

They had a continental breakfast in the lobby every morning. Jeannette Rand and daughter Kathy were there along with Steve Bennett from Great Plains. Dan Diehl and Adam were not there (probably the first one he has ever missed) due to a death in the family. Don Morin from Cocoa, Florida recorded all the action on video and the tapes will be for sale. We also had another significant first. Two KR-2's flown in by a father and son... Bob Muse and Bobby Muse, Jr.

The judges, Al Morrison, Tom Horch, Bob Lee and Dennis Pointer did a terrific job under some very hot sun.

THE AWARDS WERE:

Longest distance flow to Covington

N5826A Norm Leonard, Gillette, WY

Best engine installation

N74155 Calvin Campbell

Best interior

N891JF Jim Faughn

Best KR-2 and Best photo album

N122BB Bobby Muse, Jr.

Most innovative design (for retr. landing gear) N250KB Don Betcham

Spot landing winner

N191MR Marty Roberts

Best KR-1

N911TB Tom Bagnetto

Peoples choice

N8227 Russ Barnett

You would have to see it to believe it. This is the best example of homebuilts I have every seen.

We would like to thank Jerome Heidgar and Don Dieter from Wicks Aircraft for supplying many door prizes. Also for the same reason, thanks to Jim Evans and Bud Meyer of Aircraft Spruce.

We were again fortunate this year by having a temporary control tower set up by the Marine Air Traffic Control Squadron #48 from Millington, Tennessee. This group was headed up by Sgt. Edgar Gierbolini and we appreciated their efforts. We wish to thank all the forum chairmen: Weight and balance-Jim Faughn, finishing and painting-Tom Bagnetto, canopies-Don Betcham, continental engine installation-Marty Roberts, cross-country flying-Norm Leonard, woodworking-George Huber, composite work-Les Palmer, engine installation-Mike Ladigo, test flying-Calvin Campbell and for the spot landing contest-Bob and Bobby Muse.

The women's activities was headed up by Gladys Muse and Debbie Hill. About eight



N13706, MAX CALKIN/TOM BENTON,
HARRISON, AK



N792BC, CALVIN CAMPBELL, TULSA, OK



N912SWM, JOE SCHLOTT, SUMMERVILLE, SC



N1977M, MIKE LADIGO, TULSA, OK



N5826A, NORMAN LEONARD, GILLETTE, WY



N911TB, TOM BAGNETTO, WICHITA FALLS, TX



N8227, RUSS BARNETT, SPRINGFIELD, MO



N250KB, DON BETCHAN, PERRY, OK



**MARTIN ROBERTS WITH JOHN SHAEFFER
"MAINTENANCE AWARD"**

women made a trip to tour Memphis compliments of two vans supplied by the Covington Chamber of Commerce. Jim Hill was in charge of transportation. Tommy Waymack was a big help at the awards dinner. A special thanks for all the help of George and Maud Huber. Maud was at the registration table almost continuously for all three days and did a very efficient job at registering, keeping the builders list, dinner list, peoples choice cards and fly market receipts and much more. As is evident, it took many people to make the "93" KR Gathering possible and KR people are the best! Thanks to all!

Proof of the above is that for the "94" Gathering we have already had not one but five people come forward to say that they could have the gathering in their area. The areas are Texas, Alabama, Indiana, Oklahoma and Tennessee.

Due to last minute work load, our co-chairman Chuck Grammer and wife Wilsye, were not able to be at the gathering this year. He did however send up a "KR Gathering" sign for the highway and a large "registration" sign for our registration table. These signs were professionally made and can be used year after year. Thanks you Chuck & Wilsye.

A copy of the 93 KR Gathering finances can be had by writing to one of the 1993 Chairmen. NOTE: About 25 people left the KR dinner forgetting to pay their \$8.50 per person dinner bill. This \$212.00 bill had to be paid by your "93" chairman. If you inadvertently forgot to pay, please send your money to: Max Calkin, Rt. 1, Box 149A, Omaha, Arkansas 72662.

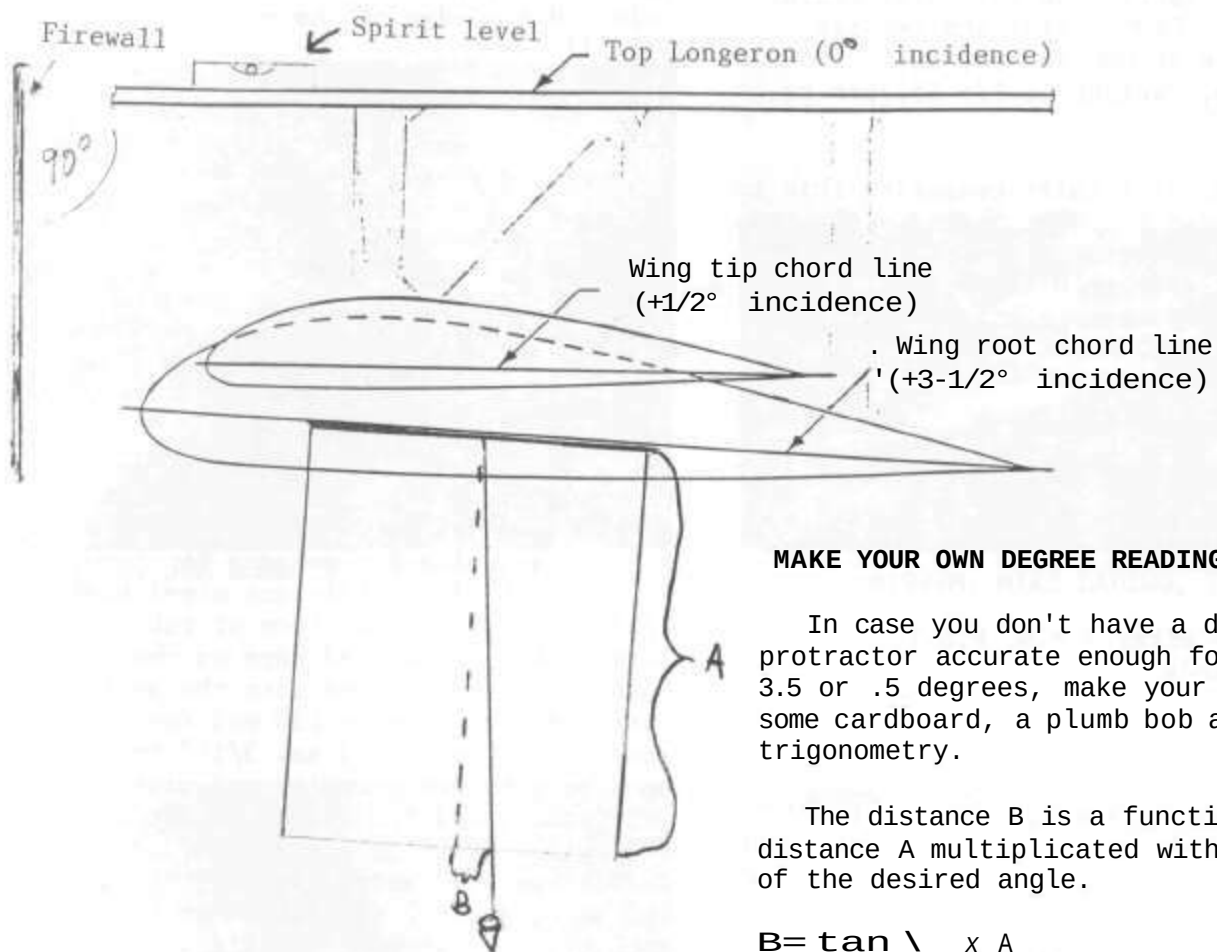
We wish we didn't have to report this but there was a tragic KR accident at Covington. On Thursday night, about 8:30 p.m., Don Cornwell and his wife attempted to land at Covington. We don't know why as yet but for some reason, Don was low on the approach and hit a tree at the south end. He was killed and his wife was critically injured. Our last report was that she was improving in a Memphis hospital. They are from Morgantown, W.V. The KR group extends our sympathy to the family. Gladys Muse collected about \$100.00 from the group and sent flowers to Mrs. Cornwall in Memphis and to the funeral parlor in Morgantown.

Max Calkin
Rt. 1, Box 149A
Omaha, Arizona 72662
501-426-5307



N191MR, MARTIN ROBERTS, TULSA, OK

A SPECIAL THANKS TO JIM GOCHNAUER AND
KEN JORDAN FOR THE COVINGTON PHOTOS.



MAKE YOUR OWN DEGREE READING PROTRACTOR

In case you don't have a degree reading protractor accurate enough for fine tuning 3.5 or .5 degrees, make your own by using some cardboard, a plumb bob and good old trigonometry.

The distance B is a function of distance A multiplied with the TANGENS of the desired angle.

$$B = \tan \angle \times A$$

$$\tan 3.5 = .061$$

$$\tan .5 = .0087$$

If the top longerons are bent for some reason, make the firewall the reference.

Dr. Rolf Ohlrogge
Muhlenbach 17
D-50676 Koln
Germany

QUESTIONS

I recently bought a partially built KR-2 from a guy I believe to be the fifth (count'em) owner. After studying the plans I found a major deviation: The fuselage is skinned in fiberglass sheet instead of plywood. I'm still trying to contact the original builder to ask what he was thinking but so far no luck.

The material itself, I discovered after an afternoon of phone work, is called "Gillfab 1338". It was used by Lockheed in the 70's as cargo compartment liners on L-1011's. I was lucky enough to obtain a complete spec listing from the manufacturer. In brief, it's made of Dupont Nomex fabric and polyester resin. Thickness is .040". Flex and tensile strengths are 28,000 and 16,000, respectively. Weight is 1/4 lb. per sq. ft.

I'm having difficulty comparing this to the recommended Birch or Mahogany plywood because no one seems to know the strength values. (It appears Mil-spec 6070 deals just with manufacturing standards but no tested strengths.)

I'm curious if anyone out there has any thoughts or experience with respect to this kind of substitution. I don't intend to finish the plane until I'm satisfied with this material. Please call collect:

Gary Gable
909-798-4815 after 7 p.m. P.S.T.
or weekends

THOUGHTS ON HINGE BUSHING ARTICLE

I enjoy your newsletter very much and like to see how the different builders solve some of the problems that come up with this dandy KR type aircraft design. It is not my nature to criticize anyone's improvements, suggestions or handy hints unless they create a safety hazard.

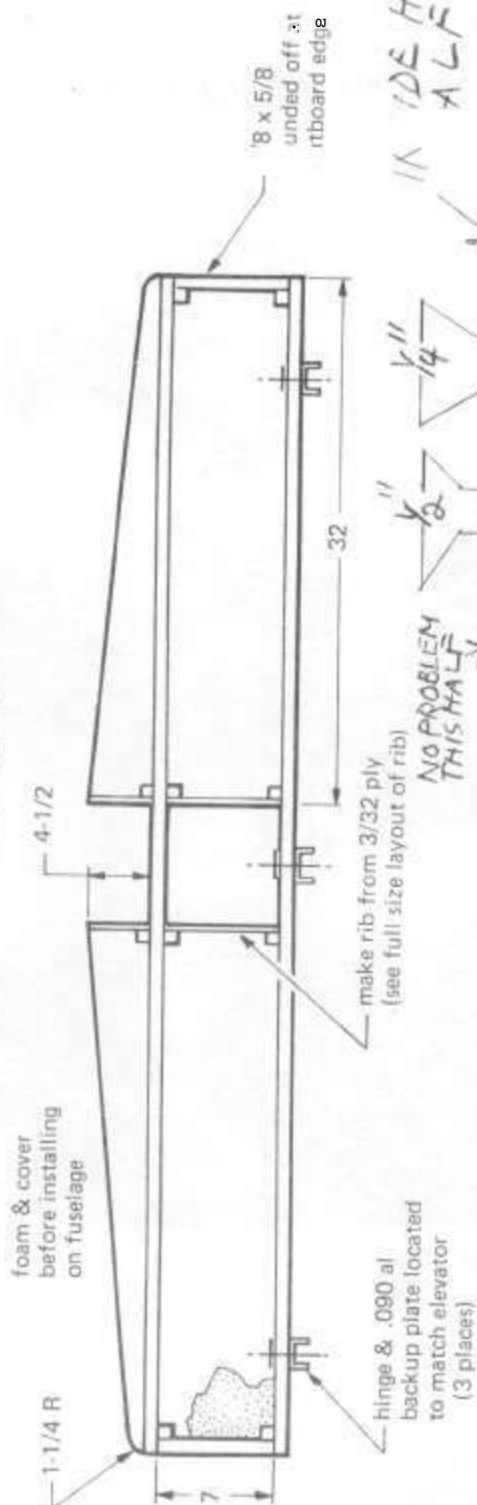
My concern is the hinge bushing article in the latest issue #196. I looked at these bushings in 1980 when I was building my KR-2 "Gypsy" and noted that on page #25 of the Building Manual (shown on next page) that the "inside" half of the five hinges which included the two control horns we cut from the 1" x 1" "U" shaped extrusion supplied in the aluminum kit on page #63. Page #25 shows the hinge line hole and the edge of the extrusion to be 1/4!!!!

If you drill the hinge line hole out to be able to press in the oilite bushing, you will only have 1/16" of "edge distance" of material where the bushing hole comes the closest to the hinge edge radius. An "edge distance" of less than the hole diameter is not acceptable in aircraft structural manufacturing specifications and any violation of this is usually cause for rejection of the parts.

On the "Gypsy" I moved the hinge line hole away from the edge 1/16" more to get 5/16" edge distance. Then drilled the hinge line holes for a press fit for 1/4" O.D. x 3/16" I.D. stainless steel bushing 1/8" long cut from a piece of tubing in a lathe. With a beveled edge on the bushings, they pressed into the soft extruded hinge blades (20 ea) for a good snug fit. Using (10) ea. 3/16" bolts sprayed with dry graphite and miniature (JAP stop nuts) the hinges do not wear out and have a 3/16" edge distance for an undersized 1/4" hole. Not acceptable by the manufacturing standards but close enough for me in a home built aircraft. I hope this lengthy note might spark some concern for possibly preventing the loss of a vital control surface in flight and another statistic in the N.T.S.B. files.

Ralph Sawyer
45432 Leatherwood
Lancaster, CA 93534
805-948-9642

HORIZONTAL STABILIZER

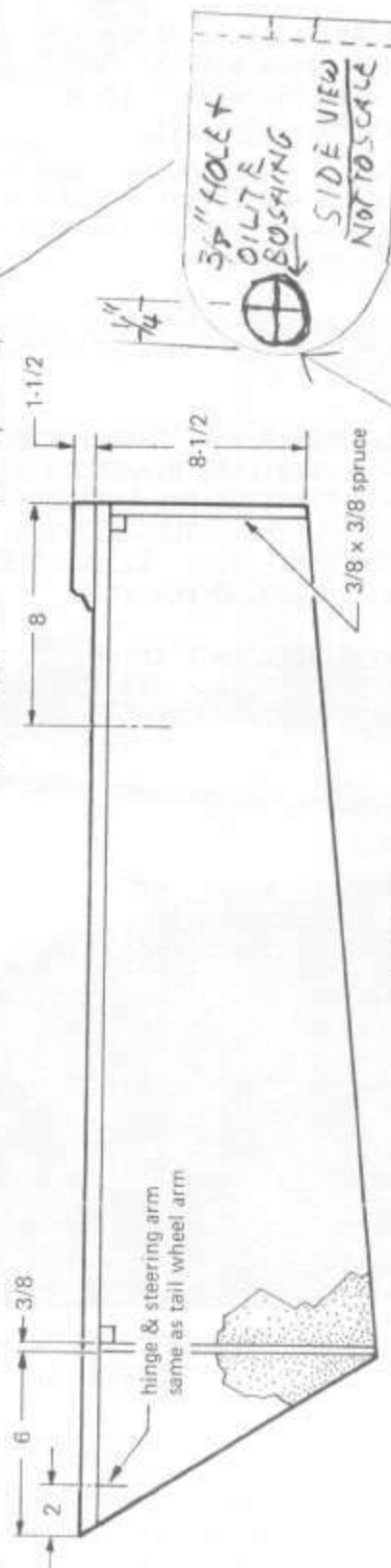


IDE HINGE
ALF

NO PROBLEM
THIS HALF

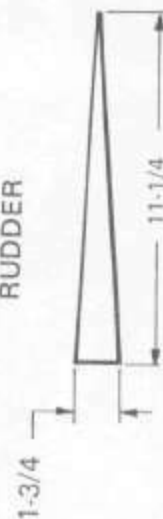
25

rudder &
elevator hinges
.125 6061-T5 or
equivalent



1/4" - EDGE DISTANCE" PER SP. IF HINGES
ARE PER THIS DWG. AND
KIT SUPPLIED EXTRUSIONS
ARE USED.

RUDDER



FOR SALE

Revmaster 2100D with turbocharger and
grounded Maloof two speed prop \$2,000.
Hapi 2200 magnum with ultracarb, \$2,000.
Low time both engines. Contact:

Robert Wood
Box 218
Angwin, CA 94508
707-965-9132

FOR SALE

KR-2S boat stage 90% complete. KR-2S
plans and instructions with a complete set
of newsletters. \$500 OBO

Larry Ward
Rt. 3, Box 908
903-237-5948/903-668-4922 after 6 p.m. CST

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 -- EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ATI. AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 197 OCTOBER, 1993



KR NEWSLETTER

ISSUE NO. 198

November, 1993



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of **KR** Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



FRANCO BUCCI'S KR-2, 1-JEMP, FLORENTINO, ITALY

On September 1992, after 3.5 years of construction, finally 1-JEMP took to the air for the first time at the airfield of Siena (Tuscany), Italy. Flight was typical of all other flights reported in KR newsletters: Fun, enjoyable, quick and pitch sensitive.

(Cont'd page 2)

My experience of over 800 hours of flight, 300 of which with taildragger (Stinson L-5, CAP 10, etc) was very useful for a safety and nice flight. Actually over 30 hours of flight are completed and the plane is ready for certification.

Plane is a totally plans built project and over 1500 hours of building, paint included. Landing gear is a stock RR fixed cast aluminum with Matco hydraulic brakes. Power plant is a 1835 VW conversion, purchased in kit by Great Plains and assembled myself. Engine is equipped with Diehl Super Case, starter, alternator and battery.

Single ignition is supplied by a 6346 Slick Magneto. Intake manifold is a dual port, exhaust a cross-over and carburetor is Super Posa. Propeller is a 52 x 68 Ed Sterba that turns 3200 RPM in cruise.

Instrument panel consists of: Altimeter, VSI, ASI, DG, compass, dual CHT/EGT, dual oil temp/press, electronic RPM, fuel indicator, G-meter.

Avionics: Becker radio and Collins VOR. EMPTY WEIGHT is 550 pounds and weight and balance come out perfect.

PERFORMANCE (at 770 pounds)

TAKE OFF: 3000-3200 RPM at 65 MPH lift off after 200 meter

CLIMB: 80 MPH (1000-1200 FPM)

CRUISE:	2900 RPM	120 MPH
(3000 ft	3000 RPM	130 MPH
45 deg.C)	3100 RPM	140 MPH
	3200 RPM	150 MPH

Fuel consumption ranges from 12 to 18 litres/hour. After several modification of bafflings, air inlet and outlet, oil cooler and adjustment of compression ratio (actually 8.2:1)

CLIMB: 3000 RPM - oil p. 60 PSI
Oil temp. 180/190 deg. F
CHT 400/420 deg. F
EGT 1200 deg. F

CRUISE: 3000/3200 RPM - oil p. 50 PSI oil
Oil temp 170/370 deg. F
EGT 1300 deg. F (mixture adjusted,
3,000 ft., 15 deg. C)

APPROACH: 70 MPH

LANDING: 40 mph, touch on three point
400-500 meter without brakes

Stall is very gentle and happens at 35 MPH! All performances are without wheel pants (in construction).

After over 30 hours of flight my consideration is that the KR-2 is a sweet little sport aircraft, easy to build, cost efficient and a pure joy to fly.



In September, at the annual convention of C.A.P., Italian EAA Chapter, my KR-2 won the trophy for the best experimental aircraft displayed for the first time at the convention! A big satisfaction for me and 1-JEMP! Actually 10 other KR-2's are under construction and several pilots are interested after my performance at convention.

I wish to thank all the people that have contributed to realize my dream: Jeannette Rand, Steve Bennett, Ed Sterba, Monte Miller for their suggestion, Earl Teporten for KR Newsletters. I hope to meet you at a KR Gathering, Oshkosh or Sun N' Fun one of these years.

Franco Bucci
Via M. Fanti 8
50019 Sesto Fiorentine
ITALY

A PRECISION CONTROL QUADRANT YOU CAN BUILD

Sitting in the "office" of a P-51 once, I concluded that I would have a throttle lever that worked that smooth some day. No doubt I could not even afford the gas to fly it, let alone the P-51 but I figured I could build me a throttle control that felt as good.

Aircraft Spruce have a couple of lines of quite decent precision quadrants for sale for not too much. But when I had the salesman drag one out for a visual, it was humongous in size. I decided I could custom build my own and make it look like it belonged in my little KR "office".

What is depicted in the accompanying figures is basically what I built. It's inexpensive, rugged and darn smooth. But there are a few secrets.

The secret to the smoothness is in the 1/32" thick teflon washers between all the parts. With teflon's natural slickness, it makes for a fine feel.

The secret to keeping the motion of the other control(s) from affecting the throttle setting and vice versa, is in the aluminum "keeper" washer with it's offset "keeper" bolt.

The secret to preventing throttle creep is in the knurled "friction" knob. It can be tightened or loosened to give you what you want.

The secret to making everything so it can be disassembled easily is in the use of hardware store variety Tee Nuts, floxed into c-bored holes at the rear of the 1/2" thick spruce block.

The secret to the device's rigidity is in floxing and glassing the spruce block to the fuselage wall. Incidentally, my fuselage wall and floor are "sandwich" all the way from the firewall to the rear of the baggage compartment. That is, the trusses have mahogany plywood on the outside, urethane foam between and glass cloth on the inside. Where the spruce block goes is directly over one of the diagonal truss members and it is very rigid.

The secret to the quadrant's versatility is that a mixture control

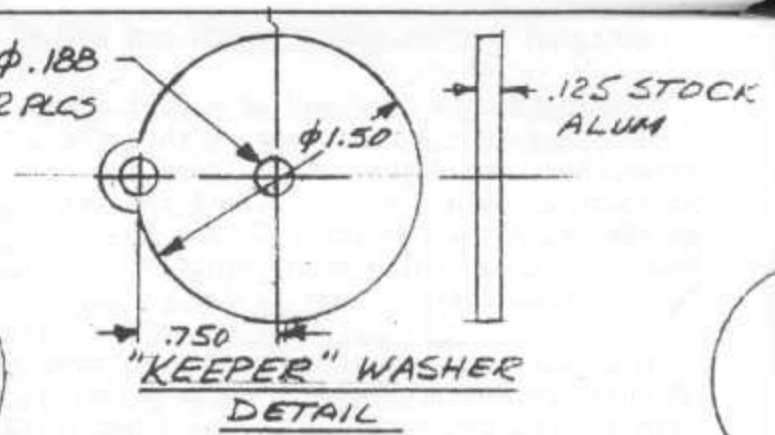
lever can be fitted by increasing the spacer length and installing another teflon washer and another aluminum "keeper" washer.

The secret to getting the right "throw" lengths, i.e., throttle knob travel vs. carburetor throttle valve lever travel for instance, is to work out what you want carefully and adjust the lever lengths above and below the quadrant's lever shaft centerline to give you what you need. In my case, I use a front of firewall mounted jackshaft (12.5" long) from the left side of the firewall to just past the firewall centerline. The throttle lever Bowden cable comes past the left side of the fuel tank, through the firewall and attaches to an arm on the jackshaft. The linkage to the carburetor attaches to an arm at the other end of the jackshaft and goes straight forward to the right side of the carburetor which is mounted on the centerline of the engine. I wound up with 58 degrees of travel in the throttle lever. By making the length of the throttle lever above the lever shaft centerline greater than that below, I was able to get a nice long "throw" on the throttle knob. This helps desensitize the throttle action. Otherwise, a small motion of the throttle knob would make too much difference in the carburetor throttle valve setting and it would be too touchy.

The secret to getting the throttle knob where it is comfortable when you fly is to make and assemble all the parts before the spruce block is glassed to the fuselage wall. Then get in the plane and try the quadrant in several positions. It won't be long before you will know where it should be. Make sure you can pull your arm back far enough before hitting your elbow against the seat back to come to throttle idle position. At this point you may want to consider a simple foam and glass arm rest attached also to the fuselage wall.

Neil D. Bingham
P. O. Box 1825
Borrego Springs, CA 92004
(714) 376-9530

$\phi .188$
2 PLCS



THROTTLE
LEVER
($1/8$ STOCK)

ELEVATOR -
TRIM LEVER
($1/8$ STOCK)

ATTACH
SCREWS (4)

$1/16$ ALUM
PLATE

"KEEPER"
BOLT (No. 10)
CLAMP

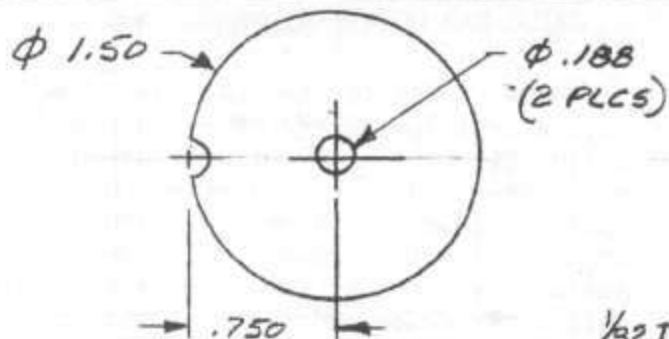
KNURLED
"FRICTION" KNOB

LEVER SHAFT
(AN3 BOLT, MODIFIED)

BOWDEN CABLE TO -
ELEV. TRIM TAB

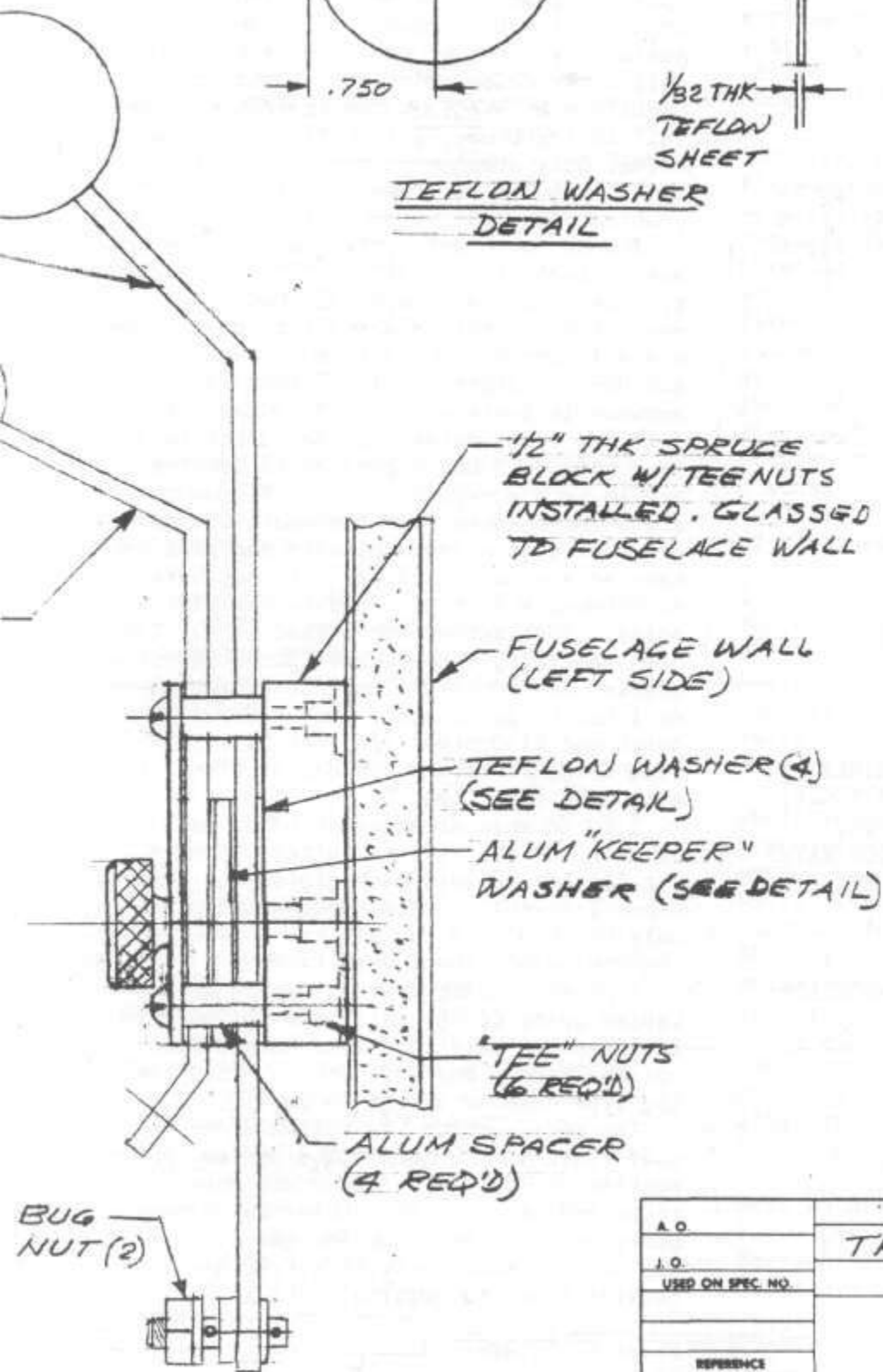
THROTTLE BOWDEN
CABLE TO CARB.

CLAMP



1/32 THK
TEFLON
SHEET

TEFLON WASHER DETAIL



A.O.		ENGINEERING EXPERIMENTAL SKETCH	
I.O.		THROTTLE QUADRANT	
USED ON SPEC. NO.		N. BINGHAM 9/93	
REFERENCE DRAWING		[REDACTED]	
SCALE 1/1		DRAWN BY DEPT. NO.	DATE APPROVED BY DATE
		CLASS "C" DRAWING OR SKETCH NO.	
		REV. SUB-LETTER	

THANK YOU...

Thank you for the lovely flowers and the many phone calls. Your kindness at this time is more deeply appreciated than any word of thanks can express.

The Don Cornwell Family
304-599-5519

Gladys Muse wrote to say that Don's wife, Juanita is now at home. Her broken leg is still in a cast but she is mobile with the assistance of a walker. A caregiver stays with her at night. Daytime she's alone except for friends that drop by.

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

FOR SALE

Slick 4016 Magneto. New...\$225.00.
Call:

Don Chisholm
509-3311 Kingston Rd.
Scarborough, Ontario
CANADA M1M 1R1
416-261-7782

TAIL SPRING

As mentioned in the July, 1993 issue I have a tail spring that works extremely well. The original "spring" had no give so it bent and broke. That so called spring, along with a very hard tail wheel, made for a noisy rough ride on most surfaces. After my retractable gear collapsed the second time I installed Dan Diehl's gear and it works great. When my tail spring broke, I installed the same thing, only stronger, then the wheel broke. It was now time to fix this problem permanently.

I went to an automotive spring shop and got a piece of car spring. You could also try the local junk yard. It took me several hours with a grinder to get it the shape I wanted. I fly from a rough field and need a larger wheel. I found a snowmobile bogie wheel to be ideal. It is 5 inches in diameter and the rubber is 3/4 inch wide. It has a good solid bearing and it is not expensive. Now I know there are a few readers from the south who may not know what a snowmobile is and will not have access to any parts. You may have to experiment a little. Hard rubber will be noisy. Soft rubber won't last long. You need something in between. The original bracket was too small for the 5 inch wheel so I had to get another one made. I purchased 4130 steel 1/8 inch by 1 inch from Aircraft Spruce and had a friend of mine make a new one.

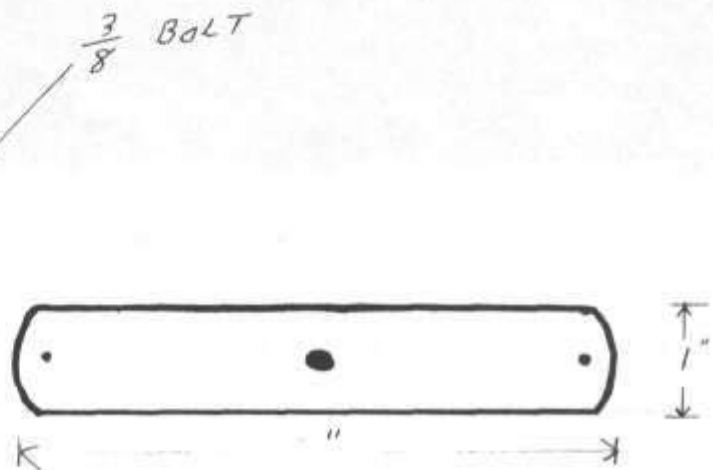
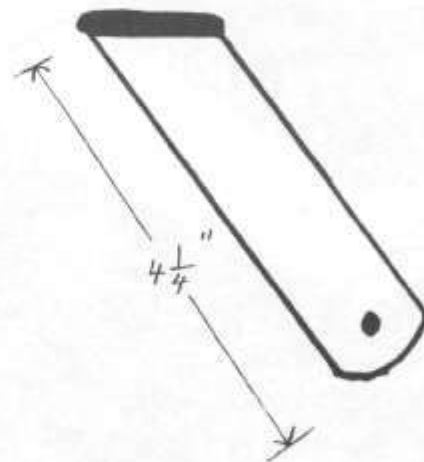
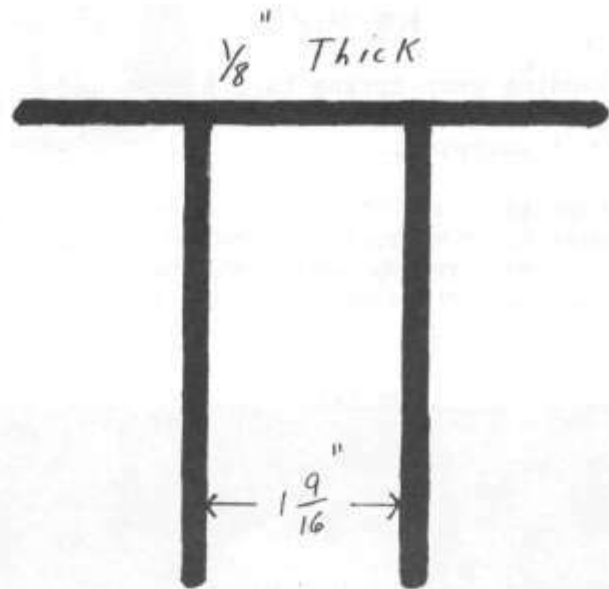
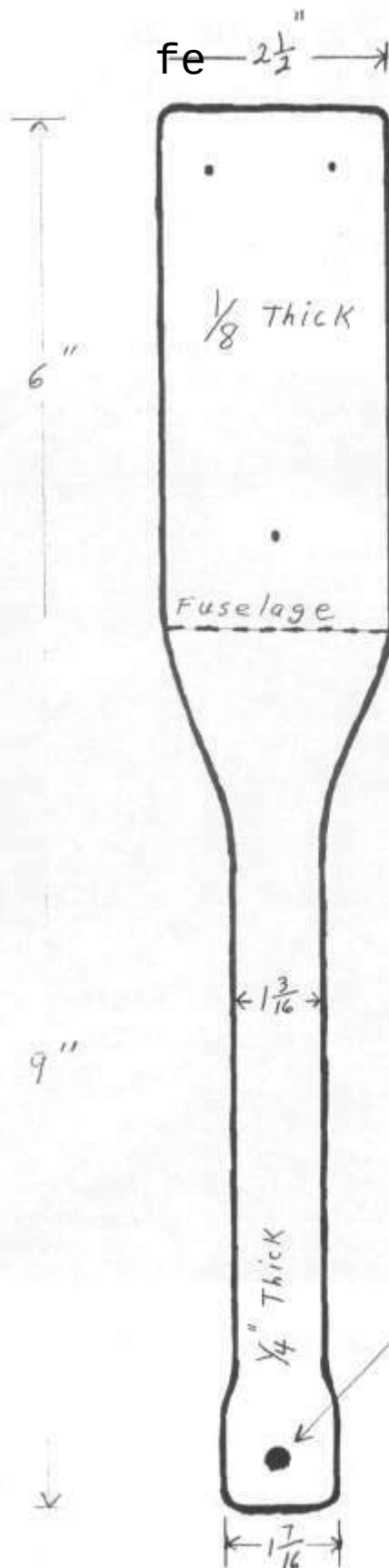
I found this arrangement to be much quieter and the ride is softer. I have put 111.6 trouble free hours on the KR-2 since I installed this combination. The only thing I paid for was the 4130 steel, the spring and wheel were free.

I am also using two springs on the cables going to the tail wheel. They are four and one half inch long compression springs from a hardware store. They are the type used on screen doors.

The wide part of the spring under the tail block is 1/8 inch. The narrow section is 1/4 inch. All edges should be round and smooth. The spring may appear heavy at first but once you get it down to the correct shape it will not be much heavier than the original.

Kevin E. Layden
25 Pondicherry Cres.
Dartmouth, Nova Scotia
CANADA, B2W 5C4

CONT'D PAGE 7



FOR SALE

KR-1 landing gear spring bar, hinges and gear legs. Partially drilled.
\$100.00 + shipping.

Al MacDonald
355 Green St.
Boylston, MA 01505
508-869-3198

FOR SALE

KR-1 Parts- Plans, newsletters, premolded engine cowl, fuel tank, wing tips, FWD and AFT top decks, canopy welded engine mount, spinner, firewall, aluminum extrusion kit, wheels and brakes, etc. \$995.00

Mitch Lindahl
25 Barko Parkway
Huntley, IL 60142
708-669-1718

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 198 NOVEMBER, 1993

FOR SALE

Complete new plans for KR-2 and KR-2S.
\$220.00

Jeff Beune
R.R. 3, Box 180
W. Pointe, Nebraska 68788
402-372-3949

WANTED

Dan Diehl wing skins, tail feathers, turtle deck canopy, rudder pedals, etc....What have you... for KR-2S.
(Must be reasonable.) Call

John Bissonnette
1715 Big Canyon Trail
Carrollton, TX 75007
214-245-7338



KR NEWSLETTER

ISSUE NO. 199

December, 1993



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



**KEVIN KELLY ON LEFT (CREW CHIEF ON RIGHT, NAME UNKNOWN) AND HIS KR100
AT THE 1993 NATIONAL CHAMPIONSHIP AIR RACES AT RENO**

Ken Rand would have been proud. Thanks to the skill, artistry and gumption of Kevin Kelly, a new plane appeared at Reno '93. It was unmistakably a KR. And it earned the respect of the big boys in the Formula 1 class.

I've been a Reno Air Races freak since I first attended six years ago. I flew a Pitts S-1 in the sport biplane class in 1988 and got hooked on the excitement and camaraderie that exists nowhere else except maybe at Oshkosh. Imagine what a thrill it was for me this year to see Kevin Kelly's KR 100 amongst the midget racers.

(cont'd page 2)

I first met Kevin when he was starting to build the plane in Jeannette Rand's shop in Huntington Beach. Since his design looks a lot like my KR-1 (Bondo Bomber), I loved it.

How did Kevin do in the races? Just great! He qualified and finished the race, earning a big trophy and a lot of bucks. He now joins the elite ranks of us professional race pilots.

Kevin got in his qualifying run OK and was scheduled to fly in a heat race to determine whether he would race for the Gold, Silver or Bronze. Only he didn't fly the heat race. His carb evidently iced up while he was sitting on the starting line for the race horse start and the engine wouldn't rev up. So Kevin was bumped down to start at the number 8 position in the Bronze race.

When you start at number 8, that means seven planes have the advantage on reaching the first pylon. The prop was there (at 50 feet above the ground) can be downright scary.

But Kevin flew like a veteran and was able to pass three contestants, finishing fifth in the Bronze race with a speed of 186 mph. He still has a way to go to win the Gold race. Jon Sharp flew "Nemesis" to a record setting speed of 247 mph.

Kevin appeared to be hooked on racing. He's planning to build a new plane to fly in the Formula 1 race at Reno. I know all KR builders will be pulling for him and I plan to be there watching.

Jim Evans
P. O. Box 345
Lewiston, CA 96052
916-778-3774

WING SPAR MODIFICATION

The following is a suggestion for a wing spar modification that other builders may want to try. It worked very well in my project and I believe that it reduces the time and effort to set the wing incidence.

When building the aft center section spar, reduce the length by 1 inch to 83 inches, the same as the forward center section spar. Along with this, increase the length of each aft center section wing attachment fitting by 1/2 inch.

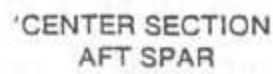
The net effect is that the wing attachment bolt center lines in the aft spars will be unchanged. It also maintains the minimum distance of 0.62 inches between the end of the spar and the first bolt through the spar cap. The final dimensions of the Number 4 fitting (page 24 of the builder manual) would then be as shown on the attached drawing.

When setting the wing angle of incidence, a one piece rib can be temporarily attached to the end of each spar and it will be flat on each one. With the fuselage rigged to level along the thrust line or plumb along the fire wall, adjust the spars with spacers or wedges until the correct angle of incidence is established. Use either a spirit level along the incidence line or an inclinometer along the chord line.

When the spars have been mounted, the one piece rib can then be permanently attached to the ends of the spars. This helps eliminate any inaccuracies that might occur when using the normal three piece rib layout.

The increased length of the fitting outboard of the spar will result in a slight decrease in the ability of the fitting to resist bending under load. To counteract this, replace the two short 3/16 inch bolts with one long enough to go through both pairs of fittings. Between the fittings, add a compression spacer fabricated from a piece of 4130 tubing. This tubing should have a 3/16 inch inside diameter and a 5/16 inch outside diameter.

Donald Reid
Rt. 2, Box 3275
Bumpass, VA 23024
804-883-6828



3/16 dia.

NOTE: No. 4 fitting (aft center section spar) is the same as No. 3 without the bend.



Product review of SYSTEM THREE RESINS WATER REDUCEABLE
PAINT by Raymond C. Bergeron

Since I have been anxiously approaching the point at which I will be painting my KR-2 I decided it would be good to investigate all the new products which have come on the market since I have started this project, almost 10 years ago. This has proven to be a wise decision.

Seeing an advertisement in SPORT AVIATION about a 'Superior Paint System¹ that is user and environmentally friendly. Claimed: Superior performance then Enamels, Urthathanes or lacquer. Cleans up with water, Non-Flammable, Low VOC, Low Toxicity, Low cost. I decide to take the \$11 plunge.

-The \$11.00 is the cost of their trial kit, which arrived surprisingly fast and exceptionally complete. What a wonderful way to get people to try a product that is new on the market without a large commitment required.

Inside the 10" X 12" box was:

- I 6oz bottle of epoxy primer
- 1 6oz bottle of Corrosion (preventative) primer
- I 6oz bottle of White topcoat
- 1 6oz bottle of clear topcoat
- 2 1oz bottles of activator (for primers)
- 2 3.5" foam rollers
- 2 1.25" foam brushes
- 2 1.25" Bristle brushes
- 6 plastic gloves
- 1 1oz packet of Non-Skid additive (Clean sand)

Numerous stirrers, cups and a piece of 1500 grit paper

Also accompanying this impressive assortment of goodies are complete instructions and descriptions, and also a chip chart with over 100 color chips.

Upon reading the literature provided I my curiosity changed to glee as properties that I had assumed were unachievable were touted. Amongst them is that the paint is WATER REDUCEABLE. In fact the manufacturer recommends cutting the paint for spray application by 10% to increase flow-out. Water is also used for clean up.

This property is of significant importance to me as I will be spraying my bird in my carport, and would get a lot less glaring from my neighbors is they were not under the impressing that I was attempting to exterminate the entire neighborhood with paint fumes. Also the fact that these paints, while they do have VOC (Volatile Organic Compounds), they do to a much lesser extent. The fumes are MUCH less (not even noticeable). This will also make the

EPA happy, as in about 5 years this is all we consumers will be able to get. System three painting is unaffected by humidity, drying will just take longer. In fact the manufacturer RECOMMENDS that you hose down the floor of where you will be spraying to help hold down the dust.

Unfortunately the final finish is not a gloss 'Wet Look'¹, but a semi-gloss. If a 'Wet Look' is desired you must apply a clear coat.

Another characteristic of this paint system is that it is UV opaque, so no graphite or aluminum base coat is needed for my glass surfaces. System three says this paint is so durable you can bend a piece of 16 gauge painted metal double without it cracking. In a trial on a small piece of fiberglass I believe them.

Maybe one of the nicest, and most unique properties of the paint is that all you do is add the cross-linker and you are ready to paint. Pot life is EIGHT HOURS, and even if you are slower than that the paint is not 'Bad' or 'Old', it's just that the cross-linker cannot do its job anymore. Just put the paint away and add more cross-linker when you are ready. No more discarded unused material!

OK, on with the review. First I got parts of my plane sanded down to 400 scratch and applied a product I know and like well, Dupont S1986 sealer/surfacer. Next to it was bare prepared fiberglass. I applied SYSTEM THREE epoxy primer (after adding the activator) and sprayed as recommended (I am using a touch-up gun). The primer is WHITE, hey, I say to myself, I am going to LIKE this stuff. The primer sent on a little WET, it did not 'Flash off' as I am accustomed, but hey, it gives me more time to be careful, I thought. First I did not consider that I was applying enough material as the surface was 'Blotting', i.e. the primer was standing up on the surface (both areas), and not flowing out. When I applied more material the primer developed runs.

Slightly disappointed but still determined to give this a trial I waited 2.5hrs (They say 35min - 1hr, but it WAS humid out) and applied a second coat to the thin areas, they then ran.

The next day I sanded down the runs (The primer is indeed very hard and sands well) and prepped the areas (Bare glass, Epoxy primer, S1986 primer) and sprayed the white topcoat. I had the same results as the day before. If I sprayed properly the paint 'Stood up' in small islands, if I sprayed a wet coat, a run developed.

So in review. Yes this paint is very safe to use, and you can REALLY take your time. It is very durable, but also

CONT'D PAGE 6

very expensive (\$100/gal for the topcoat). Also it does need a clear coat for that 'Wet Look', as the final is a semi-gloss finish without it.

Possibly someone could show me what I was doing wrong, as I do not believe that this company would still be in business if their product was not usable (They SURE are making any money on the trial kit). And one other insight. While the extended work time (Drying time too) is nice, it also allows that much more time for the local 6 12 legged residents of your area to find your wet paint job.



**WINGS ARE SUPPORTED VIA ROPES
AT WING ATTACH AND VIA 1" DIA.
DOWEL THROUGH NAV LITE CUTOUT**



PRIMER



PRIMER

MECHANICAL BRAKES

When I built my KR-2, I installed Rand Robinson's mechanical toe brakes. They didn't work very well. I was about to install a set of hydraulic brakes when I decided to try and fix what I had and save some money.

I have a HAPI 1835 engine and the brakes easily hold on a full power run up. I have a taildragger with Dan Diehl's gear. The mechanical brakes work great with this set-up but if you have a tricycle you should have the hydraulic brakes. Mechanical brakes can be made to work really well with a little effort. Here is how:

The brakes are composed of a back plate, a brake lever that is connected to a cam through the back plate, two brake shoes and a brake drum.

When you pull on the brake lever it turns the cam, this expands the brake shoes and they make contact with the drum. The KR then comes to a screeching stop in a cloud of blue smoke. Well not quite.

When I took my brakes apart, I found that only about 20 percent of the shoe was making contact with the drum. I had to move the brake lever about an inch or so to make contact with the drum. I also found that the shoes were not expanding smooth and even. I filed the brake shoes at the cam to get them to expand even, not leaning to one side. I then taped 120 grit sandpaper to the inside of the drum using double sided carpet tape. I slowly rotated the wheel and applied pressure to the brake lever to sand the shoes down to achieve 100 percent shoe to drum contact. I then measured the gap between the shoe and the drum and welded a piece of steel, 1/32 inch thinner than the width of the gap, to the shoe at the cam contact point.

If the wheel doesn't fit on over the shoes just file the weld until it does. The wheel should now turn easily and the brake lever should only require about 1/8 of an inch movement to achieve 100 percent shoe to drum contact.

I did all the work with the wheel assembly off the plane and bolted to my workbench. I don't claim that this is a miracle cure. I have read in past

newsletters where people have made them work well with a little effort. They just didn't say what that effort was. I assure you my brakes work extremely well now and they were terrible before. I have over 65 hours on the plane since I did the work. I only intended for this to be a temporary fix until I could afford the time and money for hydraulic brakes. That money will now go for a GPS because I have no need for hydraulics.

It is difficult for me to explain in great detail a procedure such as this. If you have any questions, please feel free to phone or write me and I will try my best to assist.

Kevin Layden
25 Pondicherry Cres.
Dartmouth, Nova Scotia
Canada B2W 5C4
TF 902-462-5813

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

FOR SALE

Type IV 85 HP dual ignition VW scat.
Split port heads, completely assembled,
ready to bolt on to Type 1, 2 or 3 VW
case. Like new \$500.00. No collect calls.

Walter Melton
16305 N. Oracle Rd.
Tucson, AZ 85737
602-825-9730

WANTED

1 Altimeter (7 o'clock)
1 ELT
1 Transponder
Must be reasonable (very)
Contact:

Raymond Bergeron
119 Early Dr.
Powell, TN 37849
615-945-1429

WANTED

Posa Supercarb for 2180 VW conversion.
Must be unmodified and new or as new
condition.

Ken Jordan
328 Green Ave.
Carney's Point, NJ 08069
609-299-0498

FOR SALE

KR-2 20% finished. Just about everything
to finish. Call for more info:

Bruce Mitton
200 W. Main St.
Fayette, OH 43521
419-237-2139

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 199 DECEMBER, 1993

*Season's
Greetings*



KR NEWSLETTER

ISSUE NO. 200

January, 1994



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



TOM BAGNETTO'S KR-1, 911 TB, WICHITA FALLS, TX

Thought you might like to know that 911 TB (aka Nine-Eleven Teddy Bear) has had more honors bestowed upon it. The EAA Southwest Regional Fly-In at Kerville, Texas selected the KR-1 as Grand Champion Plans Built Custom. The RV, T-18 and LongEasy drivers were not happy, but who cares.

Since the 1992 Gathering at Covington, the overgrown model has won a total of nine trophies including two Grand Champions. It was chosen Best Homebuilt at Denton, TX, Ada, OK and Pauls Valley, OK. The other Grand Champion came from the Antique Aircraft Association Fly-In at Pauls Valley, OK where it was honored over the antiques and classics. A Peoples Choice, Best KR-1 and Best Interior at the 92 Gathering and Best KR-1 at the 93 Gathering account for the rest of the hardware. I would like to take full credit for the airplane's success but in all honesty it wouldn't have been possible unless Ken Rand had designed in the potential. If there is anybody trying to decide if they should build a KR, my advice is "Go for it, you won't ever be sorry"!

Tom Bagnetto, 4817 Reginald Dr.
Wichita Falls, TX 76308
817-691-1902

KR-2 WING IDEA

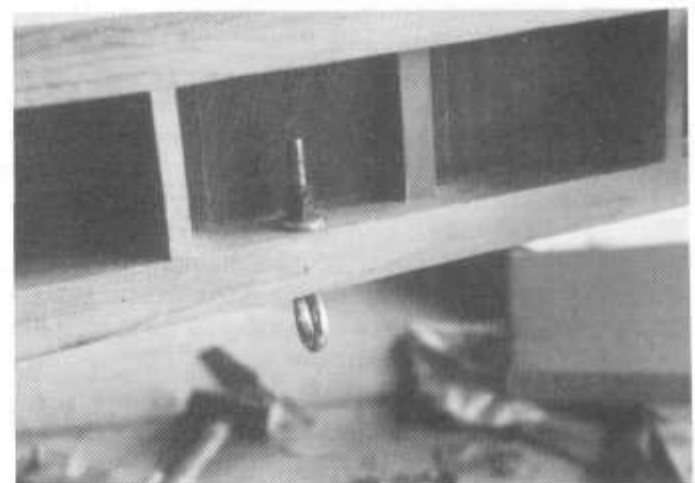
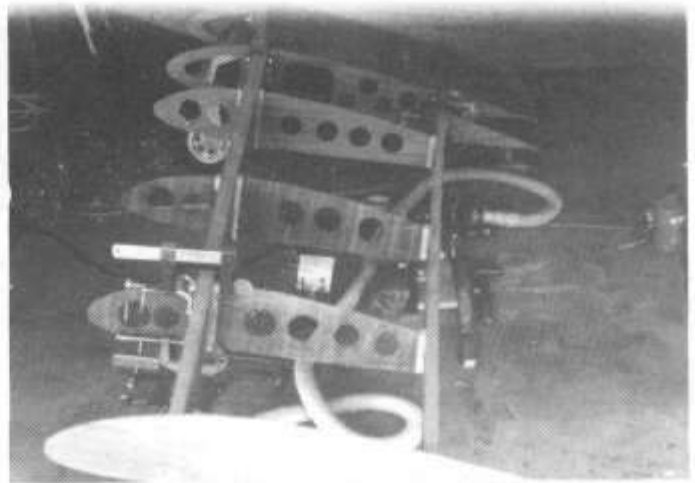
The following idea came from Ed Newton at my work who is very interested in building a KR-2 airplane. Talking this idea over with Ed one day, he came up with this idea and I couldn't find a 6 foot board to hold the weight of the six foot long board while sanding. I wasn't sure if I could sand the wing to the right size so I did this instead.

I first took the outboard wing template and the inboard wing template to a copy shop that could enlarge and reduce the blue prints or templates. The copy shop and I experimented with various $\pm$ sizes to get three templates that I could make $3/32$ " wood templates with to build the wings.

After making the wood templates for both wings (left & right) I glued them on the spars after I bolted on the spars to the plane. I've enclosed photos of all this. After I had glued the $3/32$ " wood templates on, I did use a few small nails to help keep them on, I cut out some two inch foam templates and glued these onto the wood templates as to the photos. I cut out the holes for less weight and I could put my wires through for my wing tip lights green and red I'm going to put on this KR-2. One photo is of my wing tie downs I got from a hardware store and put in before I closed the wing off with foam. I used three bolts on this so it will not come loose later on. I then started gluing in the one inch foam sheets. After I glued in all the foam sheets, I sanded the wing to contour with a shorter board with sandpaper glued on it. I sanded the wings out to make a nice wing contour then I fibreglassed my new wing with two layers of glass.

This is the way I built my wings so maybe someone can use this idea also.

John Cromwell
3824 W. Orangewood Dr.
Tucson, Arizona 85741
602-744-3303



DECISIONS DECISIONS DECISIONS

Many KR builders submit articles to the newsletter only after finishing a project and some will even write an article or two while building (thanks Monte) but I'm probably one of a handful to write one before cutting wood.

Years ago, as I was setting down criteria for what I wanted in a personal plane, I was drawn closer and closer to the KR-2 design. However, the only thing I didn't really care for about them was the VW engine (no rebuttals please, just a personal dislike - plus I have a Cont 0-200 that I'd like to build around) and the short coupledness of them. After attending the KR forum at Oshkosh in 1990 and listening to Mrs. Rand emphasis that no one should consider any larger engine in a KR, I wandered away feeling that perhaps there is no perfect homebuilt.

As I was wandering around the flight line at Oshkosh, I happened across a sleek looking plane with a conventional rotating prop. As I got closer it appeared to be a KR-2 but I knew it couldn't be since Mrs. Rand wouldn't condone anyone putting a larger engine in one. But as I approached the plane and met its proud builder, Roger Hansen, I found out it was indeed a KR-2 (modified) as he put it. After much discussion with Roger, I left thinking, what the heck, if he can do it so can I...after all, this is what homebuilding is all about. Anyway, I attended the KR gathering that fall and over the next year I studied up on the KR's all I could, wrote to Roger for more input, wrote to Dan Diehl about wing skins and his nose gear and also subscribed to the newsletter and bought all available back issues. At the Oshkosh 1991, I saw another sleek KR-2 with a Cont 0-200, this one belonging to Richard Ring. Over the next couple of years I bought my plans, attended Oshkosh when able and the KR gatherings in 1991 and 1992 where I was able to see Steve Alderman's Cont powered KR-2 plus I met Larry Fleshner who is building a stretched KR-2 with a Cont 0-200.

By this time, I was pretty well set on what I wanted. It was going to be a fixed, tri-gear, Cont 0-200 powered KR-2 with longer wing skins, a 14" stretch in the rear of the fuselage with some beefing up done to the forward fuselage and

firewall area. Even though I'd be on my own, I had gained a lot of knowledge of the proposed "mods" by talking to the many builders who have done them and through the articles appearing here in the newsletter.

Now for the best part of the story. For those of you who haven't been to Oshkosh the last couple of years or haven't been following the newsletters; Jeannette Rand has recently released plans for a new design called a KR-2S. This plane is exactly what I had decided to build. She says it is designed for those of us who want a bigger engine and more gross weight. It also incorporates the needed 14" stretch in the aft fuselage and has the necessary forward fuselage and firewall beef ups. Also, it is offered only in fixed gear (tailwheel or nose wheel) thus ending the complexity and aggravation of the old retractable gear.

What all this has to do with anything is this: The best thing that has happened to my decision making process is that it took so long. This gave Rand Robinson Engineering the time to evolve the KR-2 into a true beauty that will most certainly be a popular choice for homebuilders well into the 21st century.

My thanks go to all of you builders who did your own thing and put the big VW's and Cont engines in and more especially to Jeannette Rand for listening to the heartbeat, so to speak and for doing something about it. THANKS FOR THE KR-2S!

Let's hear from the rest of you. Gotta go cut wood now!

John Sickafoose
642 Ray Ave. N.W.
New Philadelphia, OH 44663
216-343-3964

The Great Paint-Job , Part 2
By Raymond C. Bergeron

As mentioned in a previous article, I am painting my KR-2, which off-and-on has been 10 years in the building.

Obviously, after 10 years I am apprehensive about what she will look like, that is - I want a good paint job also. I have been trying different paint systems and after quite a bit discussion and a bit of testing I have decide to go with a tried-and-true system that is available everywhere (Just in case I move AGAIN, and need repairs), DUPONT CENTARI, White.

Reading all the past newsletters in the KR NEWSLETTER, and anything else I could get my hands upon, I have come to the conclusion that if one wants a PERFECT paint job, you can NEVER finish the preparation.

What I mean by that is that 99.999% of all paint jobs is in the preparation (and that estimate is probably low)!

First I used a 4-1 micro mix (or dryer if it was hot outside and I could get it to stick) to fill in major low spots. On the high spots (invariable) you really have to make a decision as to whether to sand it through, fair it back and patch it then fair it in, or to fair in around it using great amounts of micro, or just let it be as a 'Beauty' mark. Each and ever undulation received my attention, and LOTS of sanding. It also is the BEGINNING of the realization that the 'Finishing' part of my KR starts actually at the beginning, as attention to detail in the INITIAL surface preparation, the sanding of the foam is probable the most important part. I honestly believe there is a 50 X 1 payback in time to be saved in attention to not over sanding at this point. < In my case foam dust got under my 8' sanding board between the ribs and sanded the foam to slightly lower then the ribs, causing a slight 'washboard' effect. This is probably only about 1/16", but after 200 hours of fill and preparation work you get REAL disappointed when you discover this, and there is nothing you can do about it, aside from applying 100 Ibs of fill, which would probably chunk off the first time your wing flexes.>

After sanding to a 280 scratch and getting rid of any *Observable* abberations I used FEATHER FILL (See comment a little later on) to fill weave and transitions. This is indeed great stuff as it sands easier then anything else I have tried and lays up a real hard solid surface.

Comment.... FEATHER FILL is a POLYESTER high-build product, and as it is polyester(just like the polyester resins) will NOT stick reliably to EPOXY (RR or Safety) surfaces. I had *LOTS* of problems with my initial build of FF flaking off.

CONT'D PAGE 5

It is at this point that I am sanding with 280 again then 400, noticing many pin-holes, and larger 'Holidays'. Back with Micro the FF. I guess the solid grey allows or enhances the ability to notice these areas. Oh yeh, despite what the can says on these primers you do not HAVE to spray them, at the suggestion of Norm Leonard I took 1/2" glue brushes (cheap, disposable) and touched up very small areas instead of spraying and having to clean my equipment.

After I have attained as-perfect-as-possible surfaces after 300 hours of sanding (yes, 300!) I *Lightly* with a *Slightly* Acetone dampened rag, wiped to remove dust, dirt and fingerprints (Considered by the paint to be small pockets of grease) I then applied DUPONT 1986S, which is a grey surfacer, and allows a good color holdout and surface.

It is at this point that I again noticed that the surfaces are less than perfect. Back to Micro, FF and more sanding (!). It is at this point that I decide that:

1. It is IMPOSSIBLE to have a PERFECT paint job.
2. Next time do the preparation in the beginning.
3. ABSOLUTELY buy Dan Diel's *Great* wing-skins. (They are fantastic looking, will save you 100++ hours of sanding, and will cost you less in the long run as you will not be investing \$150 in fill and primer and sandpaper (wings only). In fact if I were to do it again I would purchase *ALL* the premolded parts that are available, I would be money ahead and flying 8 years ago! (Probably a better plane also).

OK, so after 3 months of this preparation I decide enough is enough. Get EVERYTHING ready. I did my painting in my carport. I got 10' X 25' clear plastic sheeting and attached it all the way around at the top. Then got 2 box fans (21") and cut hole at opposite ends of the paint-booth and taped filters (available at Wal-Mart, 2/\$100) on the front and back of each fan. I taped EVERYTHING shut, swept and washed the floor, turned on the fans and let it dry, then vacuumed. Get out 4 mason jars (the ones with the oz. markers on them) and a empty clean 1/2 gallon glass container (Juice).

I used: Dupont 1986S surfacer

Dupont '8093S Acrylic Enamel Reducer*

Dupont 2000 performance pak

* This is the 'Slow' reducer, which gave me

more working time, more forgiving

Upon recommendation of several professionals I spent the extra \$50 on the performance pak, which includes 16 oz each of Gloss hardener and 16 oz of gloss enhancer. I also took their word and stayed with the same manufacturer all the way through, this is no time to discover that two systems are incompatible. Also used was a fish-eye reducer.

CONT'D PAGE 6

OK. Ready ?..., Last chance.... Go to the rest-room, take the phone off the hook and check the weather.

Now would also be a good time to chuck a bent-up coat hanger into your drill press set to low speed and start stirring the settled pigment into the paint (should take about 30 minutes, don't short-change this step). If the drill press is NOT slow enough, you will know it.

Get ALL your materials out. Mark with a grease pencil or indelible marker the mason jars as for each ingredient. I used:

2 jars marked for hardener/activator,	2oz each
1 jar for reducer	12oz
1 jar for pigment (paint)	16oz

Now vacuum again then wipe the bird with a tack rag.

Now put on your OSHA-approved respirator with a NEW canister and plug your spray gun into 40-50 lbs of air.

Pour and spray the 1986S surfacer directly from the mixed can without thinning. I like to spray horizontally first then in vertical fashion to prevent 'orange peel' or holidays (missed spots). This procedure also ensures a more even coat with less likelihood of runs or sags.

Now you have about 2 hrs to start the top-coat after surfacer application. This is because the topcoat will partially dissolve the surfacer and give a real good lock-in during this time (after 1 hr, but less than 2 @ 80 degrees). If you allow the surfacer to completely harden it is recommended that you sand it with 400 paper to establish a good scratch for the top coat to adhere to.

MEASURE using jars 1&2, pour and MIX (use coffee stirrers) the activator and hardener
MEASURE the well-stirred paint into jar #3
MEASURE the reducer into jar #2

Pour into the 1/2 gallon container the paint and the reducer then the mixed hardener/activator and add the fish-eye stuff. Mix thoroughly for about 2 minutes using a paint stirrer, then using a paint filter (Cone shaped, with filter mesh in the bottom, should be free from the paint store) and pour into the spray cup. You will have 16 oz. of mix.

Now, again, put on your OSHA-approved respirator, DO NOT SPRAY SOLVENTS WITHOUT PROPER PROTECTION !! 1

First spray a light coat all over, attacking the hard-to-reach places first. Now wait about 20 minutes for the VOC's to flash off. Then apply a second, heavier coat, this time -sorta wet- looking (The first 'Tack' coat should have looked almost dry when applied), BUT NOT TOO HEAVY, you should be getting the surface TOWARDS the final color in steps.

CONT'D PAGE 7

Finish this routine with what you have ready to paint, I did my fuselage first, then the wings, then the cowling (least important first, so I could improve towards the front).

It's best to apply subsequent coats. 2 or 3 more to go, at 30 minutes apart. The paint will remain good in the gun cup for about 1 hr, so do not be urged to use-up the paint remaining in the cup when you have completed a coat.

The secret to a good paint job is several THIN coats. You MUST resist the urge to cover it in 1 or 2 coats. It won't work - not without lots of runs and sags.

Now on subsequent coats loosen the tip of your spray gun so the fan pattern is 90 degrees to what it was the time before (30 minutes earlier), and spray accordingly at 90 degrees to the previous coat. Spray medium wet coats.

I sprayed 5-6 coats, the number of coats you will require is dependant upon a lot of variables such as type of paint, color (mine was white), color of undercoat (mine was grey) and such.

BE PATIENT, do proper preparation and ENJOY it. When you see the final coats of finish go on your bird after years of labor and it REALLY starts looking good for the first time you are going to be smiling like never before.

Now go outside your paint booth, leave the fans running, carefully clean all your equipment and have a coke. After about 2 hours I recommend turning off the fans and letting things harden on their own for at least 16 hours. The paint will be VERY soft for several days, so avoid laying anything on it or placing the wings back into their holders. In about 2 weeks the paint will be hard enough to be considered hard. It amazing, but the acrylic I used seems to *of* actually filled in and smoothed out during the second week.

Yes I still have some spots I could have, and should have prepared better, but you have to say its ready sometime, and heck, that's what second paint jobs are for.

Addendum:

My paint job, described above, took about 2 hours, after I got the above process down. The initial 'Wet Run' was terminated when a thunderstorm with 40 mph winds came through and thoroughly slapped my just primed paint job with wet plastic <check the weather>.

I have received several compliments from fellow EAA'ers and painted a neighbors truck and about to paint another neighbors car (at their requests). I must be doing something right.

My plane is now completed and am waiting on FAA "N¹ numbers, I intend on writing another (shorter) article as to its trials and tribulations, with attached photos.

FOR SALE

KR-2 All woodwork completed, tail feathers, interwings, retract gear, controls and more. Most all materials to finish. Lost medical.

Bill Knight
411 Mt. Alto Rd., #206
Rome, GA 30165
706-295-1276 days
706-235-9705 nights

FOR SALE

2180 engine firewall forward, new turtleneck, wheels and brakes. The engine was taken apart and cleaned out and pickled. \$1,500 for all.

James Rawlings
741 Woodbriar Lane
Ft. Charles, MO 63303
314-441-7517

FOR SALE

KR-2 75% complete excellent craftsmanship, Cleveland's, wheel pants, on tri-gear all controls, flaps, toe brakes unassembled type 4 motor over \$7,000 invested. Will sell \$4,000 OBO. Will consider trade for ultralight. Call:

Gary
508-255-4940 message

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$20.00 PER YEAR- U.S., \$25.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN INDIVIDUAL COPIES \$2.00 EACH.

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 200 JANUARY, 1994



KR NEWSLETTER

ISSUE NO. 201

February, 1994



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The **KR** Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



KEVIN LAYDEN'S C-FKEV, NOVA SCOTIA, CANADA

I have all of the KR newsletters and it is disappointing to see how many people spend years building a plane and only fly it a few times and sell it. There are some who enjoy building and have little interest in flying. I am concerned about the people who build KRs with the intention of having an economical, fun aircraft to fly, only to scare themselves on the first flights or damage the airplane and then sell it.

Cont'd page 2

NOT FOR SALE (FROM COVER)

I have been flying my KR-2 for three years now and have 200 hours on it. It is a Diehl fixed gear taildragger. When I started flying it I had no tail wheel experience at all. I have never had a problem taking off, flying or landing this airplane. Is this because I am an experienced pilot? Hardly, I have just over 260 hours total time. My success has come from my ability to listen. I read all the flight reports in the newsletter many times. I choose a good test pilot and listened to what he had to say after he flew the plane. I flew with him for 14 hours. I taxied that airplane until the tires were nearly bald. Slow at first then with the tail up. My first taxi tests were on a grass strip. Grass will help dampen your control inputs because your gear will not have a positive contact with the surface as on pavement. Even after I mastered high speed taxiing on grass, I had to start off slow again when I went to pavement.

My test pilot, Bob Poirier and I would fly for a few hours and then I would taxi alone for a few hours. I always flew right seat with Bob and never landed or took off until my first solo. We shot approaches until I got it right every time. I taxied until I had good control all the time.

Then came the big day. It didn't start out as the big day, it just happened. We had a good day of flying and I had a good day of taxiing. It was beautiful Sunday evening and everyone had gone home. I told Bob that I would make three more fast taxi runs and if it felt good on the third run the throttle would stay forward. I used the grass strip, there was no wind and it felt great. I flew for about fifteen minutes and made a great landing. Bob wanted me to fly again but I said no. I may wreck her tomorrow but today is mine to enjoy and remember as something special.

People spend years building and then try to rush the first flight. What is the big deal about being the first to fly your airplane? I know you built it and this airplane is very special to you but it is still just a machine. Isn't it better to be safe and successful than first?

I have read where pilots have landed a KR in 70 mph winds and taken off in 40 mph 90 degree cross winds. Routinely doing this is not good for your health. I know

what a 60 mph approach is like in a C172 and I know it would have been impossible in a KR at that airport that day. At first I only went up when there was little or no wind or turbulence. I used only good grass strips at first.

I gradually flew in more wind and used paved strips. So far I have never scared myself. A KR's pitch sensitivity increases with weight so don't go putting too much weight in that passenger seat just yet. If you are building a KR, install flaps. I find that they are great for getting the tail up on final and increasing visibility over the nose. I also use two notches for take-off, it gets the tail up sooner and shortens the roll.

I am sure many people are approaching too fast for a landing. I approach at 55-65 mph solo and 65-70 mph with a passenger, depending on conditions. I have even approached and landed at 50 mph. If you have any concerns about this go up high and practice approaches from 3000 ft down to 2000 ft. Adjust your speed for conditions, don't get too slow if it is rough. I have mechanical toe brakes and seldom have to use them on the landing roll.

Being apprehensive about your first flights is normal and good. You must overcome it if you are to enjoy your aircraft. If you take your time and spend a few weeks or even months working up to that first flight it will be very rewarding. You may have no intention of selling your pride and joy now but scare yourself on one of those first flights and watch how fast you change your mind.

Readers with all the back issues of the newsletters didn't read anything new here. I just told you of the great experiences I had following good advice.

Keep flying on a regular basis at first so that you will not become apprehensive. Don't spend too much time thinking about flying, just get out and do it. KR's are fun airplanes if you take your time and build them right, then have the patience to learn how to fly them well.

My wife and I had a great summer of flying last year. We are planning longer trips for 1994. Does anyone have a GPS for sale?

Kevin Layden
25 Pondicherry Cres.
Dartmouth, Nova Scotia
Canada, B2W 5C4

GROUNDING IN AUSTRALIA

As we plane builders here in America go through the trying process of accomplishing all of the tasks necessary to get our crafts built and airworthy, we barely give a second thought to the paperwork part. Doing all of the things required by the FAA to get it licensed, assign an N number and be totally legal as we taxi to the active with our hearts pounding for our first flight. It really is easy for us; a mere formality.

But in other countries, it can be a different story. Imagine having your plane built and ready to go but then the government aviation authority says "Sorry, fella." Well, that's the case for our KR brethren in the land down under.

Last November, I received a call from a frustrated chap who explained his dilemma. He had seen my ad in the newsletter when I had my last KR project for sale some six months earlier. He noticed in the ad that I had the fixed aluminum gear. He nicely requested that I send to him a letter stating that I had in fact built and flown a KR-2 with the aforementioned gear. I did so and mentioned in the letter how the gear worked out and how many hours I had flown the airplane. It did not matter that I no longer owned the plane.

FOR SALE

Subaru EA81 w/acc. \$350.00
KR-2 Retract gear \$100.00
Wanted for KR-2: Canopy, VW 1835, ace. case, mount, prop, fixed gear.

Rick Demand
P. O. Box 10982
Eugene, OR 97440
503-895-2335

FOR SALE

KR-2 wing skins \$575.00

Dennis Vanfossen
34770 County Line Rd.
Yucaipa, CA 92399
909-795-1980

Now I have received a letter from Graham that the CAA is requiring a total of six such statements. There are no other builders in Australia with a KR-2 aluminum fixed gear that are flying. However, there are two other than Graham that are ready but can't go!

I would like to urge anyone reading this who has built a KR-2 with the aluminum fixed gear and flown it, to please take the time to sit down and write Graham. Simply state that you built the plane, you modified the gear, you successfully flew it and it worked.

Let's be good neighbors to our friends around the world and help our fellow KR Family members in this matter. If we will, I am sure we will hear from Graham in the newsletter soon telling of his exciting first flight.

WRITE TO:
Graham Schott
7 Brisbane Street
Ashgrove 4060
Brisbane, Australia

Lloyd Buckner
1387 Hartman Dr.
El Cajon, CA 92020
619-447-0295



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITMAN AIRFIELD OSHKOSH WI 54903 3086
PHONE 414/426-4800

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - • EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

RETRACTABLE LANDING GEAR N32U "GYPSY"

(Featured in issues #187 and #195)

This is the second of two articles I promised dealing with the only two sub systems on the "Gypsy" N32U that I considered inadequate in operation during the first 50 hours of flight. The first, "The Tailwheel" I felt had top priority and this one dealing with the KR retractable landing gear runs a close second.

This article will first define the operational problems I have encountered and then my solutions to solving them. In my opinion the KR retractable landing gear as designed is a masterpiece of simplicity and function, however to make the dandy little airplane a joy to fly and smooth out operations, increase capabilities and safety a few changes and additions are required. First, with a center stick control system the pilot's right hand is dedicated to pitch and roll control as well as radio, xponder, canopy locks and instrument operations and gets real busy during take off and especially landing. The feet can get pretty busy about the same time so this leaves the left hand to perform the rest of the functions required. Throttle, mixture, carb, heat, cabin heat, cabin ventilation, pitch and roll trim, cowl flaps, boost pumps, brakes, canopy lock L/H. Last but not least... all retractable landing gear functions and operations which includes unlocking the left and right down locks and retracting the gear to the uplocked position immediately after take off. Now this part may seem simple but how did you unlock the right down lock and the left down lock simultaneously with your left hand.

Now with the gear in the "trail" position, how do you raise the gear to the retracted and uplocked position with your left hand?? Even with the shoulder harness released and with my right hand finger tips, my arm was not long enough to lock the gear up! I finally figured out another way to accomplish this simple little task. I lifted my right foot off of the rudder pedal until my knee almost touched my chin. Then I twisted my foot to the right over on top of the gear function level and pushed it to the floor to the uplocked position while taking some of the skin on my right shin bone and

depositing it neatly on the bottom of the instrument panel. About this time the FAA tower became quite concerned and demanded to know why I was doing aerobatics and knife edge flight about the mid field during take off! A KR with 60 H/P does not do knife edge flight. So after getting the ball back in the middle and establishing a positive climb angle, I then apologized to the tower for my unorthodox antics. I told them I was having "operational" difficulties with gear retraction and would not repeat the rules violation.

While building the "Gypsy", I saw the need to connect the two down lock levers together to act as one from the left side. **Photos #2 and 3** show how the right lock was cut off and rounded. An aluminum tube running through (4) bushings with arms and springs on the ends connected the two down locks together and provided spring tension in the down lock as well as uplock positions. The first act of the gear unlock problem did not happen to me because I solved it before the first flight. The situation from the "trail" position did happen because of my oversight and determination to improvise and could have made a major change in the status of my estate. **Photos #7, #8 and #9** show how I proceed to make the "trail" to "uplocked" function with an 8 inch pull with my left hand. Photo #7 shows a 1/16" cable swivel mounted to the inside of the gear function lever slightly above it's center. Note the two notches below the swivel, the brake cable running along the fwd top corner of the spring bar can be slipped into these notches for parking brakes. Photo #8 shows the floor mounted pulley and the firewall mounted pulley. Photo #9 shows the cable coming from the firewall pulley and around the third pulley which is fwd of the "T" handle fairlead and "T" handle. The "T" hand fairlead is clamped to a "U" shaped extrusion that is supported by the (2) 3/16" bolts that hold the left hand rudder bar split clamp together and to the crossover wood structure which makes a very rigid cantilever mount for the "T" handle. With this system in place you can unlock the gear to "trail" after take off with a good climb angle and a 8" total left hand pull straight aft and the gear is up and locked without as much as a bobble in your flight path.

Release the "T" handle and it will hang down on the cable between your legs until you lower the gear. When the gear

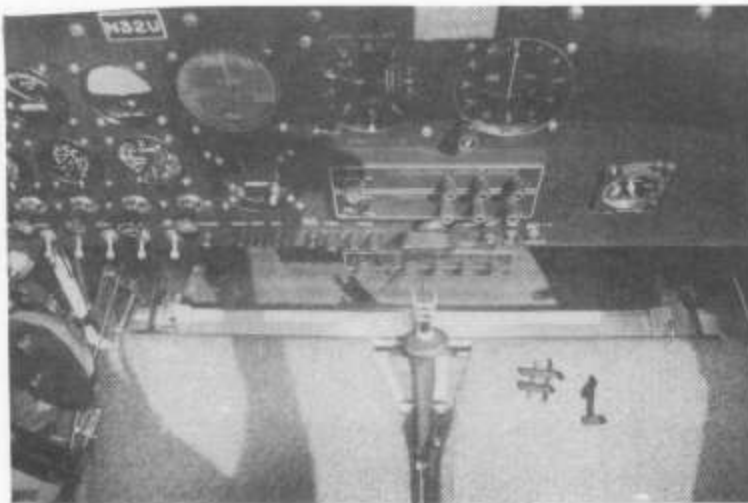


PHOTO #1

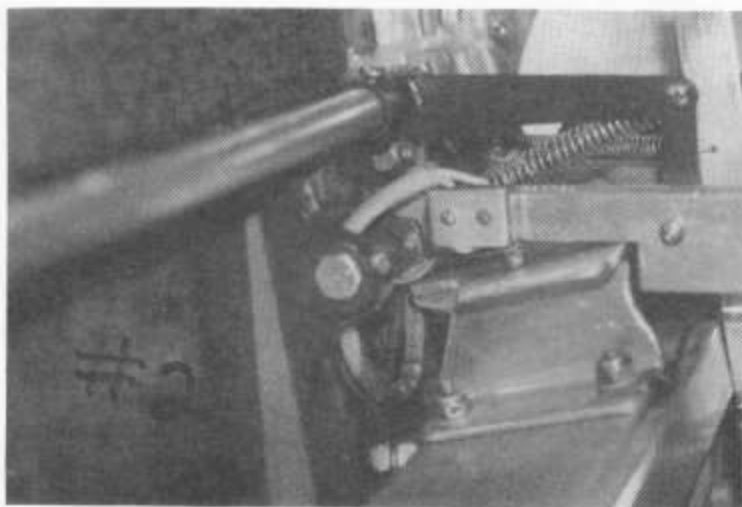


PHOTO #2

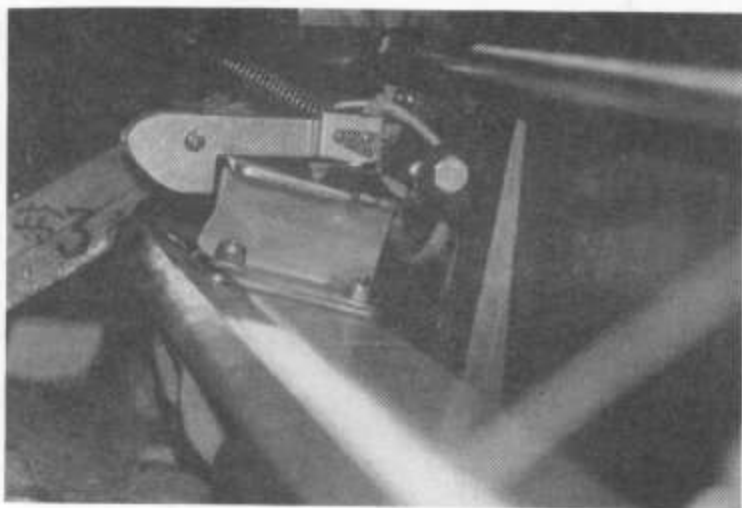


PHOTO #3

is down you lower the gear. When the gear is down and locked the "T" handle will be back in the fairlead ready for the next gear operation. Neat, simple... yes, foolproof? NO!!! Always remember that gadgets can getcha! NOTE: The three pulleys have close fitting side mounts and cable retainers close enough that the cable cannot (repeat) cannot become disengaged from the pulley groove and get jammed. The cable can never be allowed to get wrapped around anything or jammed when the gear is retracted because if it does you may not be able to get the gear down and locked. If you install this retract cable system and you feel that it is not absolutely foolproof, carry a good quality wire cutter with you until you are convinced you don't need it to cut the cable between the floor mounted pulley and the swivel on the gear lever. So much for the "gear up" phase of the KR retractable gear system. The rest of this article deals with the "gear down" operations that include high speed taxi tests, hard landings, hard braking, ground loops or any condition that can cause the gear to retract inadvertently.

The 18 years of KR Newsletters in my file show a vivid continuing thread of broken props and belly damage due to accidental or uncommanded landing gear retraction. The one feature of this simple retractable mechanism that has caused most of them is the unsupported 1/4" bolt that the landing gear down locks and left hand uplock bars pivot on. Any aircraft operation that puts an aft load on the main gear wheels when they are down and locked causes a forward load on the down lock bars. This force if great enough can bend the unsupported pivot bolts forward. As the lock bars move forward, the main spring bar rotates as it moves forward. The "I" beam extrusion on the top of the spring bar also rotates as the lock bar moves forward until the aft corner on the top of the "I" beam extrusion strikes the lower surface of the down lock bar and drives it up until it unlocks from the front of the "I" beam extrusion and the gear retracts.

Photos #2, #3 and #6 shows how I eliminated this problem during construction of the "Gypsy". I installed a 1/8" inch thick 90 degree angle on both sides of each lock bar. The 1/4 inch

CONT'D PAGE 6

pivot bolt passes thru both angles as well as the lock bar. The angles were made long enough at the base to be able to use (2) 10-32 flush head bolts to hold each angle to the forward face of the fixed hinge casting. The flush head bolt heads were countersunk into the aft surface of the hinge casting for a flush surface against the main spar. You will note, the angles are tapered as they come out around the pivot bolt with at least 1/4 inch edge distance. Note how the down lock springs are hooked around the pivot bolts and connected to the lift arm to swing link pivot screw on the outside of the lock bars while the gear warning switches are mounted on the inside. These two coil springs give a crisp action to the down lock function and is redundant. **Photos #4 and #5** shown my automatic downlock latch assembly. The latch plate with the oversized square hole in it is hinged to the mount bracket plate on it's outboard edge. The little vertical bar with pivot bolt at the top and a spring hooked to it a couple of inches down continues down below the main spring bar about 5 inches. This little bar rides against the spring bar and has a swivel mounted link attached to it which connects to the swivel on the bottom of the latch plate. The spring holds the latch system in the shown position when the gear is down and locked. To raise the gear you merely push the spring loaded latch plate forward with your left forefinger as you bring the rest of your fingers under the left gearlock bar and raise it to unlock the gear to trail. The main spring bar rotates forward as this happens and pushes the spring loaded vertical arm forward. This in turn pushes the link forward and the latch plate swings forward almost 90 degrees. As the lock bar drops into the up and locked position, the latch plate is totally clear of the lock bar. When the uplocked lockbar is lifted to lower the gear to the trail position it is released to ride on top of the "I" beam extrusion. The latch plate stays completely clear of the lock bar until you reach over both knees with your left hand and pull the gear function into the down and locked position. The latch plate snaps into the shown "latched" position as the gear lock bar drops down to locked as shown. This

CONT'D PAGE 7

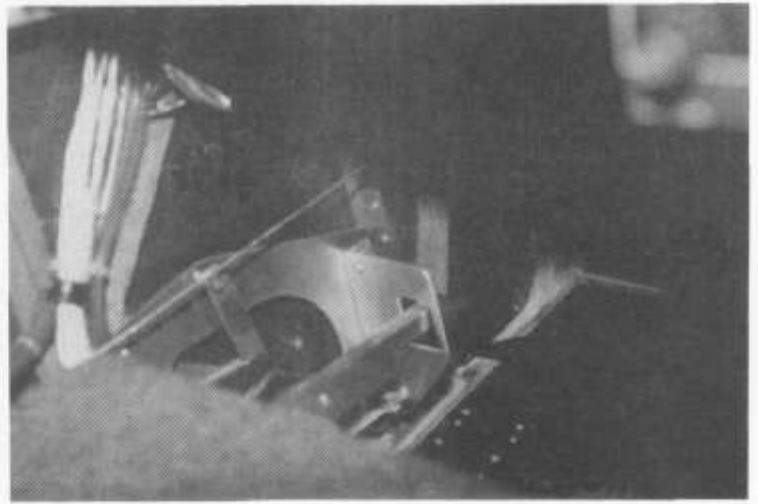


PHOTO #4

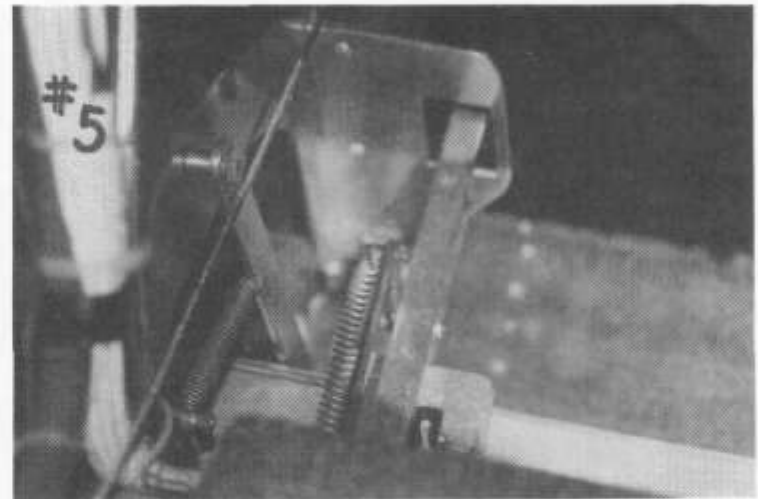


PHOTO #5

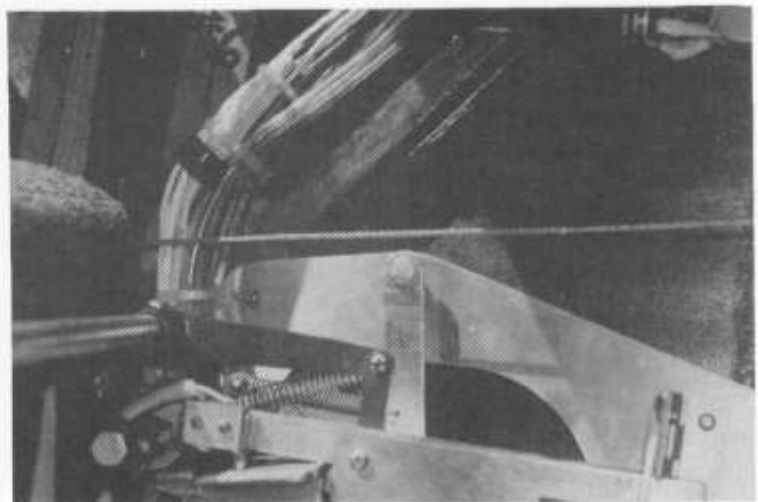


PHOTO #6

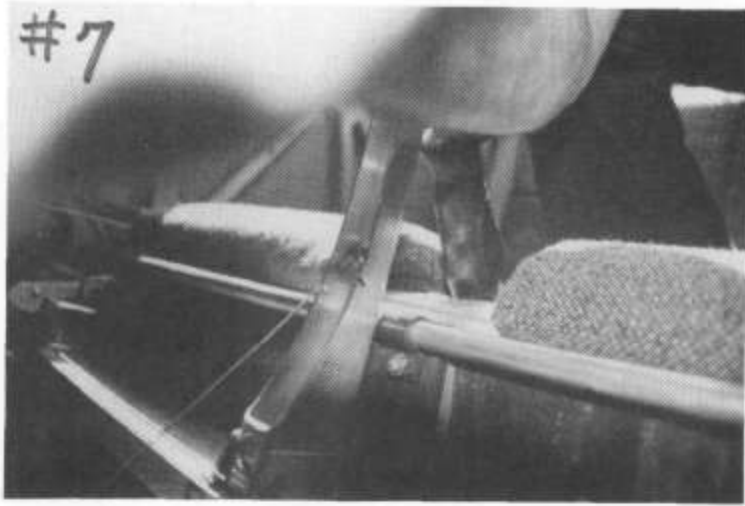


PHOTO #7

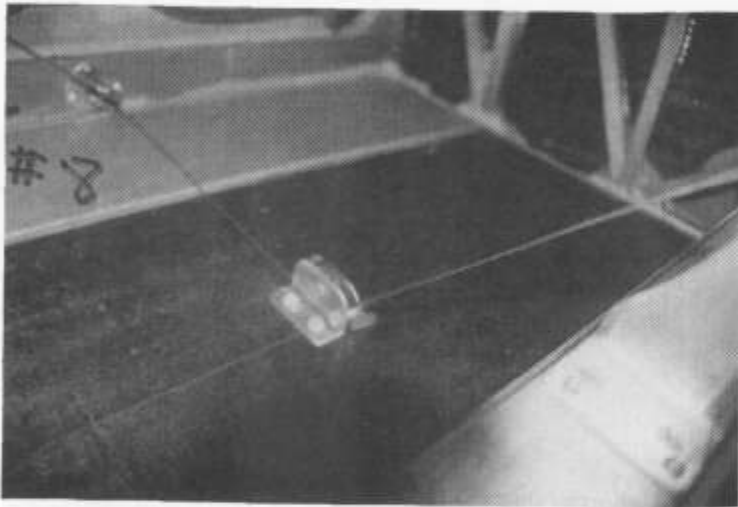


PHOTO #8

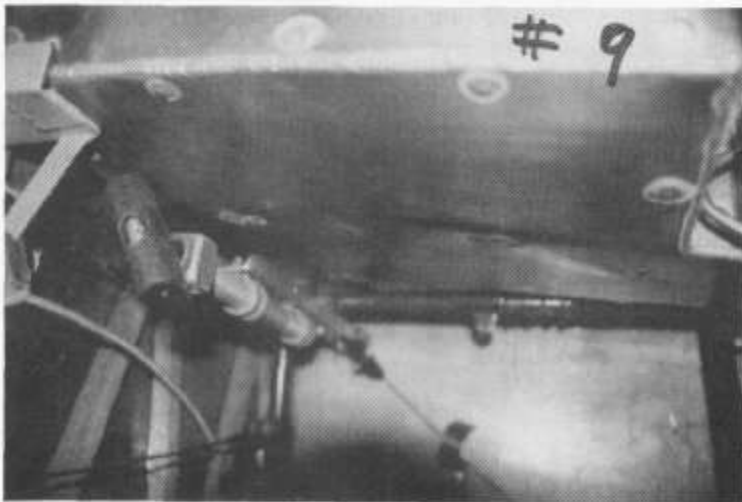


PHOTO #9

down lock latch system will prevent inadvertent accidental gear retractions unless you break something and even your passenger can't lift the down locks with his or her pant leg or cuff while shifting position or any reason. Photo #1 is an overview perspective of the "Gypsy" cockpit landing gear, panel and controls for reference only. Some of you may not agree with the logic I have used or the methods to solve the previously mentioned problems but so far the modifications and changes have proved successful on the "Gypsy". The problems I have mentioned previously refer to the 1975-1978 vintage kit and assembly book configuration that is the "Gypsy" and may not apply to the latest version being sold. I do not consider myself an authority on the KR design nor am I a qualified tech writer. The names of the different parts are as I have identified them by function.

The nine photos tell the story and if any of you KR pilots out there feel that I have bumped into some of "your" operational problems on this great little retract system I may be able to help. While this is not a commercial venture, if you will send me a self-addressed, stamped envelope and a letter describing your problem and requirements. If there is enough interest I will produce sketches and info sheets as required and send them to you. May all your take offs and landings be uneventful in the future but watch out for those "gadgets"!

Ralph Sawyer
45432 Leatherwood
Lancaster, CA 93534
805-948-9642

FOR SALE

KR-2 in boat stage includes all parts to complete, except engine and instruments! Built with fixed landing gear. Will consider best offer for whole package! It needs to be completed and flying high!

T. A. Boettcher
66960 Keeler Ct.
Dowagiac, MI 49047
616-424-3662

FOR SALE

KR-2 with fixed tri gear, MAPI 1835 engine. Flown five hours. Have \$13,000 into it and will take \$5,000 FIRM. I will even put it in a container for the buyer. It's priced so anyone can afford the \$1,000 or so to ship back to the mainland.

James W. Burns
P. O. Box 602
Kihei, Maui, HI 96753

KR NEWSLETTER

P.O. Box 579
Lakeville, MN 55044
Issue No. 201 February, 1994

WANTED

New or used epoxy pump with the ratio set to use Safe-T-Poxy. Call

Brent Bourgeois
504-785-8299



KR NEWSLETTER

ISSUE NO. 202

MARCH 1994



P.O. Box 579
Lakeville, MN 55044

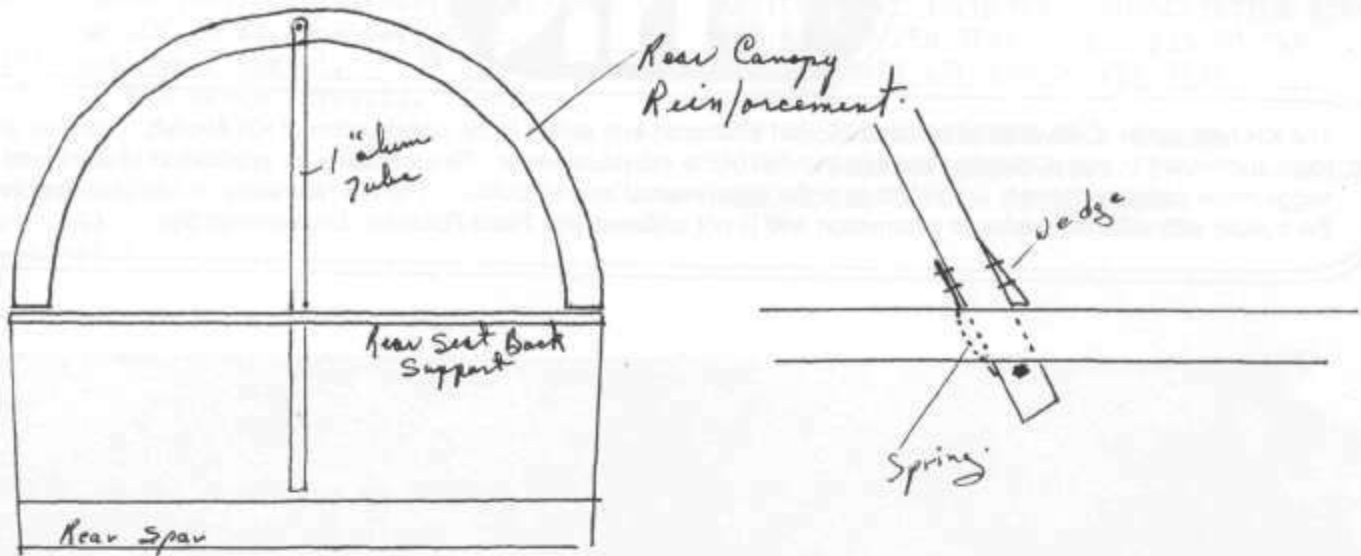
The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



GEORGE DOBBS¹ C-FGFJ, ONTARIO CANADA

My KR-2 is flying well with a Continental 85 (no electrics). Diehl tri fixed gear and 19" stretch in fuselage. Empty weight is 700 Ibs. with CG at forward limit, full fuel and light pilot. 1" aft of rear face of front spar with 2 aboard. I'm 6'2" and 190 Ibs. It actually flies 5 mph faster with two (150 mph) and 145 mph with pilot only. RPM with a Sterba 59 x 64 prop is 2600 max in air and 2500 static. It took some time getting the approach speed down from 80 to 60 mph for landing on our 2300' grass strip. (See George's "Canopy Support" article on following page.)

CANOPY SUPPORT



Rivet tapering aluminum wedge one side of tube. Rivet light spring leaf other side. Reinforce oblong hole in seat back support with .040 aluminum for wedge to rest on. Drill 3/16 hole in tube below seat back support and install 3/16 bolt to stop up travel.

The spring and wedge holds canopy in open position and will not unlatch unless pilot puts slight pressure against spring to release wedge. This arrangement in my KR-2 resists gusts and start-up air loads very well.

George Dobbs
141 Main Street
Exeter, Ontario
CANADA NOM1S1

1994 KR GATHERING

The 1994 KR Gathering will be in Columbia, Tennessee - (MRC) on October 7, 8 and 9. The awards dinner will be Saturday night, make plans to attend.

Everyone will find lots of things to do in the area this weekend with Fall colors peaking, nations largest Arts & Craft fair, historic Columbia, Grand Ole Opry and OPERYLAND.

The host hotel is the RAMADA INN, Columbia, TN (615)388-2720. Room rate is \$34.95 (single or double), if reserved by 9/23 as part of the KR GATHERING. Contact:

Jim Hill
(205)882-2054

or

Bobby Muse
(615)790-5365

These notes describe the construction of my KR2 that is not yet complete.

Curving the fuselage sides

Instead of converting the fuselage sides to banana shapes during the boat assembly as described in the plans, I found it easier to bend each side to the desired shape with the side flat on the bench. The top longeron doubler can then be glued to hold the curve in the side. However, care needs to be taken when releasing the curved side from the jig as all that is holding the side in shape is shear strength of the glued joint between the upper longeron and doubler. I made sure the glue was well cured before releasing the side (I gave it a week to cure) and store the side in a jig to relieve the stress in the glue joint.

KR2S Modifications for a KR2

If you are building a KR2 it would be well worth looking at the KR2S plans before building the fuselage sides. The KR2S contains some significant improvements to the firewall area and region around the front spar to fuselage side intersection. These improvements include a doubling of the top engine mount rail thickness and extra top longeron doublers at the front of the fuselage sides. The tail spars are also laminated to increase the strength where needed. These modifications appear to offer a significant increase strength for a minor increase in weight. Anyone considering a heavy engine should check the KR2S modifications.

Fuselage Side Assembly

After much trial fitting I decided to build some simple jigs to hold the fuselage sides in shape during assembly. The Station "A" and tail jig were female jigs and the station E and H jigs were male jigs. After making these jigs "square" (I used some 1/2" scrap ply) all I had to do was to fit the sides in the female jigs and around the male jigs then align and level the jigs. I used a plumb bob (\$2 well spent) to check the vertical alignment of each jig and set

the fin spar sweep. A piece of clear PVC tube was used to level the front and back of the fuselage and a spirit level was used to laterally level the fuselage sides.

Making the Firewall Vertical

While the fuselage was set in the jigs as mentioned above, it was easy to mark a vertical trim line down the fuselage sides at the front to ensure the firewall is vertical to the top longerons (see KR Newsletter November 1992 for the reason for this). In preparation for the trim, I used a larger "A" Vertical member (1" x 5/8" in place of the 5/8" x 5/8") in the fuselage side so as not to weaken the firewall to fuselage side attachment.

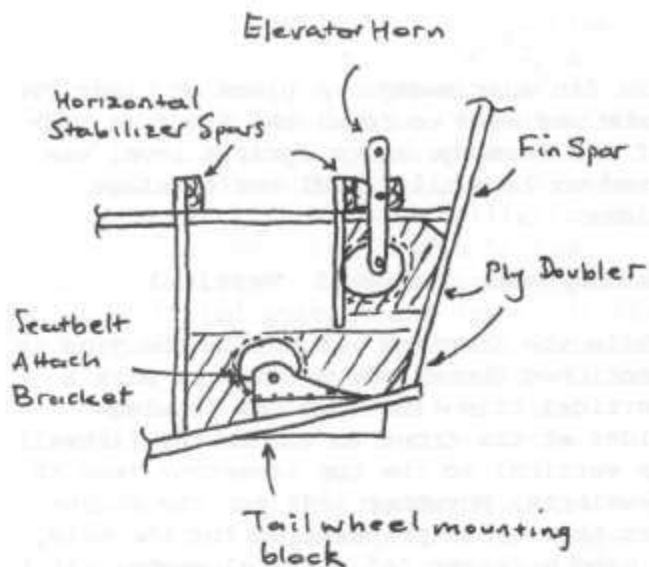
Inspection Holes

While the fuselage sides were being made, I cut some circular inspection holes in the rear skin and glued in some strengthening ply. This is easier to do while the sides are flat than when they are assembled. The only problem is determining where the inspection holes should be, how large they should be and how they holes would alter the strength of the rear fuselage. I wanted to be able to inspect and reach if necessary the cable connection to the elevator horns and the seatbelt cable connection to the bracket attached to the tailwheel bolts. The cutouts of the inspection holes will be used as the covers for the holes and they will be attached in place using a rubber bungee.

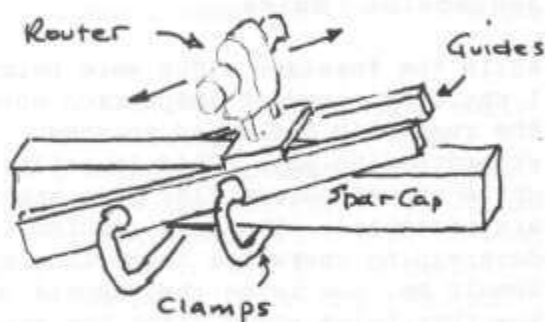
Wing Spar Caps

If you don't have a decent bench saw to cut the spar caps to the desired shapes then you might find it easier to use a router and a couple of straight boards or narrow pieces of ply wood clamped to the sides of the timber as guides for the router. With careful alignment of the guides, my spar caps came out the desired shape and with a good finish. I took small layers off at a time so as to get a smooth surface at the end.

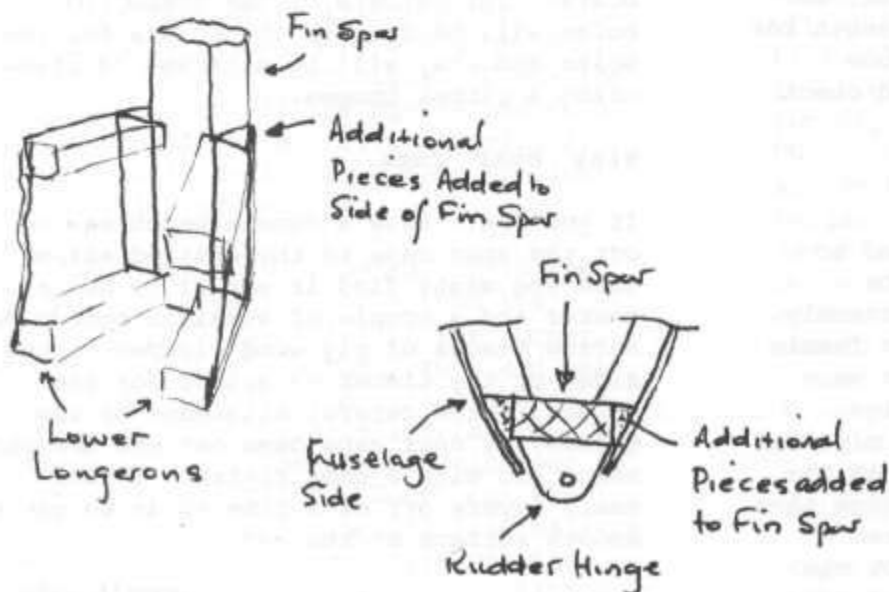
CONT'D PAGE 4



Rear Fuselage Inspection Holes



Shaping Wing Spar Caps



Additions to Fin Spar

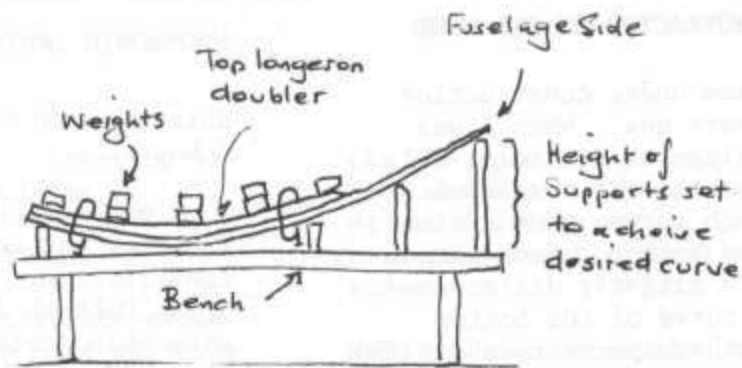
Pin Spar

Rather than cut the rear fin spar to the tapered shape of the rear fuselage, it might be better to either laminate some spruce to the sides of the lower fin or better still make the fin out of wider material. The resulting width of the rear fuselage aft of the fin spar will then better match the width of the rudder.

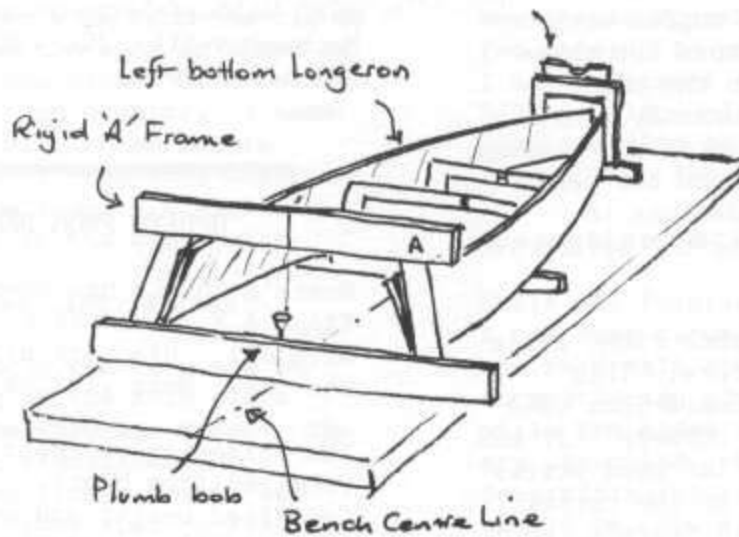
Advertisant

HelpI I need a letter stating hours flown and any problems encountered with fixed tri gear (please state manufacturer) or dual controls (please supply a drawing if available). This is to get Australian CAA approval for these modifications (if only we had an Experimental Category1).

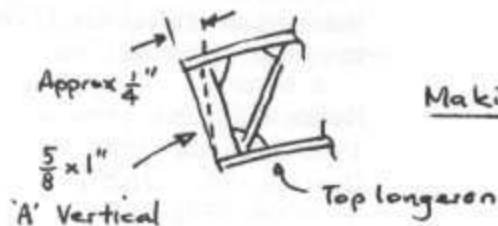
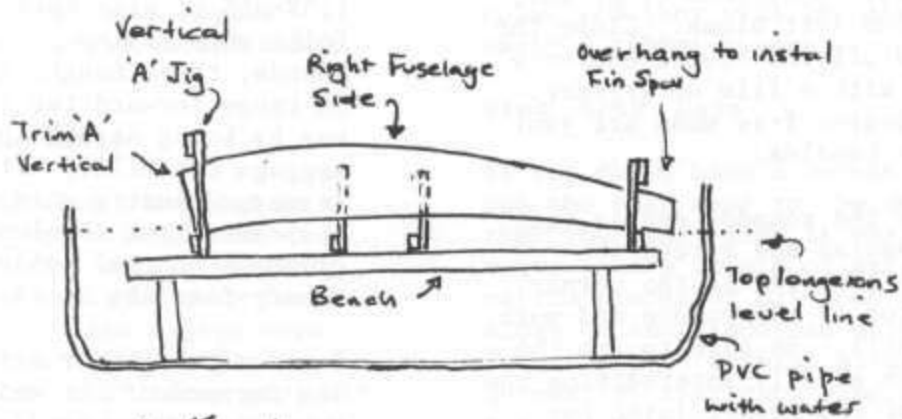
Please write or drop in to Bill Ginn, 41 Meragi Road, Singapore 1648, Tel 5457585.



Curving Fuselage Sides



Fuselage Side Assembly.



Making The Finewall Vertical

My KR-2 has been under construction for over seven years now. When I was building the fuselage side panels, all those little gusset blocks cut and fitted from 5/8 x 5/8 inch spruce were a time consuming, tedious bother. Each gusset and brace was at a slightly different angle due to the curve of the bottom longeron. Altogether there are about 250 of these fitted gussets and joints in the KR-2 fuselage "boat". The first side took me 15 hours of measuring, cutting, fitting and refitting with lots of scrap and rejects just for those little blocks.

I tried to measure the angles with several different protractors but these were too large to get into the small corners and would not accurately transfer the measurement to the spruce for cutting. I really did not need to know the angle number. All that was needed was to transfer the measurement to the spruce for cutting.

I bought a flat 3 x 3 inch right angle bracket at the hardware store. This bracket is a standard hardware item used to reinforce wood cabinet corners. It has 4 holes for counter sunk flat head screws. I cut the bracket in half at the corner with a hack saw at about 45 degrees (not a critical angle) to make two flat strips about 5/8 inch wide and 3 inches long. It is important that the strips have parallel sides. Then fasten the two pieces together at the square end with a 10-32 flat head screw and a 360 stop nut. Adjust the tension so that the two "blades" will slide past each other but will stay put when left alone. Close the blades and round off the square end to a constant radius with a file or grinder. The tapered 45 degree free ends are just right for finger handles.

To use, place the rounded end in the corner to be measured and spread the blades to get an even fit in the corner. Lay the protractor on the spruce and mark with a sharp pencil. Be sure to get the grain orientation equally intersecting the interior sides of the gusset joint per FAA standard practices. Rough cut the spruce and sand to the pencil line using a disk sander. With very little practice you can get a perfect fit on that little gusset the first time every time. Fitting gussets for the second side of my KR-2

using my custom built protractor only took 3 hours.

I am still using my little protractor for deck and canopy fitting and wing construction. Some of you may have seen it at Oshkosh last summer during the Diehl wing skin installation demonstration at the Woodworking tent. In '94 I plan to trailer my KR-2 back to Oshkosh to demonstrate conversion from a retract trail-dragger to a fixed tricycle gear.

Sid Wood
4785 Waldorf-Leonardtown Road
Mechanicsville, MD 20659
301-475-5389

UPDATE FROM DENTON, TEXAS

Monte's N684LM has been signed off by an FAA D.A.R. His KR weighed in at 509 Ibs with oil. His test pilot is chompin' at the bit. More will be coming from Monte!

The following excerpts were from a letter received from Monte. The chart on page 7 (modified weight and balance page from plans book) was also submitted by Monte:

I called Jeanette Rand on February 28 and gave her 684's weight and C.G. data. Also asked about the May '86 change in the plans CG range. Used to be two inch shift aft at 8"-16" from wing inbd leading edge (15%-35% of wing cord). Because so many folks were flying porky KR's at 1100 pounds, they thought they would push the CG range forward two inches. My complaint was by being at 509 Ibs, I had lost baggage capability aft of the seatback. Anyway, Jeanette said rig a mesh hammock suspended from the longerons, keep it clear of control cables and stuff up to twenty-five Ibs in it.

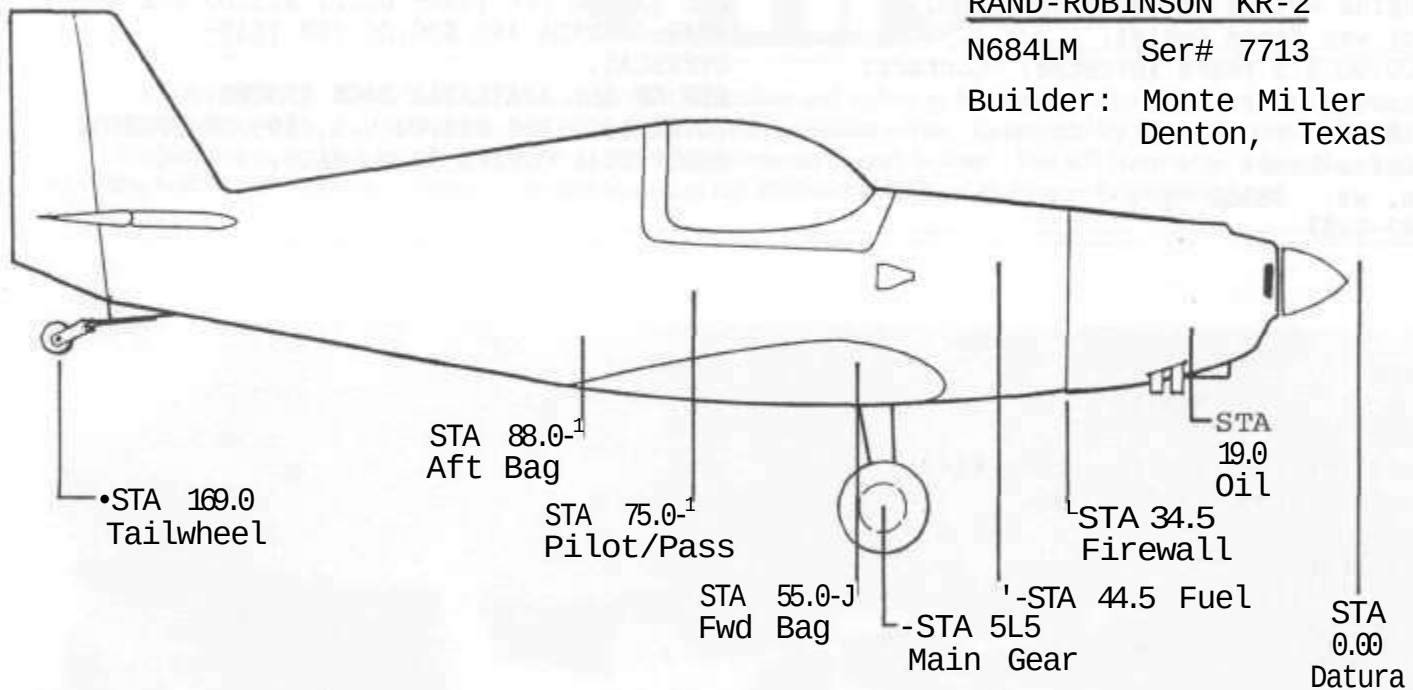
I can also carry a soft duffle at 5 to 10 Ibs forward of the main spar on the passenger side, so I've got adequate baggage for two.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871

RAND-ROBINSON KR-2

N684LM Ser# 7713

Builder: Monte Miller
Denton, Texas



A/C Empty Weight: 509 Ibs. CG Range: STA 53.75 to 62.50
A/C Gross Weight: 900 Ibs. (6 "-15" Aft of LE)

	WT.(Ib)	Tare	Net Wt.	Arm (in)	Mom.Wt.
LEFT WHEEL	251	- 0	= 251	.X. 51.50	= 12926.5
RIGHT WHEEL	246	- 0	= 246	.X. 51.50	= 12669.0
TAIL WHEEL	12	- 0	= 12	X 169.0	= 2028.0

AIRPLANE EMPTY CG (with oil) = 509 ÷ 27,623.5 = 54.27
STATION

A/C Empty				
Pilot Only				
Fuel (gal)				
CG Station				

A/C Empty				
Pilot & Pass				
Fuel (gal)				
CG Station				

A/C Empty				
Pilot & Pass				
Fuel (gal)				
Baggage				
CG Station				

FOR SALE

KR-2 Tri-gear, N723RD, certified and test flown in June 1993. Total hours airframe and engine 40+ as of December, 1993. Builder was Reece Daniel. \$14,500.00 & 5 years invested. Contact:

Louis Peifer
242 Kitfox Lane
Sequim, WA 98382
206-683-9427

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$20.00 PER YEAR- U.S., \$25.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN INDIVIDUAL COPIES \$2.00 EACH.

WANTED

Complete set of plans for early KR-2 with serial number before 475.

Ken Stichter
P. O. Box 80173
Fairbanks, Alaska 99708
907-479-2537

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 202 MARCH 1994



KR NEWSLETTER

ISSUE NO. 203
APRIL, 1994



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



YEE HA... FLIGHT REPORT ON N684LM, MONTE MILLER, DENTON, TX

At 1835CDST, 18 April 1994, Experimental N684LM reports on 122.7 Denton UNICOM that he taking active 17 for a high speed taxi test. At approximately 1835:10, my KR-2, piloted by Captain Don Pierson, passes the runway midpoint at 200 feet altitude, pitches to a 750FPM rate of climb and is out of sight in a New York minute. So much for the taxi test.

(cont'd page 2)

The first flight lasts fifty minutes. Initial impressions radioed by the pilot indicate the aircraft will require no changes to its trim or rigging. Engine revs are held to 3100 RPM with 140 MPH indicated at this throttle setting. Oil pressure and temperature plus cylinder head temp are all within limits. With power off, a pre-stall buffet is noticed at 45 MPH indicated. No full stalls are attempted during this flight test. Different throttle settings and instrument readings are dutifully radioed and recorded by an anxious builder.

The extended final approach to landing was flown at 80 MPH indicated, slightly fast but used as an energy management technique to insure making the runway in the event of engine failure. Vision over the nose was reported as almost non-existent requiring an occasional side slip to maintain the runway extended centerline. Ground effect held the aircraft a few feet off the runway until a wheel landing was accomplished. Rollout was straight, the complete landing using about 3000 feet on this first ever landing.

A postflight review, conducted over cheeseburgers and fries, revealed a few valuable notes. The climb angle used has a big impact on the Volks cylinder head temperature. The initial 750 FPM takeoff brought temps into the toasty range. A slight drop in the angle of climb provided an immediate 20 degree drop in heat.

The factory Rand fixed gear, in conjunction with Cleveland brakes, perform flawlessly. Wheel landings provide a better view of the runway. Side vision reference is also important for good landings. The observed single 4 to 6 inch landing bounce was described by the pilot as feeling more like two feet while inside the KR.

The last item on the list deals with the POSA carb. The test pilot radioed that the engine felt as if it was loading up or going rich whenever an attempt was made to push the revs past 3100 or so. After reviewing Rex Taylor's POSA tuning information plus noting the increase in CHT, the problem proved to be a lean

condition. A metering needle change improved static RPM and the next test flight should show higher revs and speeds plus a drop in head temperatures.

It's been a lengthy yet enjoyable journey taking 684LM from project to airplane. I did not build the aircraft alone; EAA Chapter 661 members were always ready to lend advice or that needed extra pair of hands. Reece Daniel, Tom Bagnetto and others within my extended KR family gave all while those faithful contributors to the KR Newsletter helped keep the creative juices going.

It would have been very difficult to complete a project of this magnitude without help. It would have been impossible without the understanding, encouragement and support from my sons, Adam and Zachary, and my wife, Lynn. Thanks, ya'll.

Monte Miller
1900 Parkside Drive
Denton, TX 76201
817-566-5871

CHAPTER #1011 PIEDMONT FOOTHILLS FLY-IN

The Piedmont Foothills Chapter #1011 of the EAA is sponsoring a fly-in on Memorial Day weekend, May 28 and 29 at the Toccoa, Georgia Airport. Rain date will be June 4 and 5.

On the 28th, the chapter will be holding a regional Young Eagles program, giving FREE rides to children from the ages 8-17.

We are inviting all the KR drivers to come to see us on the above days. We will park all KR's in a group if they want to. For more info contact:

R. W. Moore
P. O. Box 622
Toccoa, Georgia 30577
706-779-3446

POSA PERFORMANCE

Throughout the construction phase of my KR-2, 684LM, I kept to a goal of simplicity and minimum weight. A non-electric 1835 Volks utilizes the basic 32mm POSA fuel metering device, chosen because of (in spite of?) its reputation for simplicity, performance and low cost. Derided as nothing more than a metered leak, the POSA gets a bad rap from those who do not understand its unusual tuning and operational procedures.

Now that my own POSA/Volks combination is performing satisfactorily, I'll share what I learned in the tuning process. It's really no big deal.

Let's get some upstream information out of the way before moving to the POSA.

Without the support of a fuel pump, head pressure becomes very important in moving fuel from a header tank to the carb. By using three-eighths fuel lines with a minimum of bends from tank to carb, adequate fuel pressure can be attained. POSA tuning is best done with a half tank of fuel; full tank will create enough pressure to richen the mixture slightly whereas less than a half full tank will provide weaker head pressure, hence a leaner condition. Keep in mind that every setting and/or adjustment within the fuel delivery system will be a bit of a compromise.

There is reference material available regarding the POSA. SPORT AVIATION, March 1982, has a five-page Rex Taylor article regarding the POSA. This is extremely valuable information. EAA types can contact Member Services in Oshkosh for reprints. There is also a video tape made by Rex and Patrick Taylor that goes into extensive tuning detail. Finding one of these may be tougher.

If you purchased your POSA new, you probably got a handful of brass needles numbered 1 through 5; small punch marks or Arabic numbers stamped on the needle's flat. In my particular case, there were needles 1, 2 & 4 indicated by punch marks, 3 & 5 with Arabic numbers. I did not know it at the time, but these different marking styles would play an important part in my initial tuning efforts.

The SPORT AVIATION article advises beginning with the #3 needle set ten turns out. Try it. For an 1835VW, this needle will probably be lean on the top end. The video advises tossing out all but the #5 needle. I could not get either the #3 or #5 to work in my tuning process. The #3 was hopeless and the five ran only at high RPM. Hum. The #4 needle provided 3000RPM static but was terribly rich in the low/mid range, barely running. Not good. Lots of head scratching.

Remember the numbering system on my particular set of needles? As designed, the needle cutaway will be progressive from #1 to #5. On close examination, my set looked like the printout from some guy that just blew a lie detector test... jumped all over the place. I'm guessing, but I believe I received a mix of needles for different size POSA bodies due to a packaging error somewhere along the line. Ultimately, I built my own "correct" #5 needle using one of the supplied parts.

So you've got the storyline, now how do you tune the thing? The POSA is tuned backwards from what you might assume, setting high RPM first, then working back toward the low end. With an 1835 Volks, begin with the selected needle set ten turns out and the flat side of the needle facing into the intake manifold. The needle you begin your tuning process with will be your best guess based on engine displacement, POSA throat diameter, dual or single port heads with standard or big valve 041 heads. Needle #3,4 or 5 will get you going.

Start the engine and let everything stabilize at whatever RPM the engine will run. Here's how I start 684LM AFTER I've chocked the mains and tied down the tail:

1. Mag off. Throttle open. Fuel on until fuel runs from overboard drain, then fuel off.
2. Mag off. Throttle closed. Pull engine through four compression strokes to prime cylinders.
3. Throttle 1/4 open. Mag on. Prop to start.
4. Turn fuel on (The engine will run a few seconds even with fuel valve closed.)

With the engine warmed up and oil in the green, advance to full throttle. With the POSA, full throttle is usually reached when the slide is about three-quarters open. After 2-3 seconds at your max RPM, shut off the fuel valve and listen to the

CONT'D PAGE 7

KEN AND I

There is one little item designed into the KR 1 and 2's that no one ever seems to notice. I am always surprised that it is not picked up on any of the flight reports that I've read (and I truly enjoy all of them).

Have any of you KR-1 flyers ever noticed that the ball never seems to go out of the cage no matter how hard you rack it into a turn? Or, that rudder pedals are almost never needed in flight?

The KR-2 is not quite as "locked in" as the KR-1 but it is still darn hard to get the ball more than halfway out. It's called adverse yaw and in case you become so comfortable without it, just jump back into that old C-150 that you learned to fly in and rack it into a 60 bank without using rudder pedals (be sure the door is latched!). You will find out again that most store bought planes have their own ideas about how to start a turn.

If you had a good "old timer" type flight instructor, he patiently explained to you that the more lift you put on a wing the more drag it will produce. Now, when you work the ailerons (see that one going down) it wants to lift that wing up which produces more drag on that side. So, when you bank right, the nose first goes left unless you stomp the right rudder pedal to help the poor thing out.

Well, we decided to have long skinny ailerons (which are very powerful) and make them go up much more than they go down. Also, we hinged them to the top skin just like a Cherokee and that stops most of the air from leaking from the bottom to the top which produces drag. It also does one more important thing which more people miss. It opens up a large full length gap under the wing and we all know what large gaps do for drag. Of course, on the other side, the little bit of down aileron closes off most of the gap and makes things more slippery. It also produces very little additional lift and therefore not much additional drag. So now the nose gets dragged into the turn by the low wing instead of being dragged away from the turn by the high wing.

So the next time you are out there flying your bird and find your feet doing next to nothing, just flop the rudder pedals flat on the floor and stretch out. That's how I use to fly the KR-1. We never did have anything to hold the rudder pedals up except a little friction.

One and a half years ago, I was reading an article about Lance Neibauner and his super fast aircraft which also gave his new Oregon address in Redmond on the east side of the Cascades. Being the inquisitive type, I jumped in my trusty VW diesel and motored 600 miles north to see them for myself. By 2:00 p.m. the next day, I fell in with a group that was touring the plant and during the brief history given about the Lance Air Co. it came out that Lance had started to build a KR-2 years ago but being a designer type and not too happy with a "minimal" airplane, he started on his own birds and very fine birds they are.

After the tour, I introduced myself to Lance and we had a very pleasant talk about airplanes (of course) and I got a chance to look over one of his prototypes as well as his normal fleet that he had on display. I was pleased to find the flavor of the KR's in the empanage and the ailerons. He has built some fine, efficient airplanes but they are a bit out of my price range.

I was the only one in the parking lot with a VW diesel. The bumper sticker reads, "0-60 in three tries!"

Stu Robinson
22352 Longeway Rd.
Sonora, CA 95370

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 -- EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

JOHN SAVELLI'S N4288C, GULF BREEZE,
FLORIDA

I have wanted to write a letter for quite some time throughout the building adventure. I felt since I had limited experience in building aircraft my input was also limited.

It has been three years since starting my project. I know now that it will never be complete. Notice, I didn't say never fly. N4288C has lifted me from the surly bonds of the Earth and propelled me to new heights of fear and humility. It does fly.



The kinks of keeping it in the air seem to be just as challenging as building something I have to pay rent on at the airport. I know now, that without a complete set of newsletters the building task becomes almost impossible. Also a guru or mentor is recommended. The point is it ain't easy and if you haven't built an airplane before, I would help somebody finish theirs first.

The KR-2 as it appears from the plans, although looking complete, leaves in my opinion, too much to the imagination. When I signed on for the task, my head was clouded with dreams of the goal, rather than the joy of building. The airframe of N2488C is solid and stable. It has an empty weight of 670 Ibs.

I choose an 1835cc VW because I felt that one: I didn't want to set any speed records and two: Sustained RPM over 2000 on a VW seems to me a bit too trusting.

Sooner or later it will quit if everything isn't kept just right. That's my point...what is just right? The powerplant must not only be matched to the aircraft but to itself. Meaning that fuel flow and ignition within the powerplant must be not only tried to see if it would work but tested with more precision than I'm capable of performing. Let me expand on fuel flow. The maximum fuel pressure for a Zenith carb is 4.0 PSI most facet fuel pumps pump 5-8 PSI. Guess what happens? The engine floods and quits with raw fuel pouring out of the carburetor throat. Hence, if this happens on climb out it could ruin my day. I was lucky it happened to me on base... I had made the field. The experience certainly caught my attention. To solve that problem a fuel pressure regulator was installed. Next, I had a heat problem. CHT would red line and oil temp would reach 225 deg. before I shut down for fear that I would damage the engine so I set out to solve the heat problem. Since I bought a premolded cowling I assumed it would work okay, not... I carved it up like a side of beef to get it to fit. Since the nose gear might stifle the air flow in the low pressure side, I faired the area around the nose gear. Didn't help, then maybe the exit air area wasn't enough so I redesigned the lower cowling to allow more air to exit the engine area. Still too hot!

I then installed cool tins around the lower half of the cyl's ... nope, still didn't solve the heat problem. Finally after enlarging the intake area I was close to the culprit. The propeller it turns out, although, state-of-the-art carbon fiber ground, adjustable, expensive too, it didn't create enough air under pressure to force air through the cylinder fins. Problem solved? New prop time. Still waiting for the new prop. I can say Warp Drive Propeller people are fair and allowed me to return the prop for almost full credit. So here I sit typing and wondering, when I get the propeller installed and checked out, will I have the guts and confidence in the engine to climb in the cockpit and fly the hours off. Good question, right?

John Savelli
3022 Gulf Breeze Parkway
Gulf Breeze, FL 32561

REBUILD PROJECT

I thought I would share some photos of my rebuild project with my fellow KR owners. Ownership of one of these little gems had been a dream of mine since the mid 70's. With never enough time to build and not able to put 4 people in a KR-2 (wife and 2 children), I was limited to the Wichita wonders. We use an airplane as much as most people use a car.

I found this little bird two years ago. It was sitting in the corner of a hangar with the wings off and covered by a half inch of dust. After some inquiries, I located the owner and got permission to do an inspection. The plane had been in storage since the mid 80's so I went into great detail and discovered no major defects. The owner was in no hurry to sell so I put my Cessna up for sale to raise the funds for purchase and rebuild. Both children are now grown so no need for the gas guzzler any more. It is time for some fun flying!

The transaction of the "2" was made last November and she was relocated to the maintenance shop. Having 20 plus years of aircraft maintenance, I decided to do some changes to make inspection and repairs easier.

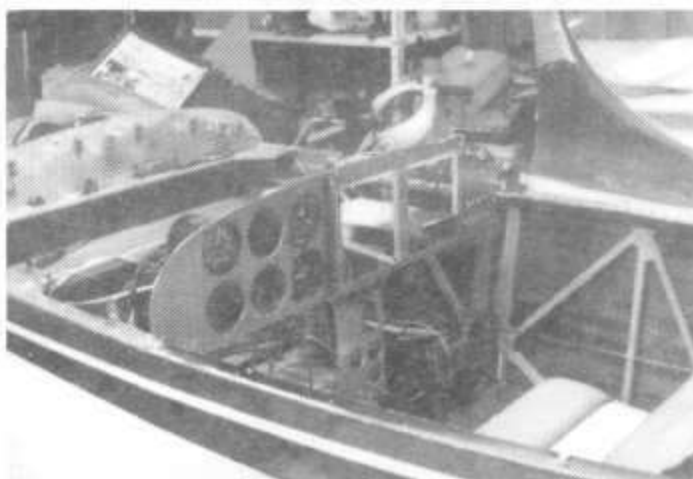
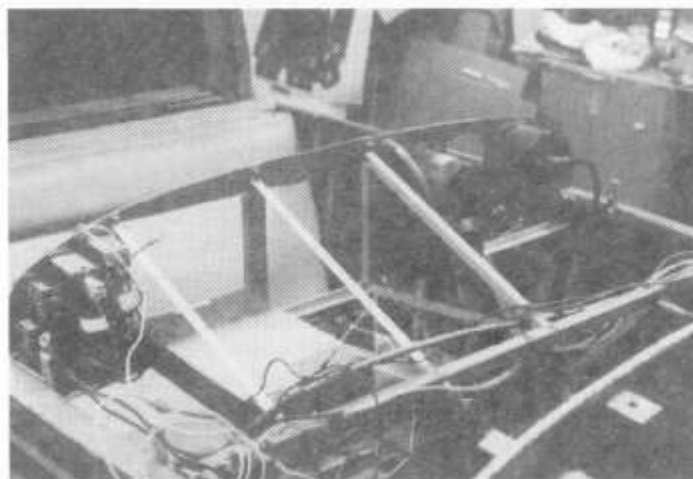
The first thing was to make the front deck removable. This item alone will make most maintenance a snap. The other changes being made are as follows:

1. Removable front deck.
2. All new electrical system.
3. Full IFR (it does all fit).
4. Add fuel tanks (removable) to wings.
5. Strobes in both wing tips.
6. Add landing lights in leading edge of wing stubs.
7. New exhaust system with cabin and carb heat.
8. Add various access panels.

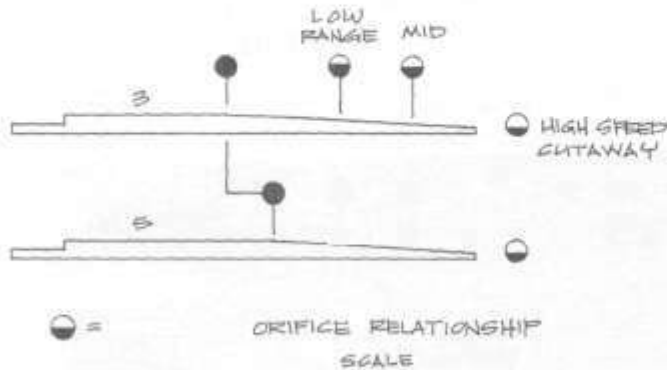
As I do each of the changes, a series of photos and text will be presented.

Anyone with a KR or any other homebuilt that needs an annual inspection can give me a call. I am an A & P. Once my plane is in the air, I will be able to travel a lot farther. I can assure you it will probably be the most honest inspection you will ever get;. No B.S., just common sense. Till next time,

Gary D. Hinkle
251 Second Street
Highspire, PA 17034
717-939-2168



engine as it shuts down. An increase in RPM tells you you're too rich so screw the needle in one turn and try it again. Try to get the engine to shut down without gaining any revs. This will then be the best setting for full throttle and nothing more can be achieved by screwing with the needle setting.



Low and mid range mixture is controlled by the needle cutaway. Carefully examine your supply of POSA needles. A long, low angle cut will be richer in the low/mid range whereas a shorter, steeper angle will provide a leaner condition. I'd bet you'll find either the #4 or #5 best for your particular needs. Remember, too, that the POSA does not incorporate an accelerator pump and will not take an extremely rapid throttle advancement without a bit of stumbling. This condition can be corrected by a slightly overrich setting just off idle. Part of the compromise mentioned earlier.

Monte Miller
1900 Parkside
Denton, TX 76201
817-566-5871



The Toledo KR Group
is hosting the

3rd ANNUAL MIDWEST

In conjunction with EAA Chapter 582's Fly-in

June 18-19
is 17th

METCALF AIRPORT (TDZ)
Tol do, Ohio

Friday Night Get Together
Saturday - Flying-forums on
Composite-Painting & More -
Banquet

Food available at airport
Lodging available at the
Comfort Inn South
(419-666-2600 -
mention KR Gathering)
Shuttle to & from airport
Spouses can enjoy shopping,
pool, and a lake excursion

WANTED

I'm looking for the following KR-2 material all together or single items:

Cowling for VW, Canopy, Canopy Frame, Forward Deck, Turtleneck, Fuel Tank, Wing Skin Dan Diehl, Fixed Landing Gear, Wheel and Hydraulic brake, tube and tires

Mario Bellanza
Via del Corno 1
50122 Florence ITALY
Phone 0039 55 216252

FOR SALE

KR-1 project; modified for "CAFE" Air Racing; fixed gear; 2110 cc engine; many extras... Asking \$3,100.00. Call:

Jim Frank
P. O. Box 459
Lynchburg, OH 45142
513-364-2646

WANTED

Diehl Nose Gear with or without wheel, tire or cover.

Maury Hunter
4108 Columbia
Des Moines, IA 50313
515-244-7952

FOR SALE

KR-2 Tailwheel	\$ 45.00
Rudder, pedal & assy	75.00
Landing gear	335.00
Stick assy	115.00
Wing fitting	140.00

Dennis VanFossen
34770 County Line Rd
Yucaipa, CA 92399
909-795-1980

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 202 MARCH, 1994





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



ROY MARSH'S KR-2S, N133RM, SANTA MARIA, CA

Roy Marsh's KR-2S won "Best KR" at the 1994 Sun N' Fun and was the winner of the Sun N' Fun Air Race up to 99 HP Class. His winning speed was 190.4 MPH at 3600 RPM at 40" manifold pressure.

Roy's N133RM is the first KR2-S (Stretch) to fly. Powered by a Revmaster 2100 turbo at a little over 80 HP. Prop is an Ed Sterba Prop 54" x 50" pitch. In the near future we will be printing an in-depth look at this exciting airplane.

TIPS FROM ONTARIO

I've included an article from Sport Aviation, February 82 by Bob Walters (starting on page 3) that I found invaluable that would probably be good info even before a person starts a project and certainly before they start foam work. Unless, of course, they're planning on hundreds of hours arm exercise on the business end of sanding board. I'm in great shape.

Secondly I'd like to submit a few of my own findings.

A good tip after you've primed your aircraft and it's looking good... all one color but you don't know where all the dips, voids and high spots are. Use a spray can of black paint and mist black paint over the whole surface to be sanded (over the whole aircraft for that matter). Using a vibrator and 180 grit paper for your first sand out, the black paint splattered on the surface will show everything. You just keep sanding until all the black paint is removed and you have a flat surface. You can next primer lay up. I did mine with 320 grit on the vibrator 400 grit hand sanding. Definitely how to change a sow's ear into silk purse.

Secondly, I painted my KR-1 with the Sikkens systems using Acrylic Urethane Top Coat white "00". It's really white, no pigment of any sort. You need sunglasses to look at it outside.

Be sure to use a sealer over a primer coat because fiberglass can have a reaction on your paint coat even through several layers of filler and a previous paint coat when baked in a paint booth. It's a photo chemical reaction called imprinting. You can see the cloth weave in the cured paint. Nothing that a light sanding with 400 grit paper and more paint won't cure but a pain in the butt.

Don Chisholm
509-3311 Kingston Rd.
Scarborough, Ontario
CANADA M1M 1R1

1994 KR GATHERING

The 1994 KR Gathering will be in Columbia, Tennessee - (MRC) on October 7, 8 and 9. The awards dinner will be Saturday night, make plans to attend.

Everyone will find lots of things to do in the area this weekend with fall colors peaking, nations largest arts and craft fair, historic Columbia, Grand Ole Opry and OPERYLAND.

Raider Aviation and the Pilots Association have decided to make the KR Gathering part of their second annual "Aviation Day", providing more support (i.e. hanger, tables, PA and port-a-toilets) and attractions for those attending.

The host hotel is the RAMADA INN, Columbia, TN (615) 388-2720. Room rate \$34.95 (single and double), if reserved by 9/23 as part of the KR Gathering. Contact:

Jim Hill
205-882-2054

or

Bobby Muse
615-790-5365

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

**HELP!!!! WE NEED ARTICLES
AND PICTURES FOR THE NEWSLETTER.
THANK YOU FOR ALL YOUR SUPPORT!!
EARL TEPORTEN, EDITOR**

The following article is a reprint of an article that appeared in the Feb. 1982 issue of SPORT AVIATION. Don Chisholm of Ontario, Canada sent it to the Newsletter. This article will conclude in the next issue.

finishing composite

By Bob Walters (EAA 147247)
VIKING AIRCRAFT
16551 Perdido Key Drive
Pensacola, FL 32507

TIN THE SUMMER of 1980, shortly after the Dragonfly prototype was completed, I flew from San Diego to attend the annual EAA Convention at Oshkosh. The Dragonfly was a big hit and I was fortunate enough to receive the EAA Outstanding Design Award. Many people commented on the excellent surface finish on the prototype and quite a bit of time was spent during the Convention answering questions related to finishing composite aircraft. At the 1981 Convention, a great many EAA members again expressed interest in finishing techniques. It was obvious to me that a lot of confusion had resulted from lack of good information on this subject. Although there were a number of composite aircraft designs on the market, the information necessary to achieve a good surface finish was either insufficient, misleading or both. A large number of people expressed interest in beginning a composite project, but were discouraged by the stories they had heard about the time and effort required to achieve a satisfactory finish; consequently, I decided to write this article for *SPORT AVIATION* so that other builders might benefit from my experiences with composites.

A survey of completed composite aircraft reveals an interesting fact.

Some aircraft have beautiful finishes, others have mediocre finishes and a few are downright ugly. It is interesting to note that there is little correlation between a builder's past experience, the time invested in the project and the appearance of the finished product. With a few exceptions, all builders **want** to have a nice looking aircraft. Why then do the results vary so much and why do some people seem to be able to produce a nice finish in a fraction of the time required by other builders? Naturally, good old fashioned craftsmanship has a good deal to do with the end result, but I believe that a lack of accurate information is the primary culprit. It is hoped that this article will help to alleviate part of the problem.

Let's begin by exploding a few myths. Finishing is not the thing that you do at the end. Finishing is, in fact, something that you do throughout your project. While it is possible to make a silk purse out of a sow's ear, it is much easier to begin by building a silk purse in the first place. Proper construction will go a long way towards making a good looking aircraft. Finishing is not an art. Finishing is a skill that can be learned by almost anyone. A talented individual will pick up the proper techniques faster than the rest of us, but natural ability is not a prerequisite to making a pretty airplane. Finishing a composite aircraft does not take a long time. It's true that some folks have taken a great deal of time to finish their fiberglass aircraft, but in each case that I'm familiar with, the builder was using the wrong techniques. Spending hour upon hour sanding will not in itself guarantee a nice finish. Although any good looking aircraft takes times to finish, I am convinced that a good finish can be put on a composite much faster and easier than an equally good finish can be put on a fabric or wooden aircraft. Some folks are bound to argue with this statement, but no one can deny that using good techniques is better than using poor ones.

The Dragonfly prototype went from bare fiberglass without any filler to white paint in 10 days. This required the efforts of two people and a lot of beer. My goal was to produce an attractive, aerodynamically smooth finish with a minimum of time and effort since Oshkosh 1980 was rapidly approaching. Achieving a Grand National Champion type finish takes more time, but the techniques are the same. By the way, your intuition will not lead you to produce a nice finish. There is nothing magic about the

proper techniques. It's just that the average builder is not likely to discover them on his own, at least not on his first project. It should be noted that I did not invent any of these techniques. Some of them were borrowed from the surfboard industry, some from boat builders, some from model makers and some from automobile finishing experts. Like many other undertakings, the/best approach to finishing is to take note of how the "real guys" do it and see if you can adopt their methods to your needs. People who make a living at their craft have usually figured out pretty good methods over a period of time. Why not take advantage of their developments?

It is appropriate to define a few ground rules for this article so that builders will be able to use the information properly. I will use the Dragonfly as an example of a typical modern composite aircraft. The Dragonfly utilizes solid foam core airfoils produced by the hot wire technique and a built up foam sandwich fuselage. The structure is basically fiberglass cloth in a matrix of Safe-T-Poxy. While this system is common to several designs, not all homebuilt aircraft use the same materials. Many of the techniques used on the Dragonfly will be applicable to other designs, but I must emphasize that you should not deviate from the designer's plans in any way that might affect the structural integrity of your aircraft. The substitution of untested materials or the use of non-approved techniques may prove to be unsafe and it is mandatory that you check with the designer of your aircraft if you have **any** doubt about the technique you are using to finish your aircraft.

Let's break the finishing process into several stages. We'll begin with the foam cores, move on to fiberglassing techniques, filling techniques, sanding techniques and wind up with painting techniques. It is not the intent of this article to deal with every aspect of foam preparation and glassing; however, since the construction techniques used on the basic airframe are so important to achieving a good finish, it is necessary to at least touch on several areas that will make life much easier later on.

Foam Preparation

It seems obvious to me that if you plan to build an aircraft out of foam and then cover it with a thin covering of fiberglass that you would want the foam core to look as much like the finished product as possible. For

some reason, this fact eludes a lot of folks, and while some designers may realize that a good core is one of the keys to success, they often fail to properly emphasize its importance. When you stop to think that the majority of the surface of your aircraft will be covered with a fiberglass skin that is no thicker than ten pages of this magazine, then it is easy to see that lumps and bumps in the foam will appear as the same lumps and bumps in the skin. It should also be obvious that since the strength of the aircraft is in the skin, that not much of this skin should be sanded away to correct lumps and bumps in the core. Not only that, but fiberglass is much harder to sand than foam. With these facts in mind, it is difficult to understand why people aren't willing to spend more time on the foam cores.

Attention to the condition of the core material is always time well spent. Wing cores are very important, but they seldom receive the care they deserve. Hot wire saws should be made as light as possible so that your arms won't get tired during the cutting process. Arm fatigue causes errors and less than perfect foam cores. A perfect core is one of the keys to achieving a perfect finish. Rather than use a massive 2x4 for your hot wire saw frame, use a light fiberglass tube or a wooden 2x2 and prevent it from bending with a wire brace (sort of like one of those old fashioned firewood saws). Put two wooden dowels or sewing thread spools on the wire and use them as handles to control the wire when cutting cores shorter than the length of the hot wire saw. Start most cuts with the smallest radius of curve first. This means starting the airfoils at the leading edge. Use plenty of weight to hold the foam down. Don't remove the weights until you're finished with all the cuts. Protect the cores from dents and dings until you're ready to glass them. Use a great deal of care when joining the foam cores. Use a good table, string, straight edges, your eyeball and whatever else is necessary to insure that your glassing jig is accurate. Spend plenty of time to establish the proper twist, dihedral, sweep, etc. A tight string, a good eye and plenty of time are required. Fasten the cores in the jig blocks so that they won't move around. Use additional blocks of foam or wood, if necessary, to remove any warps from the cores. Make sure any notches intended to accept a spar cap are deep enough, but not too deep. None of these tips are earth shaking taken one at a time, but if you keep them all in mind, you are likely to produce a nice set of foam cores.

11 there are any warps, dips, misalignment joggles or other imperfections in the wing core that must be corrected prior to flight, now is the time to do it. Why glass a less than perfect wing core and then expect to correct the defect by sanding filler material later on? Use a long straight edge to identify the imperfection and then correct things with a moderately sized sanding block. Set your straight edge down on the wing core with the long dimension parallel to the span. You will probably notice that the cores are "fatter" at the ends of each foam block and they are a bit thinner in the middle, sort of like the shape of a coke bottle. This is caused by wire lag and is likely to be worse on small radius cuts. Try the straight edge at several places on the wing. Start at the leading edge, work back to the trailing edge and form a mental picture of just what corrections are required to true up your wing core. It helps to shine a light on one side of the straight edge and observe the pattern of light and shadow on the other side. Properly made wing cores will require **very little** sanding to achieve a near perfect shape. Use caution not to alter the shape of the airfoil your designer has chosen. Since the foam is softer than filler, it is possible to use a longer sand block now than later on when you are sanding filler material. The length of sandblock that can be easily controlled is inversely proportional to the hardness of the material being sanded. Keep checking and sanding until the foam core is the proper shape. Do not attempt to sand micro joints adjacent to bare foam. For those new to composite construction, micro is the general term applied to a mixture of epoxy and lightweight, hollow spheres. These spheres may be made from phenolic plastic, quartz or glass. Glass bubbles are most often used with Safe-T-Poxy. This mixture of epoxy and glass bubbles produces a material that can be used like glue in its less viscous form and (by adding more glass bubbles) can be used as a lightweight filler material in its more viscous form. By the way, except for using micro to join the foam cores, you should **never** allow micro to cure on bare foam with the idea of glassing over it later. Micro joints are much harder than foam, consequently, sanding a micro joint will produce a high spot as the soft foam is sanded away faster than the relatively hard micro.

A high spot is the bane of knowledgeable composite craftsmen since it requires a large area of filler to blend it in with the surrounding surface. The less curvature a surface has,

the more difficult it is to correct a defect. Assuming that sanding through the fiberglass skin will produce an unacceptable structural defect (which is usually the case), a bump on a flat spot is impossible to correct unless the entire surface is filled to at least the height of the bump. Small dips, on the other hand, require only that the dip itself be filled to match the surrounding surface. When you think about it, it becomes clear that a perfect surface is most desirable, a small dip is acceptable, while a bump is to be avoided at all costs. The best way to avoid bumps while contouring foam that has micro joints is to use a low angle block plane. A Stanley 60 1/2 P is an ideal sized plane and is used throughout composite construction to cut hard glue joints when contouring foam. Keep it sharp at all times.

Alternate the use of the sand block and low angle block plane to properly contour the foam and adjacent glue joints until the foam core is perfect. Be especially careful to eliminate any sharp joggles. Joggles (or step-shaped misalignments where one foam core is joined to the next) are difficult to contour during the filling and sanding stages, but more importantly, they cause a discontinuity in the fiberglass cloth that will produce a structural defect. The solution is to join your foam cores carefully. If you wind up with a joggle despite your best efforts, be certain to correct it before glassing. In no case should you ever glass over a sharp joggle.

Glassing The Foam

Once the foam is in perfect shape, it's time to fiberglass the core. It is beyond the scope of this article to cover every aspect of fiberglassing, but some designers have yet to discover masking tape and the use of the Stanley Surform tool. The proper use of masking tape and the Surform tool will pay tremendous dividends, consequently a brief description of their use is included here. I will use a wing as a typical example; however, the techniques are basically the same for the rest of the aircraft. If we keep in mind the problems caused later on by bumps and joggles, we will do our best to avoid making them during the glassing operation. Masking tape is your best friend here. Don't skimp on cheap tape. Purchase the best quality tape you can find and be aware that the "stickiness" varies a great deal from one brand to another. The more sticky your tape is the better it will stick to bare foam or dusty fiberglass. I

buy mostly %" wide tape and use multiple strips side-by-side if I require additional width. Since bumps are easiest to correct on small radius curves, and most large components must be glassed in more than one operation, you should plan to overlap the glass cloth at the leading edge of the wing, rather than over the spar. The same idea works on fuselages. Overlap the cloth at the fuselage corners rather than on the relatively flat sides or bottom. Before glassing the wing, run a piece of %" masking tape along the entire leading edge of the core. Apply the tape so that the top edge is exactly on the leading edge. Apply one or two more strips of tape under the leading edge to protect the underside of the wing from epoxy drips. Remember that drips make bumps, but when you remove them, they tear out chunks of foam and produce dips.

The answer, of course, is to keep epoxy drips off of your foam. After the glass is ready to knife trim, use the top edge of the masking tape as a guide so that you have a nice straight trim line right on the leading edge. Pull the masking tape off along with the excess fiberglass cloth when you knife trim. The next day use a Stanley Surform blade (without the handle) to carefully taper the relatively soft wing skin so that it blends into the leading edge curve. This should require that you taper the glass edge by no more than %" back from the leading edge if your wing skins are 3 or 4 plies thick. The idea is to eliminate a joggle at the leading edge that would cause an air bubble when the second skin is applied. One solution would be to use a little dry micro to transition the skin edge into the foam; however, it increases the chance of contaminating the lap joint with micro (which can weaken the joint) plus it is messy, time consuming and can produce bumps. A few minutes spent tapering the joint with a Surform blade is well worth it. My favorite way to use a Surform tool is to hold the blade so that it cuts on the pull stroke and pull it over the surface in a series of short strokes. Holding the blade at about 45 degrees to the direction of movement seems to work well. Remember, if you don't spend a few minutes to get rid of bumps before you glass, you'll spend hours working on them after you glass. After the wing is turned over, re-jigged and the core is trued up, you are ready to glass the second side. It is common to overlap wing skins by one or two inches at the leading edge. Measure back from the leading edge the amount specified by your designer and apply 3 or 4 strips

of %" masking tape next to each other along the entire span of the wing. Now apply the wing skins according to your plans and lap the cloth underneath the wing and onto the masking tape. When it's time to knife trim the excess cloth, use the edge of the masking tape as a guide so that you produce a nice straight edge. The next day you can use your half round Stanley Surform blade (without a handle) to taper the cloth overlap edge while the lay-up is still "green". The previous skin will have cured enough to be quite hard and there is little or no risk of damage to the first skin while tapering the second skin overlap joint. This tapering could be done weeks or months later by sanding, but if you wait until the skins are of equal hardness it is easier to cause inadvertent damage to the structure. By using a Surform blade one day after glassing, it is a simple matter to produce a near perfect leading edge overlap that requires a minimum of sanding and perhaps no micro filler at all! With a little luck it is possible to produce a joint that requires only a bit of spray-on filler. In fact, your goal should be to always work in such a way so that a minimum of filler will be required later on.

Use similar techniques throughout the rest of your project. An aircraft the size of the Dragonfly will require as many as 20 rolls of %" masking tape. Every time you plan to knife trim fiberglass either against bare foam or against a previously cured glass skin, use a strip of masking tape as a guide and as protection against epoxy drips and runs. It will really pay off when it comes time to do the finishing. The key points to remember are to try to confine lap joints to the curves rather than the flats. Pre-taper lap joints if the skins are more than 2 plies thick. Do your best to avoid making additional bumps or dips during the glassing process.

Filling and Sanding

This is where many folks think finishing begins, but we've already learned that employing proper techniques prior to filling and sanding will make this stage, and the stages that follow, much easier. A popular misconception is that filling is the thing you do before sanding. Actually filling and sanding go hand-in-hand. It is necessary to use a multi-step process that includes several sessions of filling, each followed by an

appropriate style of sanding. Most composite aircraft use a number of different filler materials. On the Dragonfly, I used micro, Bondo, Feather Fill, lacquer spotting putty and primer/surfacer. Micro, as we have mentioned before, is a mixture of epoxy and some sort of very small hollow spheres. Unlike the type of micro used to join foam joints, the type used in filling is mixed very dry. The idea is to make the filler as light as possible. Micro is used for coarse filling and is used in greater volume than any other material. Bondo is a trade name for a polyester based filler material commonly used on automobile bodies. Bondo is very heavy, although the relatively new "lightweight" polyester based automotive fillers are a bit lighter because they contain some micro balloons. Many different brands are available, but most people refer to all body fillers as Bondo. Bondo is used in very limited quantities. Feather Fill is the trade name of a spray-on, polyester based material that is used to fill minor imperfections. It was developed for use on automobiles and the "feather" part of its name comes from the fact that it will sand to a nice feather edge, **not** because it is lightweight. In fact, Feather Fill is very heavy and frightfully expensive, so as little as possible is used for finishing. Lacquer spotting putty is simply very thick lacquer primer in a tube. Many people refuse to use it because of shrinkage problems, slow drying times and generally unsatisfactory results. I have had many of the same problems until I discovered Ditzler brand red spot putty. The product number is DFL-17. It is an excellent product and is used to fill tiny pin holes and other minor imperfections. One tube is enough for three or four airplanes. Primer/surfacer is used both as a filler to take care of small surface imperfections and, in combination with the finish paint, as an ultraviolet barrier to protect the epoxy from sun damage. I like to use Ditzler Kondar DZ-3. It fills nicely and sands well. Be sure to use a good particle mask for all sanding. It seems that the better a product performs, the more "nasty" it is. Most of the materials used in composite aircraft finishing are labeled "FOR PROFESSIONAL USE ONLY". Therefore, it seems only prudent to take the same precautions as those used by the professionals. It's no fun to build a nice airplane, and then not be able to enjoy the finished product because you didn't protect your health.

Before applying any filler, your project should be inspected by the FAA. This is equivalent to the "pre-cover" inspection on a fabric aircraft. Repair any part of the aircraft that doesn't meet your designer's criteria and scratch-sand the entire surface to provide a good bond for the filler material. Pay particular attention to any local bumps in the surface that may be sanded away while finishing. Structural damage is a serious potential problem. Be careful about turning your neighbor loose with a sand block because he might cause some dangerous structural damage. Forty grit sandpaper seems to work best for scratch sanding. Do not try to save money by buying cheap sandpaper. Use a good grade of aluminum oxide paper. Sandpaper is almost always used with a block. I like a block that is nine inches long, two and a quarter inches wide, and three-eighths of an inch thick. It takes one-third of a piece of sandpaper for a block this size. A larger block that takes one half a sheet of paper is also useful, but this should be considered the upper limit on sand block size. You cannot control a larger block while sanding hard filler material. Your intuition (or perhaps your well meaning neighbor) may lead you to believe that a six foot sand block is the answer to achieving a beautiful finish, but it simply isn't true.

Once the surface is ready to accept the filler, it's time to identify the high and low spots. I like to use a two foot long steel cork backed ruler found at art supply houses. It is about one and a quarter inches wide and .020 inches thick. Forget about correcting really huge dips and bumps. That should have been done before you got to the glassing stage when you were using the six or eight foot long straight edge. What we're talking about now are irregularities that can be located using a two foot rule. Carefully identify the low spots and mark them with a pencil. Hold the steel rule on edge in a span wise direction and observe the light that shines between the lower edge of the rule and the aircraft skin. It is also useful to place the rule flat on the wing surface in a chordwise direction and bend it over the skin. This points out the amount of filler required in areas such as the typical spar cap area or near the leading edge cloth overlap joints.

Consider for a moment the education of your left hand. Most of us have pretty dumb' left hands. An intelligent person can learn a lot about playing the guitar from reading a book and, in fact, his brain can store a great deal of information on guitar

chords just by memorizing the diagrams. But no matter how smart the brain may be, the dumb left hand is bound to foul things up the first time it is asked to actually produce the finger positions that are so well understood by the brain. The same idea holds true for finishing aircraft. You must train your hand to identify curves that are not perfect. Place your hand palm down on the wing surface and rub it back and forth in a chordwise direction. Vary the speed and pressure. Rub it two or three times and then wipe your hand on your pants leg. Rub the wing again with your eyes closed. Try to identify just what sort of imperfection you have in the spar cap area, for example. Is it a bump, or is it two adjoining flat spots? Next bend the flat edge of your steel rule over the same spot and try to confirm what you have felt with what you see. Practice until you can distinguish between surface irregularities and texture variations. Store this information in your brain and mark the areas that require filler on the wing surface itself.

The identification process is very important. I believe that each builder has only a certain amount of sanding effort that he is able to expend on a project. There is simply a psychological limit to how long a person can stand sanding, after which time he will apply paint and go flying. This limit obviously varies from builder to builder, so the idea is to achieve an acceptable finish before you run out of energy. The key is to avoid unnecessary sanding and the best way to do that is to identify the problem first. Spend quite a bit of time identifying just where the high and low spots are and how much filler they require. Believe me, it will be time well spent.

Once the big dips are located, it is time to mix up some filler. Clean the surface carefully and mix a batch of epoxy. Use some of this epoxy to prepare a batch of very dry/micro. Pour a tiny bit of pure epoxy[^] on the surface to be filled and use a squeegee to move it around on the surface so that the micro will bond properly. Do not use too much epoxy. The surface should just be damp. The micro should be about as dry as you can stand to mix it. Spread it on the surface with a squeegee. You will now face a dilemma. If the micro is sort of runny it goes on much nicer. It is easy to contour with the squeegee and you can envision how much sanding time you are saving by more or less sculpting the proper shape with runny micro. Resist this temptation! You cannot apply micro like

cake icing and expect to get the proper contour. Runny micro is hard to sand and heavy. Dry micro, on the other hand, is a real pain to apply. It rolls up in balls behind the squeegee. It traps air bubbles. It refuses to stick properly. It does all sorts of nasty stuff. Grit your teeth and stay with it. It will pay off later with a surface that is easier to sand and with a light aircraft. Resist the temptation to fill the entire surface perfectly on the first try. You will have a **minimum** of three filling and sanding episodes on most parts of the aircraft. This fact may be hard to face, but that's what it takes to make a nice composite aircraft. At any rate, do your best to apply the micro as dry as you can.

Once the filler has cured you must reidentify the surface contours. Use the steel rule and your hand. Remember that since the skin is a structural part of the aircraft, bumps cannot be sanded down. You are restricted to sanding the filler only. The filler should now be slightly higher than the surrounding surface. Carefully identify the high areas of filler and sand them down to match the surrounding contours. Thirty-six grit or forty grit sandpaper works best. **Always** use a block for this type of sanding. The really high lumps of micro filler can be removed by careful use of the Surform blade. Don't go overboard on the use of the Surform to contour micro fill; however, it may save some sanding if you have a bit of excess filler on the surface to be contoured.

The secret to sanding (if there is one) is to obtain a mental picture of what part needs to be sanded and then sand that spot with a sand block small enough so that it can be controlled. Use your hand and steel rule and eyeball to identify the existing contour and use your small sand block to remove filler in the appropriate spots. Sand a minute or less in each area and then re-evaluate the contour. Move the sand block in a 45 degree motion relative to the span. Sand a few strokes and then check to see if you are touching the fiberglass. Change sandpaper whenever the piece you're using gets dull. The paper is expensive, but don't be penny wise and pound foolish. Stop immediately when you touch any structural surface! Keep at this process until you have achieved the best contour possible with the existing filler. Then go over the entire surface with your hand and steel rule in order to identify and mark the places requiring additional filler. Nothing is automatic about this contouring process! If you simply lump filler on your aircraft and then proceed to give it a massage with a large sanding block,

you will produce smooth lumps. If you use fine enough sandpaper it is possible to produce smooth, glossy lumps. The idea, of course, is to produce a smooth, glossy shape that has the proper contour. This requires intelligent sanding. A simple lap joint with one layer of 6 oz. cloth may only require one session of filling and sanding in contrast to a typical spar cap, which may require three, four or more steps to fill properly. The goal during this stage of filling and sanding should be to eliminate any surface discontinuities which are larger than the basic weave of the fiberglass cloth. Before you reach this stage you can expect your neighbor or someone from work to drop by your house and try to convince you to stop all this silly micro filling and get on with the Feather Fill. Don't fall for it! It is possible to fill rather large dents with Feather Fill, but it is both heavy and expensive.

You will notice that if you used very dry micro you will sand into small air bubbles that will produce small craters. These craters can be as large as Vs" in diameter and are revealed periodically as you sand. Now is the time to take a realistic approach to this whole operation. The dedicated builder will go back and fill these small holes with micro, wait until the next day when it's good and hard, and then re-sand the part. The guy in a hurry is likely to ignore them and convince himself that Feather Fill will take care of them. Feather Fill is not bad for filling cloth weave, but it is notoriously poor for filling pin holes. Here is where "lightweight" Hondo comes in handy. It only takes very small amounts to fill these pin holes, so the weight isn't too important. Bondo is ready to sand in a few minutes, so the guy in a hurry is willing to use it. Do not be tempted to use Bondo over large areas as a replacement to micro filler. It is only used for tiny holes or imperfections that are too large for Feather Fill, but are likely to be ignored because mixing a small batch of micro fill is too much trouble for some people. Remember that there is only a certain amount of effort available and we don't want to be tempted to paint before the airplane is ready to paint.

Parts such as the cowlings and canopy should now be fitted up with a strip of masking tape covering the mating edge. If micro fill is applied both forward and aft of the cowlings joint, for example, the forward fuselage and cowlings can be match-sanded to a perfect contour together. When the parts are separated, the masking

tape will have produced a very thin gap that will be almost invisible after painting. Even if the aft edge of the cowlings is a bit wavy, the joint will look good because the gap will be uniform. A less than perfect joint will never be noticed if the gap is uniform. If your design has removable wings, like the Dragonfly, try the following technique to produce nice wing to fuselage joints. After the wing is finished to the final contour, cover the mating surface with 2 to 3 layers of grey duct tape. Now mix a batch of dry micro and apply it to the fuselage edge where it mates up to the wing. Install the wing and allow the micro to cure. Next remove the wing and sand the micro that squeezed out flush with the fuselage side. Remove the tape from the wing and you have a perfectly uniform joint with just enough clearance for paint. Techniques like this can be used in many places to produce good looking joints. Keep in mind that the key is a uniform gap, not a perfectly straight edge. Keep feeling the contours with your hand and checking everything with the steel rule. "Grand National Champion" type builders will use more steps than the builder who just wants an aerodynamically good surface. The techniques are the same, but the more time you spend at this stage, the more perfect your aircraft will be. Make sure the major contours are as good as you want them **before** you move on to the Feather Fill. It is very difficult to see the contours at this stage because the aircraft is a patch work of colors and textures. Days go by and no apparent progress seems to be taking place. Don't give up until you're satisfied with the shape of your airplane.

When the contours are perfect, it's time for Feather Fill. You must have achieved the desired contours before spraying Feather Fill. Feather Fill should be mixed with a mechanical mixer (an electric drill with a paint mixer attached is satisfactory) and the MEK peroxide catalyst must be carefully measured. Use caution with the catalyst because if splashed in the eye, it can cause severe damage. Before you spray anything, be sure to get a **good** painting mask. Do not be tempted to use one of those paper particle masks. Good masks are expensive, but they're worth it.

Use a great deal of care to blow all the dust out of any crevices or holes before spraying filler because the filler will not penetrate the dust. Future sanding will expose the dust filled crater. This crater will then require a separate step to properly fill and contour. Follow the spraying directions carefully. Use one wet coat on the unfilled portion and two passes on any filled portion of the aircraft. You may notice some previously unseen pinholes as you spray. Use a small squeegee to work the Feather Fill into these holes. After the Feather Fill has cured, carefully begin dry sanding with 100 grit paper. Contour changes are possible while sanding Feather Fill, so be careful not to damage any perfect curves. On the other hand, it is possible to correct a less than perfect curve at this stage, but the effect is very subtle. Now is the time to think about switching to the larger sand block. The half sheet size is as large as you should consider using. Finish up sanding the Feather Fill with 150 grit. Change paper as often as necessary. If you try to skimp on paper, the job will take long enough that you may be tempted to paint before you're ready. Your aim should be to sand as much Feather Fill onto the floor as you can. Feather Fill should not cover the entire surface. It should remain only in the low spots and small cloth weave craters. Remember that this stuff is heavy, so remove as much as you can while achieving the desired final contour.

If you go over the surface with compressed air, you will notice an unbelievable number of pin holes that you have somehow missed. This is where the lacquer spotting putty comes in handy. It is important to apply this product with one of those small hard rubber squeegees that are available at the paint store that sold you the spotting putty. Make sure to spread it very thin so it will cure properly. It will shrink as it dries, so use two thin coats to fill a large pin hole rather than one heavy coat. Sand these imperfections carefully with 150 grit paper and get ready to spray primer. Don't rush through this stage. Feather Fill may not be sprayed over primer, so you can't go back after you prime. If there are several small spots that require a bit more Feather Fill (or micro fill for that matter), now is the time to take care of it. It is difficult to assess the contour because of the variation of textures and colors, so use care to be sure everything is essentially perfect before moving on. Use your educated hand and metal straight edge to spot any defects.

CONTINUED NEXT ISSUE...

FOR SALE

KR-2 uses retractable landing gear.
\$95.00. Have changed to fixed.

Ken Shanon
8143 Elphick Rd.
Sebastopol, CA 95472
707-823-2224

WANTED

Engine cowling for KR-2 good condition,
new or used okay. Reasonable, call:

Tom Killgore
Rt. 2, Box 1582
Atlanta, MI 49709
517-786-4822

FOR SALE

KR-2 325TTAE, 145 MPH cruise, fixed gear.
AP built, excellent workmanship, 2000cc
HAPI engine. Electric starter EIT, no
radios. \$9,500.00

Randy Grove
1192 Purdue Mtn Road
Beliefonte, PA 16823
814-355-7343

ONE TOO MANY KR'S!

KR-1-1/2 in "boat" stage. Fuselage
stretched 21". Center spar complete,
horizontal stabilizer and elevator, wing
attach fittings, bell cranks. Retract
w/hydraulics. \$1,000 takes all. \$500 w/o
brakes, wheels, tires. Contact:

Steve Fike
9602 N.E. 70th St.
Vancouver, WA 98662-4538
206-254-8865

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 204 MAY 1994



KR NEWSLETTER

ISSUE NO. 205
JUNE 1994



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



HOWARD TRAMPENAU KR-2, ELMIRA, NEW YORK

Howard's plane is a single seat KR-2 powered by an 1835 VW with a Zenith Carburetor. Rudder slopes at 17 degrees instead of 7 degrees to give it a sleeker look. The fuselage is two feet longer than normal and is concave, again, for a sleeker look. Canopy is a Starlite.

This will be the third aircraft Howard has built, previous planes were a stock KR-2 and a bi-plane. He said he will be furnishing information on construction of the his plane in the near future.

CONGRATS MONTE!

For those of us "newcomers" to the KR group, the completion of Monte Miller's KR is a bittersweet victory. Monte's relentless path to success, which he documented faithfully each month for the past several years, has been a source of inspiration, information and levity. Congrats to Monte for completion of a dream!

I hope Monte, Bob Muse and others, will continue to encourage those of us still trying to finish our dreams by continuing to write their experiences and knowledge in the Newsletter.

I hope we meet at a future KR gathering.

Ken Jordan
328 Green Ave.
Carney's Point, NJ 08069
609-299-0498

OSHKOSH '94

The KR Dinner "Hangar Party" will be Sunday night, July 31 at 6:00 p.m. at Skystruck Enterprises Hangar located on the Oshkosh Airport. Sign up at Great Planes Aircraft Booth, Central Exhibit Building #K-209 or at the Rand Robinson Main Aircraft Display located on Stone Road.

Rand Robinson will also have on display all of the new KR-2S parts including the new wings.

The KR Forum will be Friday, July 29 from 1-2:15 p.m. in Tent #3.

KR-2S GAINING RECOGNITION

The KR-2S is highlighted in the August 1994 issue of **PLANE AND PILOT MAGAZINE**.

Rand Robinson's KR-2S was one of only 7 planes selected for an article entitled "Hot Rod Kits" in the August issue of **PLANE AND PILOT**.

Thanks to the folks at **PLANE AND PILOT** for the positive article.



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD OSHKOSH, WI 54903 3086
PHONE 414/426-4800

FLIGHT TEST UPDATE N684LM

By now, most of the adrenaline rush from the first flight has worn off. Lima Mike has a little over ten hours of flight logged and the aircraft continues to improve. The first couple of flights yielded a mixed bag of observed instrument readings. Succeeding flight tests confirmed some numbers while flight to flight adjustments tended to nullify others.

The original Hegy prop, a 52 x 49, cut down to a 51 inch diameter, was obtained from KR-1 builder Gene Darst for a very reasonable price. Before Gene passed away, he had tried the prop on his Dash One and found it unsatisfactory. After three hours of flight, I also suspected this prop to have too much pitch for the sixty Shetland ponies running around in my 1835 Volks. A friend and fellow EAA Chapter 661 member happened to have a Great American 52 x 45 currently unattached to anything other than his workbench so this stick was bolted on and tracked. Oddly enough, this prop had also been trimmed to 51 inches.

Suspensions were confirmed when the flatter pitched prop allowed my 1835 to turn up nearly 3200 RPM static whereas the Hegy could allow only 2900 RPM. In flight, the engine would turn up more RPM but now required going through the drill of adjusting the Posa carb...again.

The effect of ram air into the intake system is considerably different from that achieved during ground run testing or, for that matter, from air drawn into the system through a filtered airbox. In flight, ram air tends to cause mixtures to go lean as a greater volume of air is forced into the engine. My particular intake system has a four-inch aluminum stack mounted on the basic 32mm Posa and takes air from a small chin scoop on the cowling. A poor man's supercharger, if you will. This ram air effect plus the prop change made a two turn difference in the Posa's needle setting.

Readers may recall that in a prior KR NEWSLETTER article, I wrote about fabricating my own Posa metering needle. None of the supplied needles would work for me and my particular setup so I carved a new brass rod that met my requirements

in all operational modes: Starting, idle, low, mid and high speed ranges.

The following observed numbers were recorded on a kneeboard during flight and are uncorrected:

RPM	2900	3200	3350
MPH	115	130	140
O.P.	60	60	60
O.T.	160	175	170
CHT	355	390	360
EGT	1225	1250	1225-50

Climb @ 100 MPH & 700-750 FPM
for best engine temps.

Without a mixture control as on the Super Posa, my tuning task has taken more than expected. However, the results are worth the effort. Rather than swearing at the Posa, I swear by the Posa. I can also readily understand why so many of the carbs get replaced.

Remember the speed calculation formula in a late 1993 Newsletter? Neil Bingham shared a classic mathematical formula for computing an aircraft's top speed. Plugging in numbers for 684LM, the calculator sez 155 MPH. As currently configured and without wheel fairings on the fixed gear, I feel this target speed number to be accurate.

Nothing is ever perfect in any design and the KR-2 is no exception. Head room is limited for drivers over 5'10". With a passenger (both pilot and friend must be slim) the cockpit is crowded and headroom further diminishes. Visibility over the nose during landing must be experienced to be believed. Saying it is limited is being very charitable.

Thirty hours to go...

P.S. Between June 16 & 19, over 300 aircraft tied down at the 31st Annual Texas Antique Airplane Assn. Fly-in held in Denton. For its first ever show, 684LM garnered "Reserve Champion Experimental".

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871

The following article is a reprint of an article that appeared in the Feb. 1982 issue of SPORT AVIATION. Don Chisholm of Ontario, Canada sent it to the Newsletter.

finishing composite

By Bob Walters (EAA 147247)
VIKING AIRCRAFT
16551 Perdido Key Drive
Pensacola, FL 32507

Priming and Sanding

Ditzler Kondar is my favorite primer/surfacer. It sprays well, is ready to sand in a short time, fills well, and sands easily. It also provides a good base for the Ditzler paint that I usually use. I'm sure many other products are also satisfactory. The important point is to select a primer and paint combination that are compatible and offer good ultraviolet protection.

It seems to me that a lot of people have the idea that primer can simply be squirted on using a cheap spray gun. They have the idea that it is only important to do a good job on the finish paint. While it is possible to use a cheap gun to spray primer, you will be a lot better off if you use a good gun and compressor. Good guns are expensive. It costs at least \$200 for a gun and cup, and good compressors are becoming very expensive. It is likely that you can rent or borrow a satisfactory compressor. The two main requirements

are high capacity and freedom from oil and water contamination. It's hard to mess up a compressor. Guns are a different matter. They are so subject to be damaged by the user that people are not likely to loan a good gun. In my experience, rental guns are usually damaged and do not perform well. You should consider investing in the best gun you can afford. Take good care of it and be very careful about lending it to others.

It usually takes two or more coats of primer/surfacer to do a good job. Use care to clean the surface according to the directions included with the product you are using. If you are new to painting, try to get a good "how to" book about automotive finishing at the paint store. Follow the general tips for auto painting and you will be on the right track. Be sure to use a good spray mask for all your spraying. After the first coat of primer has dried, you should carefully inspect the surface prior to sanding. If you haven't done a good job up to this point, you will see terrible bumps now that your aircraft is a uniform grey color. Assuming you have done a good job so far, you can stand back and admire your beautiful airplane. There's something about seeing your pride and joy all one color, that is hard to describe. Now is the time to open a cold beer, stand back where you can get a good view of your project, and just dream awhile.

Unlike Feather Fill, which must be dry sanded, I prefer to wet sand primer. Use Wet-or-Dry sandpaper, of course. Start with 220 grit paper on your small hard block. It is possible to do a tiny bit of corrective contouring at this stage, but the main point is to fill any pinholes, provide a good UV barrier and prepare a good surface for painting. It is necessary to remove all coarse scratches before the finish paint is applied. You must use finer and finer grades of paper. The use of dull sandpaper is not worth it. Throughout the finishing process you should be fearful of running out of steam before you achieve a satisfactory finish. Almost no one has the discipline to put a mediocre finish on their project and then go back a few months later and do the job right. Dull sandpaper may prolong the finishing process to the point where you quit early. Resist the urge to save a few bucks at this stage.

You should go over every square inch of the surface looking for pinholes. Blow the dust out of them with compressed air and fill each hole with spotting putty. Get the kids to help spot pinholes. Sand most of the primer onto the floor, except that which is left in the small dips and holes. The second primer coat should be applied carefully and wet sanded with 220 grit wet-or-dry. Finish with 380 grit. Some places may require a third or even a fourth coat of primer. The idea is to sand almost all the primer onto the floor except for the last coat which should completely protect any surface exposed to the sun.

This includes the inside of the cockpit. Scratches caused by sandpaper coarser than 380 must be removed. This will take some effort. You have been working your way up in stages from 36 grit to 380 grit. You cannot expect to sand out 36 grit scratches with 380 grit sandpaper. The smoothing process must be done in stages. My favorite sand block for this last scratch removal is made from a piece of four and a half pound density urethane foam of the type used in the Dragonfly fuselage construction. Make a block nine inches by two and a quarter inches by one half inch thick. When used with 380 grit wet-or-dry sandpaper it follows curves easily so that the entire surface to be painted can be made smooth and scratch free. Keep in mind that paint will not hide any scratches coarser than about 380 grit. Do not use paper finer than 380 grit because the paint needs some "tooth" for a good bond. If you are in the habit of eating tuna fish sandwiches or buttered popcorn in your workshop, now is the time to stop. Contamination of the surface at this stage will cause problems with paint adhesion. Also be careful about denting or otherwise damaging your parts. Always rest the parts on a padded surface from now on. Your final paint job is only as good as your primer, so make sure you have a perfect primed surface.

Finish Paint

Color selection is becoming more controversial with the advent of some composite aircraft that have been painted other than white. I believe that people who choose to use colored finish paint are asking for trouble. The folks who manufacture the epoxy agree with me. The cooler you keep your aircraft, the better. White is far and away the best color. If you don't believe it, run your own test

in a parking lot. Place your hand on a number of cars and check out the surface temperature. Silver seems like it shouldn't be too hot when you look at it, but you'll be surprised how hot silver is when compared to white. You must select a finish paint that is compatible with your primer system. I prefer to use Ditzler Acrylic Enamel with the DXR-80 Delthane additive. The additive is expensive, but greatly improves the hardness, gloss and drying time. Other companies make similar catalyzed acrylic enamels. Take your choice. I don't recommend that the novice use either lacquer or polyurethane finish coats on their first attempt. Several years ago, lacquer was often preferred by the beginner because he could easily correct mistakes. The acrylic enamels offer the same ease of repair along with easier to achieve gloss and better longevity. Polyurethane is a super paint, albeit a bit expensive, but it is not easy to make an invisible repair. Unlike the acrylic enamels, the original polyurethane gloss is difficult or impossible to achieve following a repair. Experienced painters may prefer the excellent finish obtainable with polyurethane; however, the first timer is bound to spray at least one run, so I think it's best to stick with an acrylic enamel. I also prefer to use a non-sanding primer sealer under the finish paint. The sealer is applied just before the paint goes on and is not sanded at all. It helps seal the relatively soft primer/surfacer and helps achieve a nice gloss. Once again be sure to choose a product compatible with your primer/surfacer and finish paint. Beware of the clerks at the paint store. I have found that you don't always get good advice from them, especially when it comes to selecting the proper thinner or reducer to go with your paint. The best advice is to follow the manufacturer's printed literature very carefully.

The actual painting of your home-built is similar to painting an automobile. Keep things clean, protect your health and use quality products.

The materials required to finish your project will be surprisingly expensive, but I think that good paint is a wise investment. It is not easy to learn how to adjust your gun and apply the paint by reading about it. If you do not have much painting experience, you should consult someone who has painted aircraft or cars before and ask for some assistance. It is good insurance to see something that the "local expert" has painted previously. I have run across a few "painters" who didn't really know what they were talking about, so be careful about taking advice from strangers. If you use the proper reducers for the temperature and if the paint is applied properly, the acrylic enamel will give you a nice gloss without rubbing. If you choose to rub the paint, either to correct a defect or to improve the finish, be sure to wait a week or so. Runs may be sanded out using a sand block and fine wet-or-dry paper. In most cases, it is possible to sand away runs by using a series of finer and finer grit sandpaper and finally using rubbing compound to restore the original gloss.

The cockpit interior finish may vary a great deal. The criteria I used on the Dragonfly prototype was to sand any sharp edges that might hurt someone and then spray the interior with "trunk finish". Several companies make similar products, but I used a Ditzler product that comes in a spray can. It's sometimes called "Zolatone" and is the same as the spatter paint used inside porta-potties and automobile trunks. The advantages are that it's quick, cheap, light, hides dirt, is easy to repair and it looks pretty good. How can you argue with that? Some folks will opt for a glossy interior or full upholstery. Frankly, I prefer better climb performance rather than a fancy interior, but take your choice.

Conclusion

By following the procedures that I've outlined, anyone should be able to produce an aerodynamically good finish. Award winning finishes will require a bit more work, but no one should have any difficulty achieving a smooth finish in a reasonable time. I like to use a little automotive wax on my leading edges because it makes the bugs easier to remove. If you have done a good job finishing your aircraft, you will have extensive laminar airflow and bugs on the leading edges will cause a noticeable performance decrease. The rag wing guys may laugh at you for always wiping down the leading edges, but they don't cruise at 155 mph on 45 hp either.

HE.I.P.

I want to change my taildragger retract KR2 to fixed gear. I feel the cheapest way to convert is to use fiberglass lay-up method using existing Lamb tire and existing mechanical brakes that work well. Would like to use existing outer hinge holes in spar...if possible. Can anyone offer help or advise.

Eddie Smith
1762 Moore Rd.
York, SC 25745
803-684-3425

WANTED

Diehl Nose Gear with or without wheel, tire or cover.

Maury Hunter
4108 Columbia
Des Moines, IA 50313
515-244-7952

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

JIG/CLAMP SYSTEM

Thought some of the KR builders just getting started, like myself, might want to try the jig/clamp system I designed and fabricated. Just finished gluing up my first fuselage side and it worked great!

Total cost for making 14 clamp sets was under \$5.00. Can't beat that! Hope the sketches are satisfactory. I worked to get it all on one page to save space in the Newsletter.

(SEE NEXT PAGE.. Thanks Bill.)

Bill Gambrill
2302 Meetinghouse Rd.
Boothwyn, PA 19061
610-485-8515

SMALL BATCHES OF EPOXY

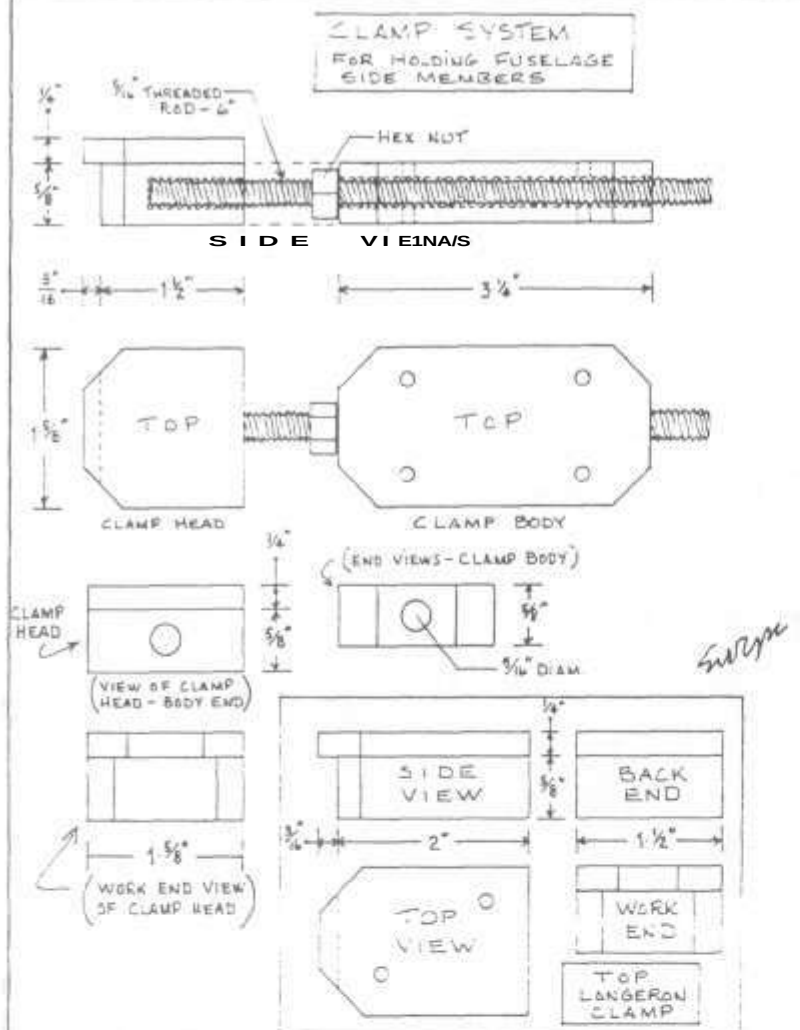
Here's an easy way to mix small amounts of epoxy for those small jobs. Safety epoxy is mixed at the ratio of 7 parts of resin to 3 parts hardener. A 10cc syringe can be used to accurately measure this ratio.

The clear plastic container that is used to package 35mm film works very well for mixing. Put a strip of masking tape on the side of the container. Fill syringe with 7cc's of water. Squirt into container and mark that water level on the tape. Now squirt 3cc's of water into the container and mark that level. You now have the 7 to 3 ratio marks. Be sure container is dry before filling with the epoxy.

The film container is large enough for 21cc's of resin and 9 parts of hardener...the 7 to 3 ratio. Hope you can use this.

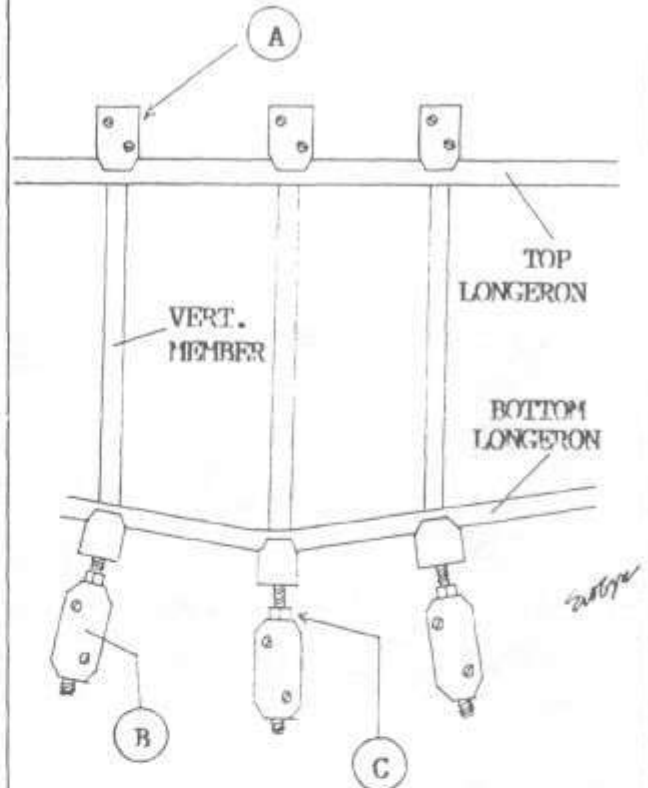
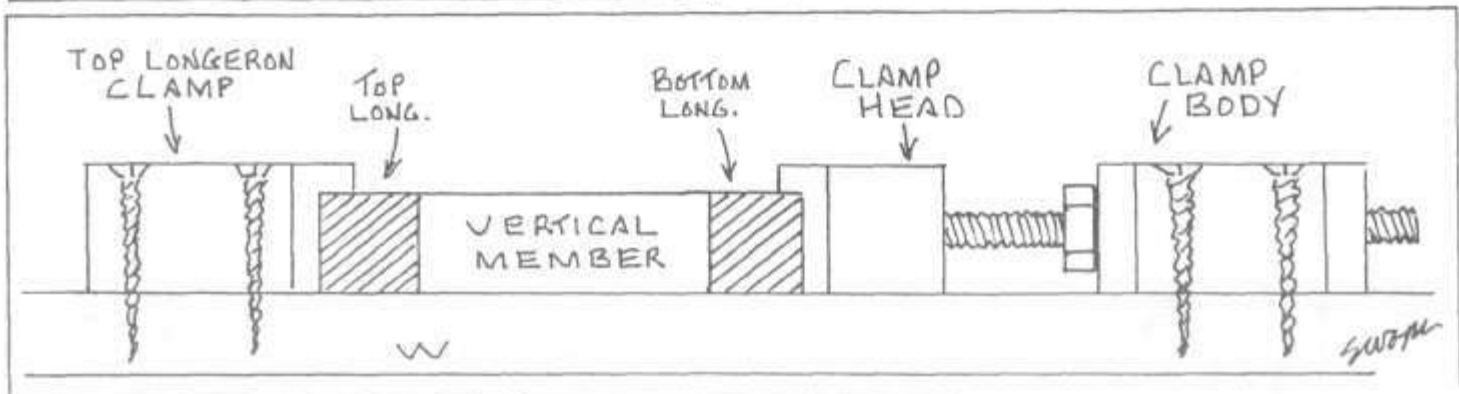
Howard Trampenau
924 Scio St.
Elmira, NY 14901
607-732-0517

Dr. Bill Garabril
2302 Meetinghouse Rd.
Boothwyn, PA 19061
(610) 485-8515



- NOTES:**
1. Use hardwood for clamp pieces.
 2. Drill 5/16" holes through pieces with drill press or doweling jig. These holes must pass through the exact center of each drilled piece for clamps to function properly. Otherwise, unwanted off-center pressures will be applied to work and fuselage members may not be held in true position.

SCHEMATIC ILLUSTRATION OF CLAMPS IN USE



- Secure top clamps to work table with screw to hold top longeron in "true" position. (Screw gun & building or dry wall screws work well.)
- Secure clamp bodies to work table, keeping clamps perpendicular to the bottom longeron.
- Tighten hex nuts against clamp bodies to move clamp heads against bottom longeron.

NOTE: When all pieces are fitted, use screw gun to slightly back-off screws holding clamps to work table. With this accomplished, waxed paper can be placed easily at all necessary locations prior to joining parts.

FOR SALE

FOR SALE

- 2 AirHawk 500 x 5 tires & tubes
Paid \$182, will sell for \$150.
- 1 Set of MATCO Wheels & brakes (#W50S),
Paid \$354, will sell for \$300.
- 1 Rand Robinson Tail Surface Hinge Set,
Paid \$125, will sell for \$80.

All items are brand new and never used. I will pay the shipping.

Larry Reid
11006 West 11th St. Ct.
Wichita, KS 67212
316-729-9166

KR-1 90% complete. Includes 1700cc VW engine from AeroVee. Diehl accessory case w/slick mag, starter and alternator. Sting tuned exhaust, RR 3 blade prop with uncut aluminum spinner. Posa injector carb, laydown oil cooler w/reverse plate. Instrumentation: Airspeed ind, Alt, 2" elect. TC, mag compass, egt, cht, oil temp, oil press, ammeter and fuel gauge. Must sell, no reasonable offer will be refused. Contact:

Richard Delhay
R.R. 5, Box 141C
Danville, IL 61832
217-431-8697

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 205 JUNE 1994

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN



KRNEWSLETTER

ISSUE NO. 206
JULY 1994



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.

THIS IS A REPRINT OF THE NOVEMBER, 1992 COVER OF THE NEWSLETTER BECAUSE AT THIS POINT WE'VE RUN OUT OF NEW PHOTOS. PLEASE SUBMIT YOUR PHOTO AND ARTICLE ABOUT YOUR PLANE. THANKS FOR YOUR HELP! EARL



DAVID CARROLL'S N90JC "DUMBO", KENNESAW, GA

This photo was taken by EAA staff photographer Jim Koepnick during an air-to-air photo shoot at Sun-N-Fun, 1992.

The plane is powered by a ZI00cc homemade engine, cruise speed 155 mph at 3,000 feet, 3100 rpm. Stall speed 43 mph true. Weight 628 lbs empty, 1,000 gross.

First flight, May 1991- since then Dave has accumulated 145 hours on the airplane. The plane is stock with the exception of cutting two inches off each end of the landing gear spring bar, bringing the gear legs in a little closer and allowing the gear to absorb a higher landing load. (See Dave's sketches next three pages on his dual-stick design.)

THIS NEWSLETTER CONTAINS REPRINTS TAKEN FROM THE EAA TECHNICAL COUNSELOR NEWS NEWSLETTER. INDIVIDUAL AUTHORS NOTED WITH EACH ARTICLE.

FROM THE FAA COMPUTER BULLETIN ON THE LONG-EZ

An on site inspection of a LongEZ revealed that the builder had failed to remove the dacron peel ply between build-ups of the spar cap. The Technical Counselor discovered the need to inspect the ends of the wing while doing some peel strength tests on sample lay ups provided by the builder. The parts separated easily. When questioned, the builder was unable to explain why. Since the parts had been cut and trimmed, there was no edge frill to suggest an explanation. The clue to the cause was the texture of the surfaces which revealed a weave pattern too fine to be the 8 oz. glass called for in the plans. The builder thought that the peel ply was a part of the structure.

Editor's Note: *This is not the first occurrence where a fiberglass aircraft has had peel ply left in. Peel ply's primary function is to draw the resin up out of the matrix and to keep the resin "green" so that the next lay up will adhere. If the peel ply is left in the structure and the structure build up around it~ you just have a useless unit. If you are looking at a composite part to buy, say a wing, and you lift up on the wing tip and you hear it crinkling inside the wing, someone probably left peel ply in the wing. There is no way to correct this and the part must be discarded at this part. Peel ply will cause the structure to separate piece from piece. If you realize upon inspection of an amateur built aircraft that the builder has left peel ply in the structure, either the part has to be torn down to the peel ply, the peel ply removed and the part redone or the part discarded. Due to the nature of most fiberglass structures, this implies that the structure will have to be discarded and it is recommended that it be destroyed at that point. The above occurrence is not the first time that this has happened, I have had several calls here at EAA Headquarters on this very problem.*

FUEL HOSES

- from Hank Gauntt of Vero Beach, Florida

To anyone who will use auto fuel in aircraft: I hope the facts revealed here will prevent someone from coming to grief by using auto fuel in their plane.

When restoring my Culver Cadet, I used a short length of MIL-H-6000 low pressure aircraft hose from the strainer-bowl to the carburetor. I did not have enough of this hose to reach from the tank valve to the strainer-bowl so a trip to the local auto supply provided the item and all was well.

After approximately two years of flying using auto fuel, I detected symptoms of fuel starvation. I first suspected the automotive hose, but it was good as new. Next removed was the short length of MIL-H-6000 hose - the 3/8" hole had closed to approximately 1/8" and obviously was the culprit. Naturally I used automotive hose for the replacement.

When I replaced the windshield with one made from 0.10 inch General Electric Lexan, I thought the tougher more flexible material would offer increased bird-strike resistance. The fuel filler is very close to the windshield on the Cadet and the very first fueling with auto fuel caused many breaks in the windshield were wet by the fuel. Another Lexan windshield and this time I will be more careful. You guessed it - it happened again. Now I have a regular Plexiglass windshield.

The 100LL aviation fuel does not attack Lexan or MIL-H-6000 hose and Amoco white gas does not attack it, but all the other brands of ASTM D-439 fuels I've tried do attack Lexan and will probably also attack the MIL-H-6000 hose.

Moral: *Be more careful when you use auto fuel.*

We had a call from Gary Moore in Maine and he stated that he had similar swelling with the lines in his Ercoupe with the auto gas STC. He had MIL-H-6000 with 3/8" ID which swelled approximately 25%.

A FUEL TANK NOTE

-FROM HARRY ZIESLOFT
EAA DIRECTOR AND CHIEF ENGINEER

In the Sept-Oct-Nov 1992 Technical Counselor News, page 6, there is a letter about fuel hose deterioration. As early as 1985 the FAA General Aviation News cautioned about accelerated aging of rubber parts exposed to 100LL aviation gasoline. Excessive toluene in avgas is one of the culprits, which, by the way, should not be contained in autogas.

Also appropriate reading applying to 100LL avgas is the FAA General Airworthiness Alert No. 77, Dec. '84. It carries an AC No. 43-16. People using autogas should also keep an eye on their rubber parts.

PROBLEMS WITH SILICONE SEALANT USED ON FUEL SYSTEMS

*-The following is from NASA's
Aviation Safety Reporting System (ASRA).*

ASRA research on General Aviation fuel exhaustion incidents, published earlier this year in Callback concluded that many fuel emergencies could be prevented with careful preflight planning and visual inspection of aircraft fuel system components. Yet even a careful pilot may need perseverance to detect some fuel system hazards, as illustrated by these recent ASRA reports:

I proceeded to fly with engine roughness on two occasions. Each time upon landing it was assumed to have been water in the fuel or carb ice. Then, after a three hour flight the engine quit. An off-airport landing was made in a rough 800 -1100 ft. hay field. The next day a mechanic could not find the cause of engine failure. The aircraft was flown out and refueled. All fuel screens were clean and clear. At home port the investigation went on. Then, as a last resort, fuel flow was checked from each tank, not both. The left tank would not flow sufficient fuel to operate the engine. The tank flowed freely, but not past the fuel selector valve. The valve was removed and the left port found plugged with silicone caulking blocking proper flow. The records show a reputable service firm had reseated the fuel tanks at the filler cap gasket and excessive caulking had been used. This flaked off and collected in the fuel selector valve.

During a callback conversation, this reporter told ASRA that the excess silicone had been visible at the aircraft's filler cap, which had been inspected many times with no indication that the silicone could be a problem. The pilot had also seen "little sparkles" when fuel was drained, but did not know these were silicone flakes.

A second pilot experienced loss of fuel pressure during climb, but avoided an off-airport landing by turning on the plane's auxiliary fuel pump and switching fuel tanks. Silicone sealant was again found to be the culprit. A piece of silicone sealant was stuck in the selector valve inlet from the main tank causing the fuel flow problem. This was easily removed, and the pilot returned to the hangar without incident.

Based on these experiences reported to ASRA, aircraft owners and operators who have used silicone as a fuel tank sealant may want to inspect filler caps carefully during preflight for signs of flaking, and be aware during fuel system maintenance, that excessive silicone is a potential hazard to flight safety. Because silicone sealant (also known as RTV, GE Silicone Caulk, Bathtub Sealant) breaks down to a sticky goo when brought in contact with fuel, it should never be used on fuel systems or such things as fuel tank gaskets. There are special sealants available for fuel systems which can be obtained through most aviation supply houses.

FAA SAFETY BULLETIN

Before your next flight physical exam, which might require a blood test or drug test, consider the following:

- If you've taken Advil, Nuprin, Mediprin, or Motrin it could show up as MARIJUANA.
- If you've taken Nyquil, Vick's Inhaler, Diet pill, Heat/Asthma medicine, or many nasal sprays, it could show up as AMPHETAMINES.
- If you have taken tonic water, or herbal tea, it could show up as COCAINE
- If you have taken Benadryl, Soma, or Norflex, it could show up as METHADONE.
- If you have taken Dilantin, or Phenobarbital, it could show up as BARBITUATES.
- If you have taken Vick's Formula 44, Tonic Water, or have eaten poppy seed rolls, it could show up as HEROIN.
- If you have taken Contact, Dristan, Nyquil, Hall's Menthol Drops & many cough medicines, it could show up as ALCOHOL.

The message here is that if you use these over-the-counter drugs before the medical exam, there could be some very serious charges against you because of your head cold. There could be a lot of reactions by the FAA to some of these things, and it would not only delay renewal of your medical, it could cost a lot of time, money and written statements from doctors to get this straightened out.

USING DITZLER® AUTOMOTIVE ENAMEL

*-from David Wagner, EAA# 321781,
Colorado Springs, CO*

Some of the fellows in the Colorado area are using the following process on their aircraft. It seems to work well and they are betting it lasts twenty years! Basic fabric finish involves covering with two coats of Rand-O-Proof® primer following with two coats of Rand-O-Fill® butyrate dope followed with two coats of Ditzler® automotive gray primer with plasticizer. (The first coat is thinned substantially.) Following with color coat or coats as needed of Ditzler® enamel with plasticizer. He says it is fairly easy to repair Ditzler® using paint remover to the bare fabric, wash it clean and use the same process as previously used. He says if you do have Stits® on your aircraft that it is very possible to keep the gloss by using 90% reducer (50% acetone and 50% MEK) and 10% color. As always, use personal protection. The best is pumped-in air to a full-face mask.

COMPOSITE TIPS

Q-Talk Newsletter
Quickie Blders. Assn.
By Mike Bergen

Have you ever wondered why "the Book", on page 3-14, tells us to paint our plastic airships white opposed to some other color? Then we see the Air Force's plastic, fantastic, invisible airplanes painted black, or the Lancair painted red! If some of you boys are as curious as I tend to be, I would like to offer you a little crash course in "Composites 101, Temperature versus Structural Properties". You may want to refresh your memory by referring to the chart extracted from SOARING that is given on page 3-14 in our plans. Pay close attention to the temperatures.

Most organically derived materials have that which is known as the glass transition temperature (Tg). This number is used to indicate the temperature at which the material starts to soften and lose the "solid" properties. The number that the designer pays attention to is the heat distortion

temperature (HOT). The HOT is typically ten to fifteen degrees less than Tg. Now, how does this concern us?

The old SAFE-T-POXY, now HEXCEL EPOLITE 2410 & 218X, is what is known as your basic room temperature amine cured bisphenol-A epoxy. It enjoys a "mighty" HOT of about 165 degrees F. In addition, empirical results (lab tests) have shown the compression strength to be cut in half at a dry 145 degree F. temperature. In the presence of moisture (humidity), this could be worse! Don't sweat yet boys, a good safety factor can make up for this. The question is, what did our boy Gene use as a safety factor to allow for this and builder sloppiness? Builder slop would be things like low fiber volume fraction (i.e. wet lay ups), high void content (air in between the plies or poor wet out of the fibers), and poor alignment of the fibers, as mentioned in the closing of my last article. How else can we achieve better properties? Simply by "post curing".

There has been some discussion in the past about solar post curing of the wings. There is some merit to this! Post curing while the resin is still a little "green" causes full polymerization of the resin

SAVE YOUR ELECTRONICS

Claude Preston, 18235 Fortieth Place, Seattle, WA 98189, (206) 243-0205

Your solid state equipment in your new vehicle is expensive. You don't need to ruin it by hitting the starter with your radio on. There is a cure, cheap and simple, which will take care of the problem.

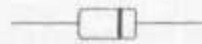
Go get yourself IN4007 (or equivalent) diodes. These look like a resistor, with a lead coming out each end, and a colored band painted near one end. That is the cathode end. Remember it. They are rated about 1000V and one to three amps.

You put these across your master and starter solenoids. The master takes one, the starter takes one. If your master solenoid has only three leads coming out of it (one to the battery, one to the switch - small wire and one to the rest of the airplane) put it from the battery terminal on it to the small terminal on it, with the cathode end of the diode on the battery terminal.

If your starter solenoid has four posts on it (two big ones and two small ones), one of the small ones is normally wired to the battery side of the solenoid, the other goes to the starter switch. Just put your diode across between these two small terminals, with the cathode end on the battery side, not the starter side.

What happens is this: When you release the starter switch (or the 11 luster switch), the energizing coil of the solenoid creates a huge reverse current spike due to

the collapsing field of magnetism. This spike can be very high voltage, and is opposite of normal polarity of the system. If your solid state radio or other gear is in the "on" position, this spike can blow your solid state gear apart. The diodes shown above "short" this spike out, saving your valuable gear.

These diodes look like this  and just put some kind of a lug on each end to accomplish the purpose. Good luck. By the way, they don't cost much, and are cheap insurance. The reason you only have three posts on a Master Solenoid, is that one side of energizing coil is connected internally to the battery post. You are accomplishing the same thing on your starter solenoid, wiring it as stated above. When you hit the starter, all you are doing is grounding the other side of the solenoid, making it work. Some people like to have it hooked up so you are supplying current to the solenoid when you throw the switch, but I prefer my method, because if you get a short in your switch wire, it doesn't short anything out and get hot. All it does is activate the solenoid. Make sense?

If you hook the diodes up backwards, all that happens is that they will get hot and burn up, almost instantly. Just go buy new ones and put them in the right way and no problem will exist.

REPAIRING COMPOSITE SKINS

From the Lancair Newsletter

We know that you never ever make mistakes when building your Lancair. But what if a friend were to come into your shop and drop a hammer through your wing skin, or drop your horizontal stabilizer on the floor and ding the leading edge. What if your helper failed to seal a fuel compartment and

you were forced to fix their error. What then?

Fixing screw-ups is easy with composites if a few simple rules are observed:

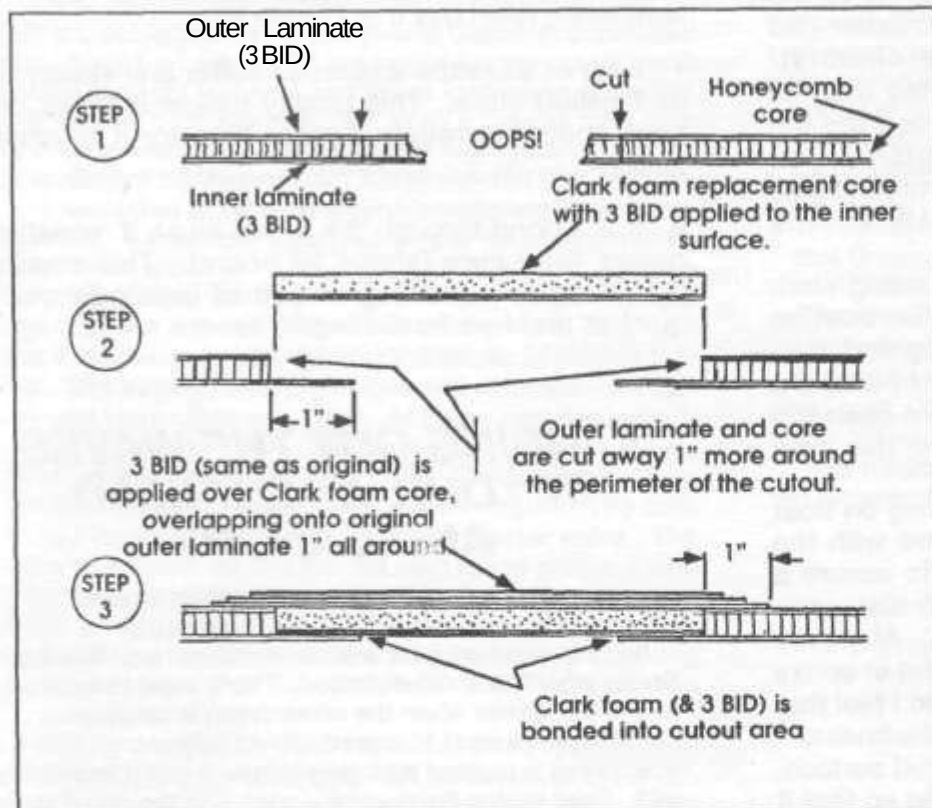
- If both sides of a sandwich structure are damaged then both sides must be fixed, not just the outer laminate.

- The fiberglass used to repair any skin should overlap onto the original surrounding skin by 1" all around the damaged area.

- It is difficult to replace damaged honeycomb core with another piece of honeycomb. Clark foam can be used as a substitute for most larger core damage areas, and a thick epoxy/micro mixture can be used for a small (T square) damaged area.

- If the damaged area was originally 3 BID, then repair the area with 3 BID.

A basic sequence of repair is shown in the drawing below. Keep in mind this is a generic repair but it does show the general principles. Both inner and outer skins have been tied into their original laminates by a 1" overlap and the core has been replaced. Yes, you will have a slight cosmetic bump (.030" high) on the outer surface because of the 3 BID repair, but that serves you right for letting your clumsy friend into the shop in the first place! Just fair the area into the original skin with micro and repaint.



PAINTING TIP

If you are priming with lacquer primer you should let it dry for at least 4 to 5 hours as it shrinks. If you put lacquer right over the top of lacquer primer be-

fore it is completely dry and shrunk tight, you may have a ruined paint finish.

STROBE LIGHT POWER SOURCES

On the shelf from WHELEN ENGINEERING COMPANY, INC., Deep River, Connecticut 06417(203-526-9504)

Any strobe light power supply that has been out of service for a long period of time is subject to failure because the electrolytic condenser loses the polarity formation. A strobe light power supply not having been used for one year or longer is vulnerable to failure.

If this is the case, it is recommended to start operating the system on a voltage that is reduced

25% for 10 to 15 minutes before putting the power supply into normal service. This will prevent overheating of the condenser while they reform. If the power supply, after a long period of non-use, is operated at full voltage immediately, there is an excellent possibility that the condenser will become overheated.

Call WHELEN - Tom Geffen for how to do this.

EPOXY AND ITS PROPERTIES

- by Ron Brown of Tolar, Texas

A few things need to be cleared up about epoxy and its properties. Epoxy will degrade in ultra-violet light. As good as epoxy looks as a coating, it is no substitute for paint or a good spar varnish in areas that are to be exposed to sunlight.

Epoxy is recommended as a base coat to tie the varnish or super UV resistant clear finish to the wood by some formulators. After a distributor had recommended this procedure, the chemist/representative of a major paint firm stated that the epoxy below the coating would degrade from the light being passed through the finish. One statement he made that struck me as profound was "if you can see through the finish, UV light is getting through."

Some boatbuilders in the north are using such methods. In southern areas, where the boating season is more than three months long and they stay outside and in the water, one is courting a mother of a different nature. She has not been too kind to those of us who have tried the new "miracle" stuff.

When epoxy is used as a barrier coating on boat bottoms, layers of glass cloth saturated with the material are used below the waterline to assure a continual thickness of epoxy. This cloth also adds hardness and abrasion resistance. Airplane designers recommend light glass cloth set in epoxy over plywood skinned wings. Once again I feel that this is to guarantee a minimum coating thickness.

If one does a repair on an epoxy coated surface, they only need to scuff the epoxy coating so that it will bond to itself. Varnish and polyurethanes are not suitable to glue upon.

Other products available for composite use are resins with higher physical properties and various viscosities. I prefer resins thin enough to run that can be modified with fillers for diversified uses. Several formulators have such resins, all stronger than wood.

A magazine I receive, Professional Boatbuilder, has had several articles that would be of interest to the amateur airplane builder. One in the December/January issue was about Post-Curing of various resins and resin systems. A condition known as print-through is possible if this is ignored. Problem solving is cheaper to read about and cure than to do twice.

Epoxies have different curing temperature requirements. One other than Chem-tech (T88) that can be used over wide ranges is by System Three. These people have one resin with three hardeners of various speed that can be used down to 35°.

Other advantages that System Three's wood laminating resin has that I enjoy are:

1. It is not as brittle and cures softer and slower to its finished state. This quality makes it easier on edge tools but requires more time for it to sand easily.
2. It will bond through the amine blush if recoated before total cure (about 72 hours). This makes recoating and glueing on top of previous work quicker, and less frustrating.

SANDING OUT THE WAVES IN YOUR WINDSHIELD AND CANOPY

- by Terry Kuenzli, Editor "Just Choppin-Around"

So, you sand on it for a while and then re-polish it out. Guess what? It's still distorted. There's got to be a way to see the waves when the windscreen is opaque.

Let's move over to automotive body work. When a door panel is painted with gray primer it might look beautiful. Paint on the finish glossy coat, and the panel starts to take the appearance of the surface of the moon.

The idea is to make a perfectly flat, even body panel. To accomplish this you spray some black primer over the top of the gray. Now, as you sand on the panel with a rigid sanding block the panel's high spots will turn to gray and the panel's low spots will stay black. The perfect panel appears when the sandpaper evenly takes the black color to gray.

You want to accomplish the same thing with your windscreen, but like me, I had no desire to start painting it with black and gray paint. So, here's what I used as a solution. Get a spray can of the DYKEM® steel blue layout fluid that is used to layout the steel brackets on the flat metal. It's produced by the Dykem Company, 8501 Delport Drive, St. Louis, MO 63114.

Spray the windscreen blue on whatever side you want to start on. Now as you sand, the high spots will show opaque plastic and the low spots will still retain the blue color. The object is to take a swipe with the sanding block and watch an even change from blue to white, which will prove that the waves are gone.

After you have accomplished this on both sides of the bubble, you're ready to polish it out.

WEIRD ANGLE HOSE FITTINGS

- from Central States Association Newsletter, Tom Coughlin -

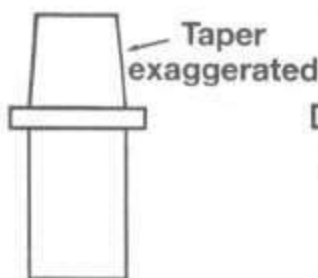
I used rubber aircraft grade hose when my engine was first installed but was never quite satisfied. When the EZ was down for paint I changed all rubber hose to EARL'S Performance Products Auto-Flex stainless steel hose rated at 1,000 psi and intermittent temperatures of -40°F to +300°F. The extra protection and less hassle is worth the added price. Besides, they look neat. Now the real advantage is all the fittings. They not only have straights, 45's, tees, and 90's in all sizes, but they also have 120's, 150's, and 180's. They even have fittings they call a TUB-Mate, that connects tubing to hose in sizes from -4 hose to 1/4" tubing to -16 hose to 1" tubing.

Their great catalog costs \$5.00 or is free with a \$20.00 purchase. As usual, do not mention it's going on an airplane. Contact your local EARL's or : EARL'S Performance Products, 189 Victoria Street, Long Beach, CA 90805, telephone (213)609-1602.

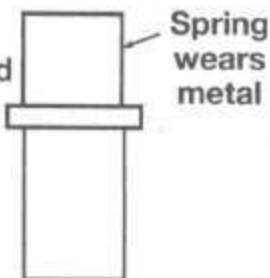
0-200 & C-89/C-90 Valve Guides

by Pete Fleis, EAA 080928

Correct Guide



Incorrect Guide



I recently solved a problem I was having with my 0-200. Brass chips or shavings were showing up on the oil screen. I found the source to be the exhaust valve guides. The inner spring of the three springs that are on each valve were rubbing the guide and shaving off metal because the replacement guides I had put in 125 hours ago were not made correctly. If anyone is putting guides in an 85/90 or 0-200, or having them put in, they should check for this.

GROUND THOSE FUEL TANKS!

Not many people are aware but fiberglass tanks should really be grounded. We have had previous articles in Sport Aviation on grounding tanks in aircraft and even plastic tanks that you use to fill your aircraft tanks with. You probably recall the articles on Bill Barton and his fiberglass tanks in the November/December 1989 Sport Aviation. The articles on fueling up safely was in the Craftsman's Corner of the February 1988 Sport Aviation.

The Around the World Voyager had fiberglass tanks but they didn't use grounding material which is like a very light metallic mesh inside to save weight. Dick Rutan reported on the static electricity he could see floating around on the top of the tanks at night. EAA member, Terry Schubert, reports that in portions of the interior fuel cells on the Voyager carbon tracking was noticed which is an indication of very high voltage electricity wandering from point to point. If you must use a fiberglass tank in your aircraft, contact Bill Barton to see if you can get the mesh that is used inside them to ground them. The same applies to any plastic tank used for any fueling operation. Here the solution is simple, just stuff metallic screen inside, run a wire from the metallic screen out through the filler neck and silicone in place so that you will have a grounding device for it.

ELECTRICALLY CONDUCTIVE FIBERGLASS TYPE REINFORCING MATERIAL

There is a new product sold under the trademark, RoMHOGlas™. Conductive mat is a non-woven fabric mat composed of a dense intersecting network of very fine aluminum coated glass fibers. Why a conductive mat? For the insides of fuel tanks and other applications for lightning and static electricity protection. Contact Lundy Electronics & Systems, Inc., Lundy Technical Center, 3901 N.E. 12th Avenue, Pompano Beach, FL 33064, telephone (305)943-1500.

FOR SALE

KR-2 BOAT STAGE ON RETRACTS, 1800 VW
ENGINE. MOST PARTS TO COMPLETE, NEWER SET
OF PLANS. \$2,000.00.

KEVIN YETTER
402 7TH ST. S.E.
STEWARTVILLE, MN 55976
507-281-0766 DAYS
507-533-8621 AFTER 6:30 PM

WANTED

KR-1 PARTS FOR PROJECT. CALL WITH YOUR
ITEM AND PRICE OR DROP ME A NOTE.

JERRY BUNNER
7214 E. 19TH ST.
INDIANAPOLIS, IN 46219
317-352-0393

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

**WE NEED YOUR HELP____PLEASE SEND PHOTOS
AND ARTICLES!!! THANKS!**

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 206 JULY 1994

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



BOB HAWK'S N685RH, ELYRIA, OHIO

N685RH's first flight was May 10, 1994. Once around the pattern and upon landing I bent the half inch one piece aluminum gear. I installed Dan Diehl's fixed gear (I highly recommend) and had my second flight August 2, 1994. I now have eight and a half hours with only having done a little tweaking. I'm running a Great Plains 1835cc VW, a 37mm Zenith carburetor, intake and exhaust pipes are of my own design, 54 inch Warp Drive propeller, the canopy is eighth inch lexan hinged up the middle.

Cont'd page 2

Empty weight is 598 pounds, static rpm is 3000, at 3500 rpm I hit 150 MPH, 2800 rpm gets me 85 MPH, above 120 MPH I seem to be burning 3.4 GPH, at 80-90 MPH, I seem to be burning 3.0 GPH (100LL av gas). I'm still working on the envelope so that's it for the specs for now.

In calm air, the plane does fly hands and feet OFF. I've been very impressed with how it handles in the air. On the ground is another story. I should preface the following by saying that I've flown 134 hours in the past 14 years, all in Cessnas (150, 152, 172) and Piper Tommy Hawks. After talking to numerous KR pilots and other taildragger pilots (all of whom said I should get some taildragger experience with a CFI first) I took off. When taking off I hold the stick back until I have enough speed where I feel there is some rudder control (approx. 5 seconds), then I push the stick forward so I can see the runway, a little left rudder pedal to keep me in line and as speed rapidly builds up, the plane feels like it's flying but I hold the nose level until the plane lifts itself off the runway then I hold it at 20 feet until I have my 75 MPH climb speed. All of this occurs in less than 1500 feet. By the way I couldn't locate a CFI with a low wing taildragger that would give instruction. I did approximately 35 hours of taxiing where I proceeded to wear out a set of tires. This helped give me a feel for the aircraft.

My original one piece aluminum gear had a little bit of toe-out which helped in the stability of the plane on the ground but I think it was a major reason for its failure during my first landing. On Dan Diehl's gear he recommends a little toe-in or neutral but definitely no toe-out. I started with his recommended toe-in and it was OK. Before my third flight I was ready to put on my new tires so I also installed a couple of shims to bring my wheels to a neutral position. The neutral position was noticeably more stable and I would recommend that just for the sake of longer tire wear.

I am using the stock tail wheel but on a longer 10 inch spring bar, it seems to be holding up real well. As for the lack of visibility during my taxiing hours and

it has presented no problem for my take offs and landings (really I keep my eyes closed so it doesn't matter).

I can't include description of my landings because I'm still trying to find the right technique. I'm sure other KR-to-be pilots would appreciate some graphic descriptions of experienced KR pilots' techniques for takeoff and landing.

It's not real pretty and it's not real fast but it sure is fun!

Thanks go to Terry Warner in Columbus, Ohio, Dan Diehl and Steve Bennet at Great Plains Aircraft.

Hope to see everyone at the KR Fly-in in Columbia, Tennessee October 7, 8 and 9.

Robert Hawk (Bob)
821 Jamestown Ave.
Elyria, OH 44035-1811
216-365-6867

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

HELPFUL HINT FROM KR BUILDER IN ITALY

I'm building a KR-2S (plan #244) and have just encountered a problem that drawings don't help to solve, or perhaps I did a mistake in the assembly sequence.

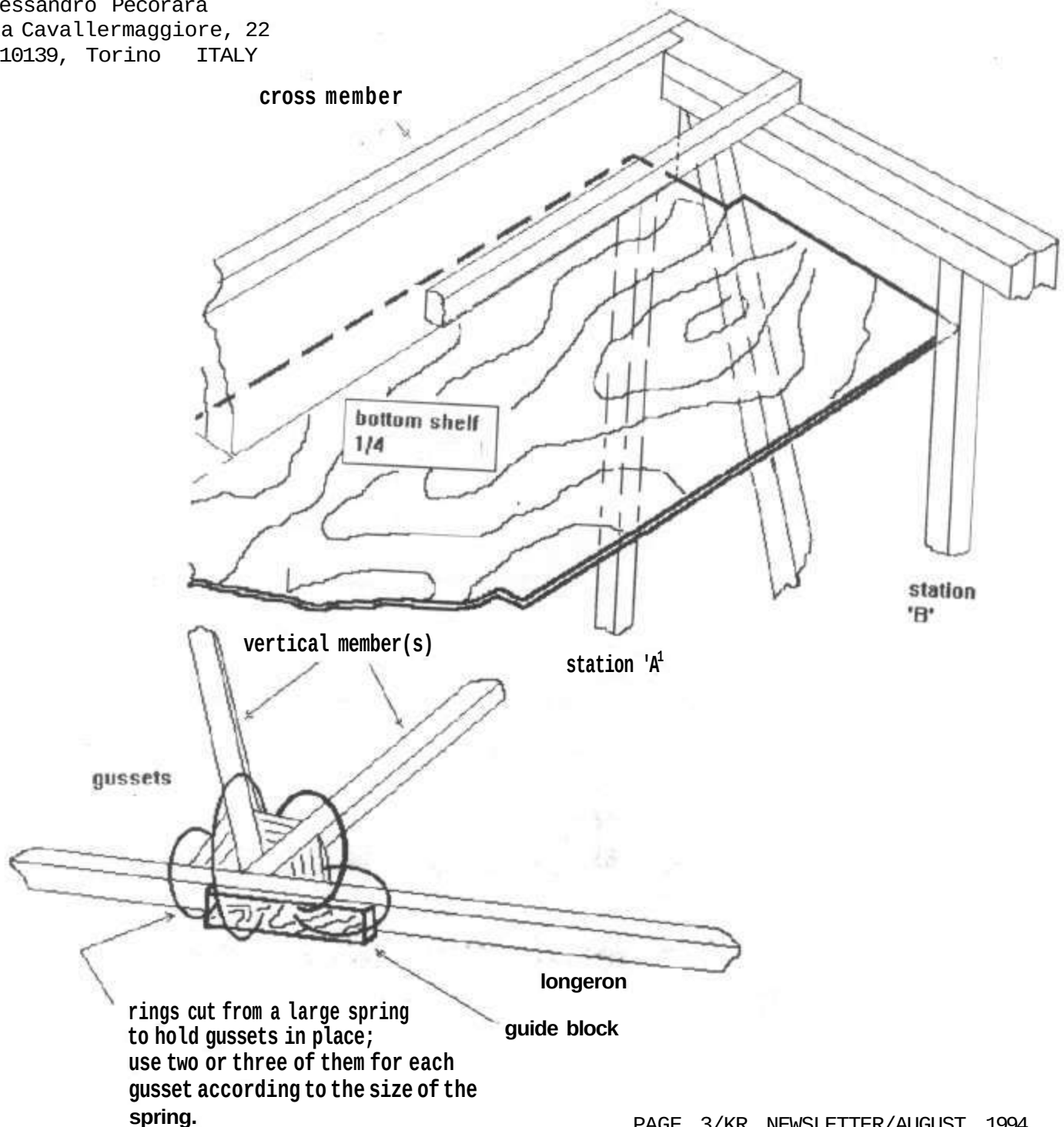
The KR-2S has the 1/4" plywood bottom shelf that fits thickly between stations A and B (see sketch) but with the firewall cross member(s) and the doublers already in place, I found impossible to insert properly the plywood shelf.

So I choose to cut two shelves from 1/8" plywood: Rather than a single 1/4" piece and to place them one at a time, being quite thin and easy to bend. So I epoxied first the upper one then, after the epoxy had cured, the lower one, putting plenty of pressure to the two sheets, using many clamps and hardwood blocks.

I've included a sketch showing the simple tools I used to apply pressure when glueing the gussets: They are just rings cut from the springs of an old mattress.

Hoping that this hint may help someone. I should like to know if anybody found a better way.

Alessandro Pecorara
via Cavallermaggiore, 22
1-10139, Torino ITALY



A - Wing Stub Glassing

Well I finally made it to the point where I could cover my wing stubs. Install the ribs, and foam. I had one big killer problem that caused me about a year delay. This was a year where I would think about the plane, but not be sure of what to do to solve the problem. Then I had an idea, but I moved, and the plane ended up in storage for a year. Only now can the story be told.

There is this small sentence in the KR2 manual. Some of these are six month sentences, such as "By holding the spruce to be sawed to the spar CAP GUIDE, it can be pushed through either a circle saw or radial arm saw and perfectly tapered caps result." — Pg20 A six month sentence.

The one year sentence is found on page 69 at section 9.11. "Retract landing gear and check that aileron cables completely clear the gear leg castings" — I did, they didn't... A year to decide what to do, add a pulley, fairlead, move a pulley? The sentence I missed that should be paid careful attention is on page 62 section 9.8. "This pulley should be positioned as close as possible to the aft side of spar leaving enough room for smooth cable travel." Don't miss that one. I build my pulley to the specs on page 68, but due to how I positioned my landing gear attach brackets, I had a problem. I expect I will also have a problem on page 77 section 10.20 "The wheels should not touch the top skin when retracted into the wells." Keep all of these sentences in mind when placing your gear retract hinges on the spar. I had this idea of going for minimal wheel exposure when retracted, also looking at the top line of the rib contour. At any rate, things don't always go smoothly.

My solution to the cable interference problem was to install a spacer made from my first spring bar. (did I mention the mistake on the first one?). I just happened to have an extra spring bar from which I cut two spacers to move the wheel fork casting down 1/2". This made the casting move away from the cable 1/2" clearing up my problem. This added weight so I cut the forks as mentioned in the plans, earlier I had decided not to make the cut, but now I felt I had to. In addition, I was concerned about the AN-3 bolts possibly shearing due to the additional lever arm created by the block, so I re-drilled the holes for AN-4 bolts.

Aircraft Spruce and Wicks have some neat cable fairleads that are 3/4" diameter with clips. When I recieved them, I thought, gee these are kinda big. But the neat thing about them is that the brackets you make with 3/4" holes are big enough for cables turnbuckles, and thimbles to pass through without cutting cable. This means MAINTENANCE is easy. I routed the forward spar aileron cable through two fairleads one at the inside wing rib, and the other at the fuselage to insure that the cable will not touch the retracted casting. I am considering using these fairleads where the rudder cable exits the fuselage as well instead of the floxed nyrod as mentioned in the plans. That approach would require cutting cables for maintence.

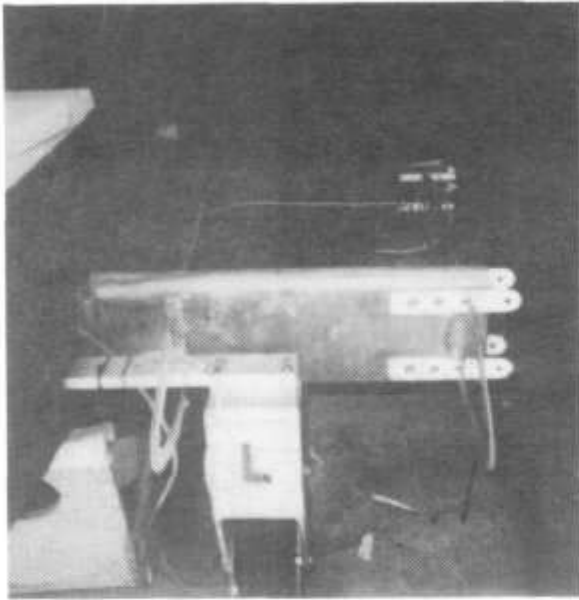
Photo 1 shows the Left wheel casting installed with the spacer in the gear down position. Note the "L" on the gear. The black paint used for sanding/filling the tail section worked great for labeling the large landing gear assemblies and hinges as well (Left,Center,Right). No mistakes on assembly, reassembly. Buy a spraycan! The fuel line was run on the AFT spar secured by two clamps at attach fitting. The pilot/static lines will run through the forward spar. REMEMBER DON'T RETRACT AFTER INSTALLING RIBS. I busted one when I had the ribs clamped in position, then moved onto testing the retract mechanism.

Photo 2 shows the author about to sneeze due to not using the dust mask. Buy some of those too!

Photo 3 shows wing stub after sanding ready for ... well perhaps a bit more sanding, then dry micro and glass! Too bad the movers didn't move my resin. Also note the project is sitting on the infamous "KR-Cart" which was contributed by Monty Miller in an earlier KR newsletter.

See you!

Ross Youngblood
1017 ME Diane PI
Corvallis, OR 97330
(503)753-7370



Fuselage Side Base/Jig

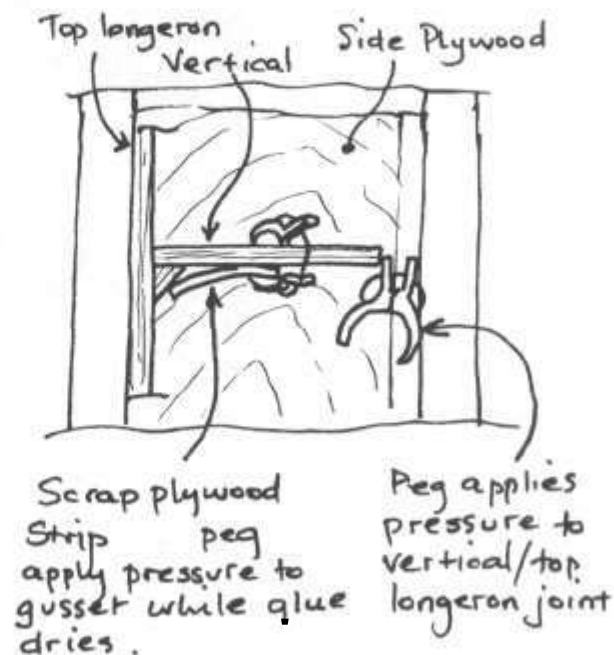
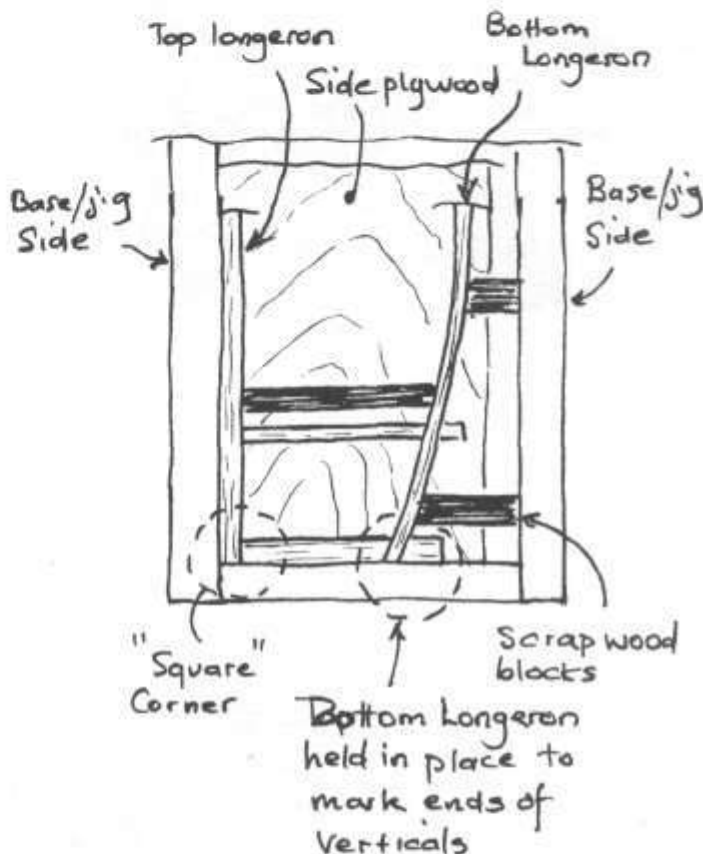
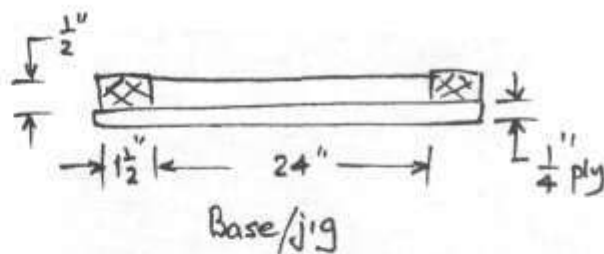
I was not keen on the idea of making the fuselage side "frame" and then glueing it to the plywood. I could see all sorts of problems with that technique such as glue setting before I could get the side aligned, misaligning the frame with glue lines on the ply and generally making a mess of the whole operation. So I decided to make a jig into which I could make the fuselage side by glueing sections of the frame directly to the fuselage side plywood.

I started by constructing a "base/jig" and used this to align each piece of the "truss" as it was glued in place.

The "base/jig" was made out of a sheet of commercial grade 1/4" plywood about 24" wide and 12' long (an 8' piece temporarily joined to a 4' piece) to which I glued 1-1/2" x 3/4" straight timber around the edges. It could be easily lifted off the work table for storage when not needed.

The commercial plywood had very square ends and straight sides (unlike the aircraft plywood that was more like a trapezoid than a rectangle). This enabled me to easily make a "square" rectangular base/jig in which to lay out the fuselage side.

Onto the base/jig (painted white for easy marking) I placed the fuselage side plywood already spliced to the full length of the fuselage side. The ply for the sides was trimmed straight on one side and square on one end using a router and the base/jig as a guide. This "square" corner was the forward top of the fuselage side. The plywood was placed on the base/jig and top longeron clamped to the straight top edge of the base/jig and glued to the fuselage side plywood. Padded bricks were used to apply vertical pressure to the glue joints.



When the glue dried, excess glue from the top longeron where vertical members are to make contact was removed using a dremel with router bit. The positions of the verticals were marked on the side plywood for alignment of the verticals and glue lines. Before glueing the verticals in place, the shape of the ends of the verticals was determined by bending the lower longeron into shape while lying on top of the verticals. Scrap wood cut to the correct length and braced by the two sides of the base/jig were used to hold the bottom longeron in position while the lower ends of the verticals were marked for cutting to length and shape.

With the verticals cut to shape it was easy to glue each vertical in place. The "handle" ends of opened pegs were used to apply pressure to the vertical/top longeron glue joint while the glue set. The plastic pegs had a strong spring that provided a good compression force for glue joints. The pressure on a joint could be varied by the number of pegs used and being plastic, they did not stick to the glue. The only problem with pegs is that they are in demand by other members of the household.

The effort in making the base/jig was more than rewarded as it allowed me to make a square flat fuselage side that was easily built up at my own pace and that did not have any staple holes in the plywood skin. The base/jig has also proven to be very useful for making many components where a straight edge and square corner was needed, particularly the spars.

Bill Ginn
41 Meragi Road
Singapore 1648

1994 KR GATHERING

The 1994 KR Gathering will be in Columbia Tennessee - (MRC) on October 7, 8 and 9. All planned activities are on Saturday and the Awards Dinner will be Saturday night, make plans to be there!

Everyone will find lots of things to do in the area this weekend with Fall colors peaking, nations largest Arts & Crafts Fair, home tour of historic Columbia, Grand Ole Opry and Opryland.

Presentations for KR's will include "Electrical Systems", "Interior How To", "KR Kit Package", "Engine Selection" and "Flight Testing".

The host hotel is the RAMADA INN, Columbia, TN. For reservations call: 615-388-2720. Room rate is \$34.95 (single or double), if reserved by 9/23. Tell the hotel that you are part of the KR GATHERING.

Contact (if needed):

Jim Hill
(205) 882-2054

Bobby Muse
(615) 399-9853



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD OSHHOSH WI 54903 3086
PHONL 414/426-4800

FOR SALE

KR-2 kit, fuselage including tail on gear, most parts to finish. Dissassembled VW engine. Just don't have the time to work on it. \$1,900

Ronald Barsness
R.R. 1, Box 86
Cyrus, MN 56323-9602
612-795-2708

FOR SALE

Collection of KR Newsletters with indexes. Issue #1 dated 7/75 through Issue 206 dated 7/94, plus quarterly magazines by Steve Bennet and some seminars which were taped and transcribed.

Joe Wallace
515-782-8190 evenings

FOR SALE

Revmaster 2100D engine: \$2,500
(firewall forward)
1. POSA carb 2. 4-1 Exhaust
3. KR Engine mount 4. Sturba Prop 52-50
5. Bendix Dual Mag 6. Starter
7. Revmaster engine cowling

KR-2 Project 35% done: \$3,000
1. All parts minus foam, glass, epoxy, inst 2. On Diehl fixed gear; conventional
3. Matco hyd brake package 4. Lamb tires
5. Pedals installed on floor 6. Miniature metric control stick assy. 7. Hobbs meter

Len Johnson
315 Amsbury Dr., Apt. 219
Lafayette, LA 70507
318-232-0390

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 207 AUGUST 1994

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN



KR NEWSLETTER

ISSUE NO. 208
SEPTEMBER, 1994



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



TOM SWEARINGEN AND BILL MASTERS' KR-2, BLOOMINGTON-NORMAL, ILLINOIS

This is the story of the KR-2 built by the partnership of Tom Swearingen and Bill Masters of Bloomington-Normal, Illinois.

In November of 1992 we spotted an ad in "Trade-A-Plane" to sell a KR-2 in the boat stage in Lawrenceville, Georgia. We went to Georgia and hauled this project home with great enthusiasm and started learning how a KR-2 is built. A bare Type 4 VW was included and a visit to Steve Bennett at Great Plains Aircraft got us a box of goodies. Jeannette Rand at Rand Robinson sold us cowling, canopy and molded fiberglass fuselage parts, wheel pants and gas tank. We got the wing skins from Dan Diehl.

Cont'd page 2

Through the winter and into spring and summer we worked in my garage and got the fuselage and panel built and the engine mounted. We ordered a prop from Ed Sterba. We had decided to have a starter and use a carburetor, heat box and air cleaner. This required a lot of reshaping of the cowl.

On the single ignition we came to the conclusion that distributors were more reliable than mags so that is what we used. With no shielded ignition we worried about radio noise but were pleasantly surprised to find the hand-held we use had no static at all.

In early Fall of 1993 we loaded up and moved to a hangar at the airport and attached the wing spars that came with the uncompleted project with which we started. The skins were applied and ailerons cut out and built. Painting was started using DuPont primer and sealer with lots of sanding between coats. The finish Imeron was put on by a "pro" because cold weather came and we could not keep the uninsulated hangar warm enough to paint any longer. We were glad to have a good painter do the last coat anyway. After painting, we moved to a heated hangar so we could work through the winter.

When we ran the engine the first time, oil came out the back like mad so we had to pull the engine. We found that the rear oil seal had been left off and we had not had the fly-wheel off so we didn't realize it.

We had kept a work log and taken lots of pictures which we put in an album. Also, we had been in touch with the FAA from the start and, when all the requirements had been complied with, we called for an inspection. It was last winter and we always had details to keep up busy anyway. The inspector was very kind and signed us off with no problems.

Next came the wait for spring weather and the test flight. On May 1, 1994, a calm evening, with my wife and son watching and taking pictures, I taxied out and took off and flew for an hour - feeling the plane out at slow flight, approach to stall, etc. The first approach to land was high so I told the tower, "I have to go around". Next time I drug it in about 80 MPH with speed broke

down and made a wheel landing. The plane handled well and I was pleased with the way it flew but forward visibility when the tail was down was nil and much different than anything I had flown. Two days later, with my partner, Bill, and several others watching, I flew again. When I landed on the the mains I raised the tail trying to see where I was going. The prop struck the runway and got the tips but I didn't know it until I shut down in front of the hangar. This took a considerable amount of pride out me. We ordered a new prop from Ed Sterba and bolted a temporary prop on to fly in the meantime. The morning I flew with the temporary prop was warm and oil temperature and cockpit temperature became a problem. We installed a duct on the oil cooler and put a snap vent in the fuselage wall for cooling. I found we needed to hold left rudder to keep the ball centered at cruise so we put a ground adjustable trim tab on the rudder.

We decided not to fly again with the temporary prop as it only staticed 2800 RPM and the original prop staticed 3000. So we waited six weeks for a prop. When it finally arrived it was a beauty. We bolted it on and early one morning I went out to check everything out. While we were waiting we had re-adjusted the fixed gear to set the plane up a little higher to give the prop more clearance. It hurts me to have to report that I busted that new prop on take-off. Got my tail too high again trying to see where I was going. Good-bye to the hope of flying off the 40 hours and going to Oshkosh '94.

Another six weeks of impatient waiting. To get the prop a day or two sooner we flew to Delavan, Wisconsin and picked it up in Bill's Cessna 182 and got the prop on in time to display the airplane at the Prairie Aviation Museum's Airshow at our home field.

I told Bill, "I've made enough mistakes ... it's your turn to fly it". On August 22, Bill made a nice take-off, had a nice flight and made an excellent landing -- with about 22 people from his church watching. Bill was not a taildragger pilot, nor a stick pilot but he got along fine.

CONT'D PAGE 3

This brings us up-to-date. We miss having a building project to work on so may sell the KR and get something else going.

Tom Swearingen
14 Donna Dr.
Normal, IL 61761
309-452-5025

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$20.00 PER YEAR- U.S., \$25.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN INDIVIDUAL COPIES \$2.00 EACH.

THIS ARTICLE TAKEN FROM THE EAA TECHNICAL COUNSELOR NEWSLETTER. INDIVIDUAL AUTHOR NOTED.

ELECTRICAL

Product Review: RST Kits
from October "Coupe Capers"

PRODUCT REPORT: Radio Systems Technology Kit
Avionics: Telephone 1-800-824-5978

In particular, their intercom and headphone kits.

Headphones: very sturdy parts produce an extremely rugged and comfortable headphone. It has some 26 decibel diminution of aircraft noise. The bass response is a little weak in the ear pieces, but the sound is as clear as can be enjoyed from a sound system that could be put in an aircraft.

The electret microphone is the clearest I have heard.

The directions for assembling these headphones could be clearer by including a diagram or two, but it is not too difficult to figure out. Just take care that the polarity is correct in plugging in the microphone.

The cost is \$85.00 each for headphone

The RST 442 intercom is a 2 piece intercom, which, for \$85.00, has every feature of every intercom you can buy—including all of those wires and plugs and cockpit cluttering things. The solution to this problem shall be addressed later.

This intercom is the clearest intercom I have heard—even though others are very good and at least twice as expensive.

There are two reasons for using these kits. The first is they can be sold for less than half the price of similar units. They are as good as any completely built unit you can buy. The second is the ease with which their design and installation can be adjusted to the unusual needs of the owner.

In order to enjoy these advantages, the buyer has to put these kits together. In consequence of having not paid the money for a factory to do it. they are

ELECTRONICS

not unreasonably difficult to solder and assemble, but time must be taken to do it very carefully. It probably took me less time than usual to build mine—I've had such practice dating back to my teenage years.

It is advisable to allow several hours of uninterrupted time to solder together the intercom circuit board. The directions are very easy to follow for the RST 442 intercom. But it is tedious. There are 35 resistors, 16 capacitors, 4 transistors, 2 diodes and 2 integrated circuits. They supply the solder. You need a fine pointed soldering iron to solder the minuscule joints.

Assuming the reader has the bravery to take on the project, it is best to solder each piece one at a time, checking it twice, and marking it off on the directions with a fountain pen. If a mistake is made here it will be horrendously difficult to figure out why it does not work later.

I spent eight hours slowly, inexorably laboring over mine, taking care to neither heat damage parts (especially semiconductors) and not to leave a cold solder joint. Then I departed from the directions quite radically and wired it my own way so that I would have stereo sound in the headphones from the cassette and television in my plane with normal radio sound in both headphones.

I wired the printed circuit directly to its circuit breaker and the switches and microphone and headset plugs which I put in the aircraft instrument panel. I sealed the circuit board in a plastic bag, and ran telephone cord to a bicycle horn button on my control wheel. This gave me stereo sound, and intercom, and no wires and plugs going everywhere and breaking.

If you do not have a good result, there is no factory or unions or communism to blame. Therefore, follow the directions and do the labor you are not paying someone else to do, correctly.

VERTICALS AT STATION "M"

Here's another contribution to the ever-expanding body of KR builders knowledge. There must be a better way to do the verticals at Station "M" and those short ones at the aft horiz. stab, spar position. Whether this is it or not is yet to be established, but here goes.

If you build the KR-2 sides in the manner suggested, you're asked to install vertical members "M" (at the fwd. horiz. stab, spar position) and the short verticals at the aft horiz. stab, spar position only when ready to install the plywood webs. With skins on and the boat formed, it is difficult, to say the least, to maneuver your body and the appropriate tools in order to properly bevel these members to accept the plywood webs and make for an acceptable glue joint. If these bevells are not made, or made poorly, bending of the webs will result, causing unwanted stress. Also, if done by the plans, much wood must be removed from the fore and aft surfaces of the verticals. A look at sketch #7 shows the amount of wood that must be removed and reveals that a vertical member with only about a 1/2" fore-aft dimension remains.

After wrestling with a protractor, drawing some lines and bending some wood, I estimated the bevel angle to be approximately 11 deg. So, with a thoughtful gaze skyward and quick prayer, I decided to bevel these verticals first, then install them while the fuselage was still flat on the table, jigged and skinless. After further thought and having some time for a bit of paranoia to set in, I decided to install only the "M" verticals prior to skinning. Being concerned with the 7" distance between the stab, spars. I'll attempt to install the short verticals later and worry about how to do it when the time comes. I have a couple ideas and will keep you informed.

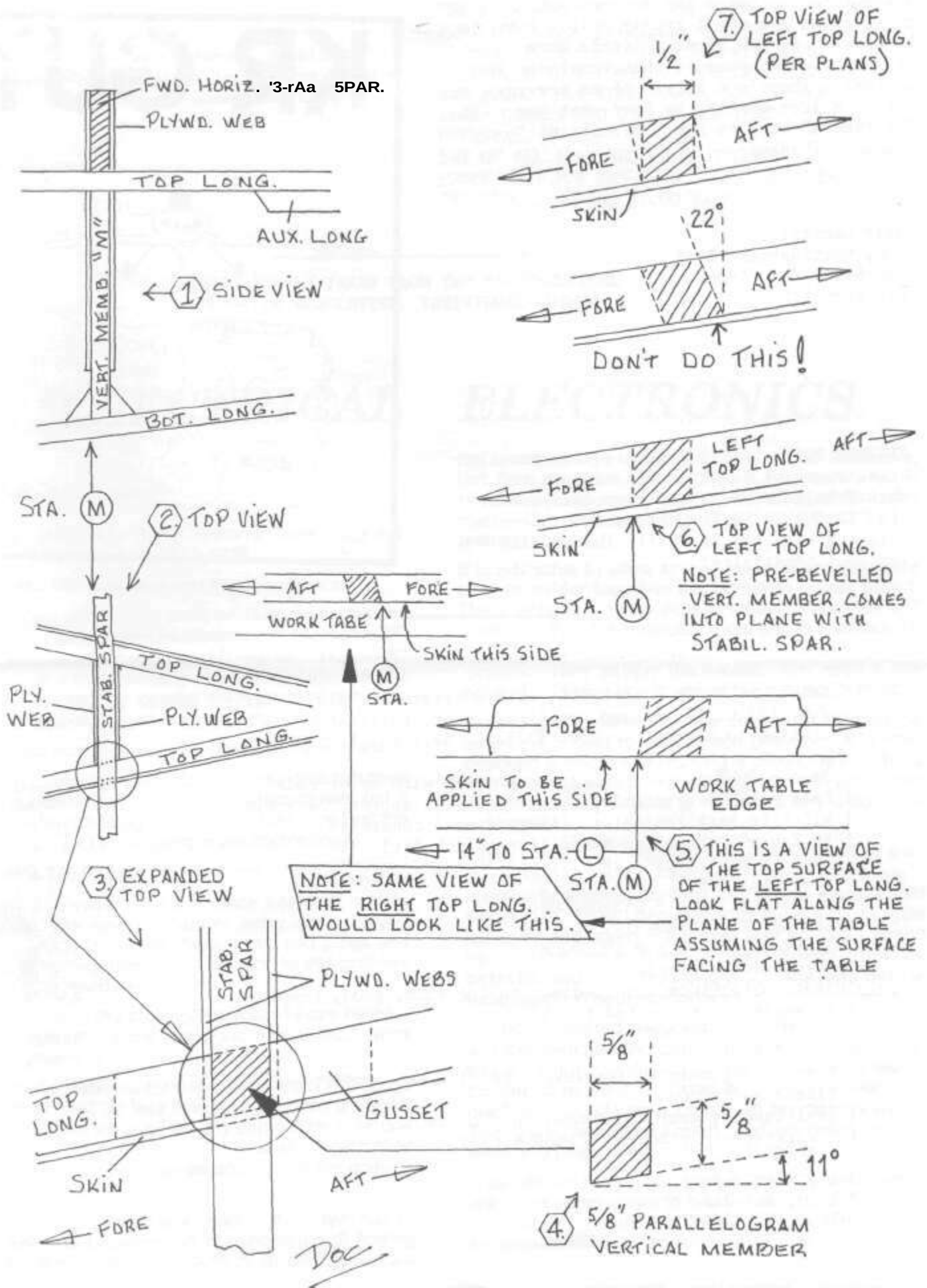
To begin, I pirated a piece of 5/8" stock (3" x 37"), which has since been re-ordered, and cut a 37" length of 5/8" parallelogram on the table saw (see sketch #4). From this I cut the vertical members "M", (with enough remaining for the short verticals), made the proper angles at the bottom longeron joint and dry fit them. Sketch #5 illustrates it's proper positioning relative to the

top longeron at Station "M". NOTE: This sketch is for the left side only. See NOTE: For sketch #5. One must be sure not to install it backwards or skin the wrong side, or a 22 degree forward bevel will result once the sides are bent to contour. Next, compound-angled gussets must be shaped to fit with the bevelled vertical, but this is no problem. As far as gluing, no different than at any other station.

I'm now at the stage where I'm jiggling up the two sides to square things and install the belly cross-members and stern post. I am bending in the sides very slowly over a period of a week or so, bringing each side in at the aft end about 2" each day to allow the wood to compensate and sort of making up a jig as I go along. So far, this seems to be working well and none of the glue joints have made a peep. If the manner in which I'm jiggling up the sides works ok, I'll also let you know about that. Right now, it looks as though the pre-bevelled, pre-installed "M" verticals are angling-in nicely (as per sketch #6) and appear as though their fore and aft surfaces will come perpendicular to the centerline and into plane with the line upon which the slab. Spar will be installed when the sides are completely pulled-in. Sketch #3 is what I'm looking for, with a full 5/8" vertical member and full and even glue joints between the verticals and the webs. Again, I'll let you know how it works out. Maybe someone else has a better idea?

One thing's for sure: This Newsletter needs some more Monte Millers'! Being a newcomer to KR World, I don't wish to make waves. However, if you'll all read the first line at the top of the Newsletter it says, "Devoted to the promotion of education and safety in the construction of KR aircraft." Now I know there's a bunch of you out there, yet the same pictures and names appear over and over in the Newsletter. It only took me 90 minutes to sketch and write-up my idea.

CONT'D PAGE 6



I don't think that's too much to ask, considering you might really help a few builders. So how about a little more devotion. Send some of that knowledge in to Earl. There's a gaggle of us new guys out here just waiting to hear what you "oldtimers" have to say. Educate us! Please! Thanks!

Bill Gambrill
2302 Meetinghouse Road
Boothwyn, PA 19061
610-485-8515

EDITORS NOTE: Bill Gambrill also has a great sense of humor as you can see in this Newsletter with the introduction to the "KR GUY". We look forward to upcoming episodes with the KR GUY!! Thanks Bill for your creativity!



FOR SALE

Model 542 RST-VHF Transceiver with 6 crystals: 118.5, 121.9, 122.2, 122.55, 122.8, 123.0. Purchased new in 82, Sept. calibrated and certified, never used or installed in aircraft. Cost \$325.50, Sell for \$295.00.

1 Posa - 29MM injector carb, never used with meter rods	\$ 59.00
1 Posa - 29MM injector carb, used on V.W. approx. 24 hrs.	39.00
1 Electric bank indicator, 14V good used condition	85.00
1 VW Propeller hub and plate (for shrink fit)	115.00
1 Wind up A/C clock - 24 hr., etc.	15.00
1 Electric tach	55.00
1 Mechanical tach - 0-3500, CW	15.00
1 Genane microphone	15.00
2 Slick magneto's - @ \$90.00 ea.	180.00
1 Wire harness complete	25.00
1 Cont. 65 - Oldie but goodie - no log runs, good, complete	650.00
2 VW engines - converted for A/C	
Use 1 - 1100	120.00
1 - 1500	130.00
1 Partially completed fuselage - KR1-1/2 with wood to finish, also fiberglass to cover	?
1 KR-1 landing gear with wheels and tires	?
1 8'worktable - place on 3 wood horses	?

Betty Roch
R.R. 3, Box 222
Salem, IN 47167
812-883-6478

C- Cockpit Installations

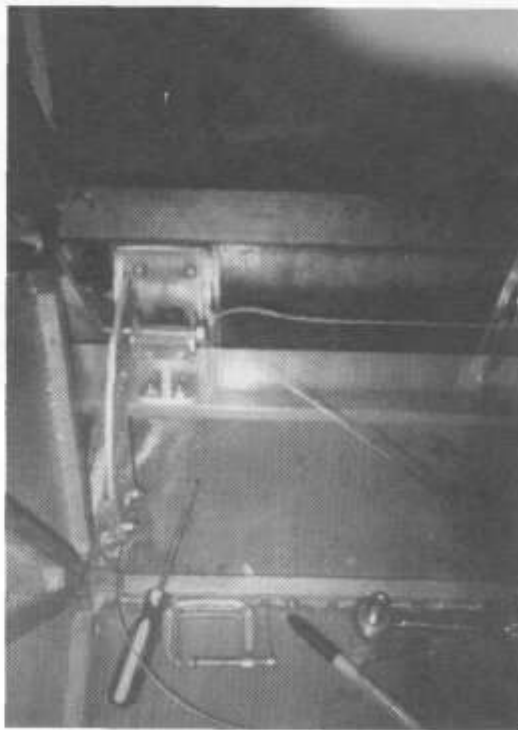
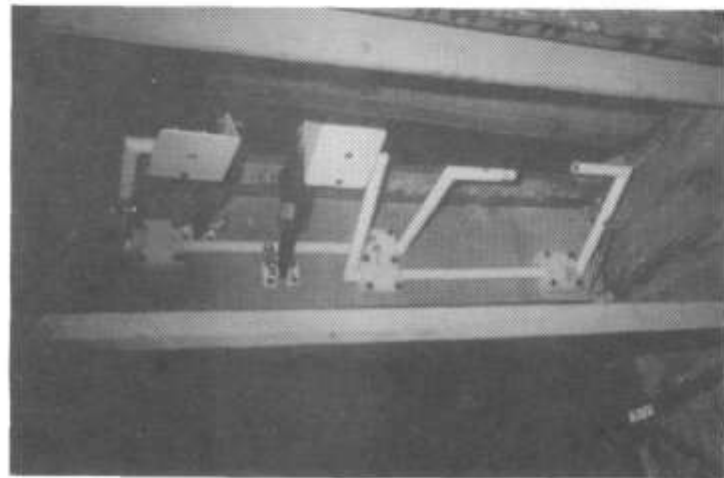
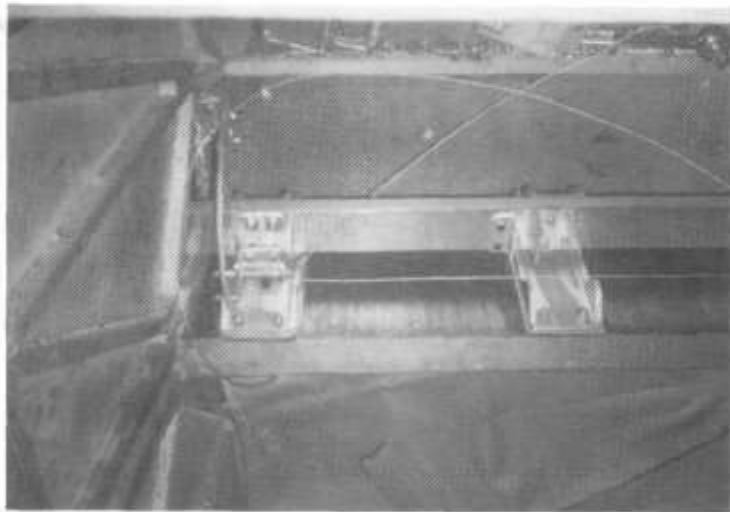
I have two stories to relate in this installment. First, I was hearing from EAA chapter members in Mesa Arizona, and others that the "mousetrap" retract mechanism was not the hottest thing since sliced bread. So when I came across an alternative in the HAPI engine catalog, I ordered the plans for it and fabricated it. I understand that Rex Taylor's HAPI engines has been bought out by Mosler so I would suggest that you check with them to see if they still sell the kit information. I don't feel right giving away stuff that other people did. In addition, we should support folks that do the work. At any rate here is a photo of my installation. Since I took these photos, I did a cockpit test and discovered that the handle bracket needed to be moved to the center a bit. The handle isn't shown (I don't want to give away everything.) But you should see from the photo that there is a positive locking pin. This seems to work pretty slick. (We haven't flight tested this sucker folks!)

The other is a story about cost... do we pay \$160 for mechanical brakes or \$400 for disk brakes. As I was pondering this, a fellow KR builder ran off the runway and busted a perfectly good prop. He had drum brakes. I decided to save up and buy disk brakes, earlier I submitted an article on how I machined my forks to mount the disk calipers to the forks. I thought I would submit a photo showing what the rudder side of the situation looks like. If you order the KR rudder pedal kit from Wicks or Rand you get a nice set of instructions as well, which is how I was able to get the stuff to go together. Oh, I decided that if you use steel you should probably get stainless steel. I moved from Arizona to Oregon, and decided to remove and paint the steel spacers for the brakes.

I hope these photos help folks on their projects.

—Regards

Ross Youngblood
1017 NE Diane PI
Corvallis, OR 97330
(503) 753-7370



LASER ALIGNMENT TOOL

By Daniel A. Majka, Technical Counselor

One use of lasers in industry is to measure straight lines. With the cost of laser diode type pointers coming down to \$39.00, they have become a useful tool for homebuilders. These are low power (3 mW) lasers but will project a beam of red light from a fountain pen sized case that uses two AAA size batteries. These pointers are sold to project a laser spot on a screen to highlight slide shows or lectures. My pointer shoots a rectangular shaped beam that measures 4 mm X 0.6 mm and will project this beam the length of a fuselage or span of a wing.

The beam itself is visible if smoke or dust is put in it's path allowing measurements from the beam any place along it's path or where the beam hits a rib or bulkhead. One way to use the laser is to combine it with a level to project a reference line or to measure the angle of a wing. The laser beam is not affected by temperature, humidity or anything else. May the force be with you!



EXPERIMENTAL AIRCRAFT ASSOCIATION

1A1UMAN A/Rf1tLL1 OSHKOSH WI i>490J JUB6
PHONL 414/476-4f00

DOCKEN SPRAY GUN HINT

The following comes from Bob Nelson, a Technical Counselor of Beverly, MA. For a very low price this tool does many things well. For filling holes in fiberglass with featherfill in small quantities it has no equal.

The gun utilizes a 16 oz. paper cup which is too large for efficiency with small batches.

Use two staples to fasten a 7 oz. cup into the large cup near the top. Use a paper towel loosely around the back of the smaller cup to stabilize its position. Having a smaller base creates a taller column — featherfill or paint — that is less sensitive to gun position.

You may have to shorten the siphon tube to 1/16". Use a razor—to maintain a diagonal cut.

With this set-up and a squeegee, pin holes are a snap to fill and clean up is a breeze.

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 208 SEPTEMBER 1994

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN

500

MONTE MILLER
1900 PARKSIDE DR.
DUBLIN, OH 43017



KR NEWSLETTER

ISSUE NO. 209
OCTOBER, 1994



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



LES KINKADE'S KR-2S, JEFFERSONVILLE, INDIANA

In response to your plea for pictures, here is our contribution. Our KR2-S was begun in December of 93 and has taken about 450 hours to get to this stage. The plane is as per plans except was widened to 39" inside. We are using main gear and wing skins from Dan Diehl, wing root skins from Keith James. Nose gear is from Alpha Aviation Tx. The gas tank is aluminum and we are building a Subaru EA81 for power. Our canopy hinges forward and will have a flat wrapped windshield. So far the foam and glass work has taken about 125 hours excluding the tail feathers. The building has been a very rewarding experience with every step learning new skills and always searching for information or inspiration on how to proceed.

(cont'd 2)

The newsletters are a great help,
here's a few things I found to help.

When building the spars and such on the table, I screwed blocks of wood at the necessary pressure points and used tapered builder's shims to supply the pressure.

When foaming, I found the hot glue gun to be the easiest and fastest means of gluing, just keep the glue below the sanding depth. To stiffen the foam panels, the extra builders shims to the underside of the foam. This can really help when trying to shape the foam. A great tool for shaping is a sharp edge on your straight edge used as a scraper.

Thanks Earl for your work on the newsletter.

Les Kinkade
2303 Crums Lane
Jeffersonville, IN 47130
812-282-4661



LORAN UPDATE

It's a wonderful system, However, it may not last into the 21st century as the original plans called for.

At the time the 2 new chains (NOCUS & SOCUS) were commissioned to bring us total Loran coverage of the lower 48 states, the plan was to have the Loran system operational 'til the year 2015. However, in a recent BOAT U. S. newsletter, the coast guard hinted that due to budget constraints and the fact that G.P.S. is doing such a good job, they may pull the plug on the LORAN system as early as 1998.

With this in mind, anyone wanting to equip their aircraft with an area navigation system would be ill advised to purchase a Loran unit. Electronic supply houses are offering Lorans at dirt cheap prices and it's probably because they want to get their shelves cleared off before the whole system becomes totally obsolete!

The G.P.S. is the system of the future and the prices are already very low and creeping lower every day. Portable G.P.S. units with aviation data bases can be had for under \$600 and a good many panel mounted units are available for near the \$1000 mark. If a plain vanilla unit would suit you, I've seen non-aviation portables (same G.P.S. - just no built in data base) for as low as \$385. These units can be found in BOAT U.S., E & B marine, & WEST marine catalogs to name a few.

Of course the big rage now is the moving map display, but it may just be more bells and whistles (also more stuff to break) that will entice a person to be staring at one of these marvelous inventions when he runs into a 747.

I fly a Corp. twin with a Loran unit and believe me, the Lorans do roll over and die just when you need them (near thunderstorms and any time we get into icing and get a static charge on the plane). But a G.P.S. would keep right on working. The one thing that could shut the system down would be a war somewhere and since G.P.S. is global, the whole system (which is controlled by our government) could be switches off!

CONT'D PAGE 3

With some of these concerns in mind, plus the fact that 90,000 people bought Lorans just last year, we ought to do what we can to help ensure that the Loran system is kept operational (at least in this country) for as long as we can.

LORAN users are urged to send their comments to:
Elizabeth Carpenter
Volpe National Transp. Systems Center
DTS-52
55 Broadway
Cambridge, MA 01741

Let's do what we can to keep the LORAN system active and useable for flying in this country. It works well enough for me (if I just stay away from those thunderstorms and the icing).

John A. Sickafoose
642 Ray Ave. N.W.
New Philadelphia, OH 44663

**WE NEED YOUR HELP _____ PLEASE SEND PHOTOS
AND ARTICLES!!! THANKS!**



EXPERIMENTAL AIRCRAFT ASSOCIATION

AIRMAN AIR/IE(;> OSHKOSH WI .S391U JU96
F-10Ht 414/4^6 4800

RUDDER SPARS AND RIBS

I am in the process of building the KR2-S version. While working on the rudder spars and ribs I found a problem with the "A" and "B" supplemental plans.

After calling Jeanette, I got in touch with Rick Hanson who is working on the CAD drawings.

The rudder rib "F" on the "B" plans that is used for a template is too long. Trim it to 8.5 inches in length. I took the length off the back of the rib near the printed "F". Also on the plans there is no measurement for the length of the rudder at the tip. That total measurement should be 16 inches. The forward part of the vertical stabilizer 6.5 inches, the rudder itself with the foam insert is 9.5 inches.

I have modified my "S" slightly from the plans to accommodate my 6 foot 210 lb. frame. Added 1.5 inches to the width from the cockpit "H" vertical to the front. I also foamed the interior area with 2 lb. density foam from the front "A" vertical to the back of the baggage area and covered the foam with a thin birch ply 1.5mm thick. You can't believe the strength not to mention how much quieter the cockpit will be. I also foamed the floor with 4 lb. density foam to the front spar only.

Being in the same hangar with Steve Marish, who as far as I know is the first KR-2 with a Subaru EA81, has been an education in itself. Therefore I will be using the same set-up as him. Let me tell you the way he worked out his plumbing for the radiators was sheet genius.

I am looking forward to finishing the "S" and finding out the joy the other KR pilots have found.

Warron Gray
2670 North University Drive
Suite 2065
Sunrise, FL 33322
305-741-5017

PAGE TWO

You roll that brand new KR out of the hangar, ready for the first flight and it's perfect. You know it's perfect 'cause you built it and you're pretty sure you've got it all figured out. Yep, the KR expert.

Yeah right, uh huh.

684LM is still working through a fifty hour test restriction. It's gotten hot, even for a Texas summer, so my flying in the KR and the spam machine has slowed down a bit. During this time, several changes have been made in an effort to fine tune this already "perfect" aircraft. Gleaming the cube, so to speak. Huh? When my sons were much younger and deep into skateboarding, they spoke a different language. Gleaming, I think meant making an awesome thing even more awesomer... or something like that. Anyway, there are a few less than perfect areas; some builder induced and some pilot induced. Some are even, uh, lack of experience induced. Look close, I'm blushing.

I can't see crap out of the KR. In a tail down situation, I'm as blind as granma's old lap dog. The Rand fixed gear, that itty bitty tailwheel and the snug free-blown canopy combine to keep the aircraft's nose way up whenever I'm in a three point attitude - taxi or flight. To compensate, the initial landings were attempted from long flat approaches while carrying some extra speed to insure making the runway in the event of an engine stoppage. We're also testing a low time homebuilt engine; something else kinda critical. My jet jock friends call this energy management. So, we wheel land the beast a few times just so we can end up really scaring the beejeebers outta ourselves. My home runway is 150 feet wide and 5000 feet long. I've seen every foot of it, both ways. Gotta be a better technique.

A stall series shows the aircraft will stop flying as the ASI needle passes 40 MPH indicated. If you're slow on the rudder, that puppy will wind up to the right awfully quick. The Volkswagen turns differently from its American cousins. Yikes, more beejeebers.

Back in the pattern for another attempt. Over the threshold, power off and wings level. Start bleeding airspeed and letting the nose come up. Carry some excess speed and ground effect will hold the aircraft -off for a small eternity. Where the hey is the runway? The edge of the runway is all that can be seen, if I'm doing it right, and finally, runway contact.

This is not the easiest thing I've ever done. While in the process of frequently scaring myself, I have evolved a few aircraft adjustments and pilot techniques aimed at calming the runway pucker factor.. a bit.

I'm using Mahle compression springs at the tail wheel. After a few landings, the assembly bedded in and seemed too loose. Removing a link in the connector chains snugged up the installation and helped calm down the tailwheel's activity. The springs need to be quite firm in compression for best function. The grocery cart of a tail wheel went back to the Honk 'N Holler to probably be reinstalled on that wobbly cart I always seem to get. Wicks A/C Supply provided a six inch diameter tailwheel with a 3/8" bore that fits the Rand tailwheel fork. Another improvement.

Should you think I'm overdoing this a bit, I did actually bend the .035 wall rudder bars called out in the plans. This happened during the roll out from one of those adrenaline rush, fast wheel landings. Stomped until I had no more rudder then stomped some more. Rebuilt with .058 tubing. If I bend these my instructor sez he's gonna cut my Achilles tendons.

Continued practice and experience will certainly help the landing situation. I'm looking forward to it. For now, I've adopted a carrier-style approach and landing that does make life less traumatic. As the aircraft comes abeam the runway on downwind at pattern altitude, I cut power and begin a continuous, curving approach to the runway-remaining in a bank and keeping a visual on the hoped for touchdown point. On short final, top rudder maintains a controlled slip. Rolling wings level, the aircraft should be passing through about 50-55 MPH and flairing to land. This is

CONT'D PAGE 5

where the runway disappears. Head back and watching the edge of the runway, get through ground effect, and then touchdown. Feet stay pretty busy but can get stopped in 800' if all goes right. Still do plenty of 2500' plus landings... I ain't proud and I leave my ego in the pickup truck.

Also made two additions in the cockpit. An EGT gauge took most of the guess work out of carb mixture tuning. The almost immediate needle indications saved tinkering and helped get a carb setting while maintaining a comfortable engine oil temp and cylinder head temps.

I'm amazed at the amount of material that accumulates in a cockpit. One day it's tidy and you go flying then, suddenly, there's junk everywhere - charts, pencils, hats, little tools. Fortunately, the vast expanse of panel space allowed for a glovebox that nestles into the fuel tank's unused radio stack cutout. So far, no gloves in it.

Might add that the airspeeds noted are for a specific 509 pound KR-2. Higher weights will require higher speeds. Fly safely.

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871

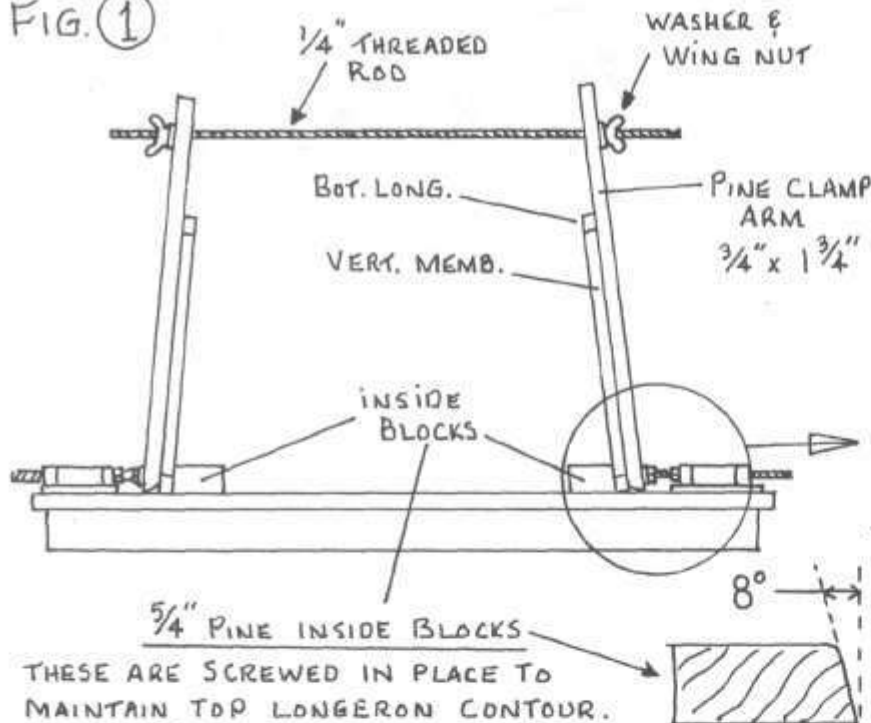


THIS ARTICLE TAKEN FROM THE EAA
TECHNICAL COUNSELOR NEWSLETTER.

THROWN BLADE

There was another instance of a Lectro Prop throwing a blade that was forwarded to us by the NTSB. One of the blades has been sent to the Forest Products Laboratory and the Forest Products Laboratory "guess" as to the problem was that the blade shrunk from heat due to thermal sun cycling. Moisture broke down the cell walls and the adhesive. Thermal cycling was also emphasized by the steel hub over the wood blades. The surface had fractured like a pencil break. As it would be very expensive to do lab testing, this is not currently being followed up. There have been two previous accidents in other aircraft and this recent one only emphasizes the problem. It is strongly recommended that you consider using a solid wood or metal prop over using an experimental propeller. The prop uses 1/8" thick maple veneers and it appears phenolic resin glue. The company, out of Tennessee has contacted buyers of the prop advising them to remove the propeller due to these losses.

FIG. ①



THESE ARE SCREWED IN PLACE TO MAINTAIN TOP LONGERON CONTOUR.
NOTE: 8° ANGLE DIMINISHES PROGRESSIVELY AFT OF STATION "G".

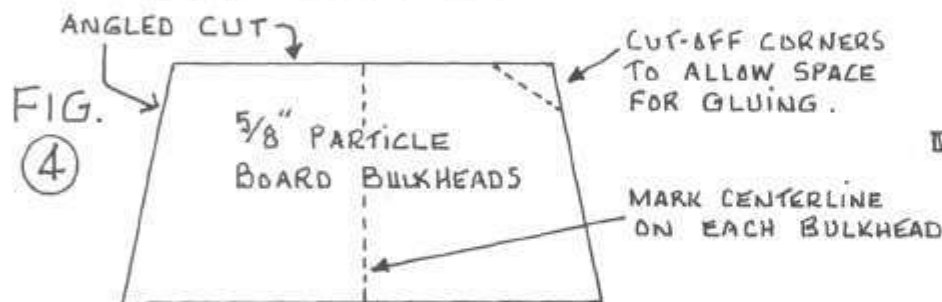


FIG. ②

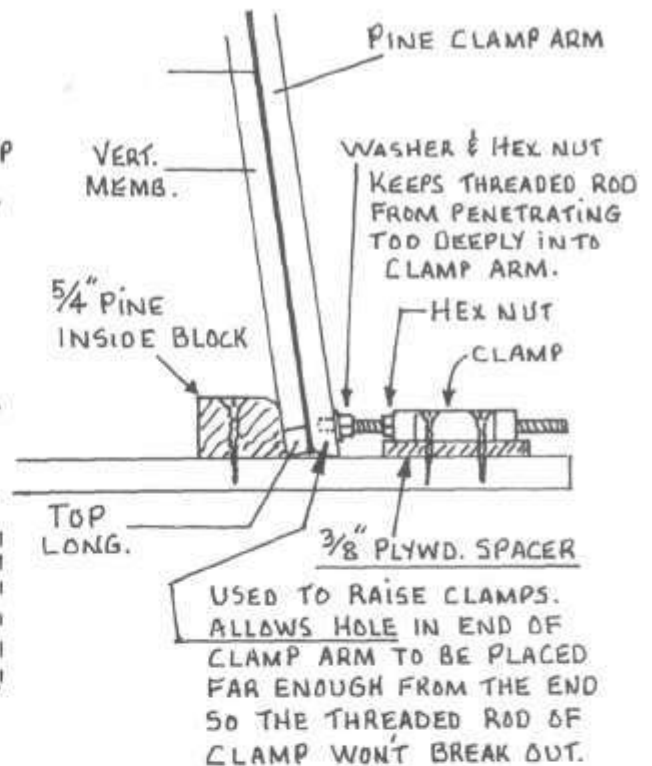
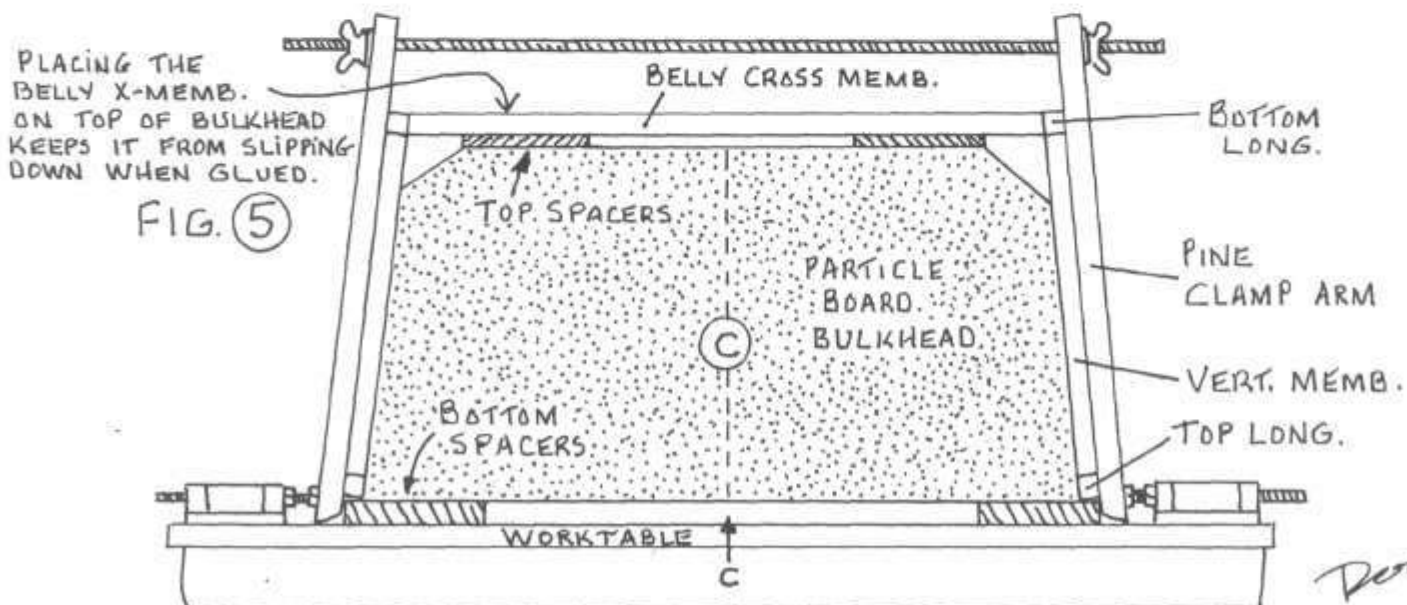


FIG. ③ SEE 6/94 NEWSLETTER



NOTE: THIS ILLUSTRATES FUSELAGE CROSS-SECTIONS AT STATIONS D, F, G & K. ANGLED CUT-OFFS AT TOP CORNER OF BULKHEADS AND BOTTOM SPACERS WILL ON "A".

FIG. ⑥ VIEW LOOKING DOWN AT WORK TABLE

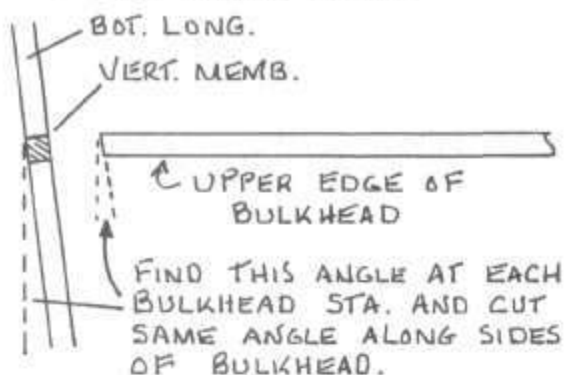
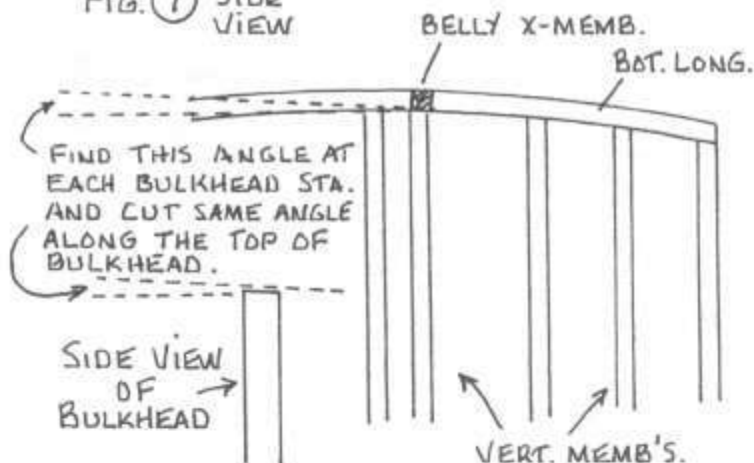


FIG. ⑦ SIDE VIEW



INSTRUCTIONS:

FIG. 1. - (1) LAY-OUT CENTERLINE ON TABLE.

(2) DRAW PERPENDICULAR LINES AT STATIONS A, D, F, G AND K. (3) FOR STATIONS A, D, F, & G, MARK LATERAL DIMENSIONS FOR THE TOP LONG. CONTOUR. (4) USING CLAMP SYSTEM SHOWN IN FIG. 1 - BLOCK & CLAMP THE SIDES TO PROPER CONTOUR AT STA. A, D, F & G. (5) OVER A SEVERAL DAY PERIOD, BRING THE AFT ENDS OF THE SIDES TOGETHER AT THE STERN POST. (6) FUSELAGE SHOULD NOW BE "BENT" TO APPROX. SHAPE.

FIG. 4. - (1) NOW THAT FUSELAGE IS "GENERALLY" SHAPED, CUT TEMPORARY BULKHEADS TO THE INSIDE SHAPES AND DIMENSIONS OF THE FUSELAGE X-SECT. AT STATIONS A, D, F & G. (2) MEASURE THE ANGLE AT EACH BULKHEAD STATION AS ILLUSTRATED IN FIG. 6. THIS ANGLE CUT ALONG BOTH SIDE EDGES OF THE BULKHEAD. (3) MEASURE THE ANGLE AT EACH BULKHEAD STA. AS ILLUSTRATED IN FIG. 7. THIS ANGLE IS CUT ALONG THE TOP EDGE OF THE BULKHEAD. (4) FOR BULKHEADS D, F, G & K, CUT-OFF CORNERS AS SHOWN IN FIG. 4. THIS ALLOWS ROOM FOR INSTALLING CROSS-MEMBERS AND GUSSETS AND KEEPS THE PARTICLE BOARD AWAY FROM THE EPOXY JOINTS.

FIG. 5. - (1) INSTALL FIREWALL BULKHEAD AT STATION A. (2) LOOSEN BOT. CLAMPS AND WINGNUTS, SLIDE BULKHEAD INTO POSITION, RE-TIGHTEN, ADJUST BOT. CLAMPS SO BULKHEAD CENTERLINE MATCHES CENTERLINE ON TABLE AND SIDES ARE PULLED IN AGAINST CONTOUR OF THE BULKHEAD. (3) REPEAT FOR THE REMAINING STATIONS.

NOTE: DUE TO SEVERE NARROWING OF THE FUSELAGE AFT OF STA. G-H, INSTALL THE BULKHEAD AT "G" BEFORE INSTALLING "F".

NOTE: DUE TO TOP LONG.'S RAISING OFF THE WORK TABLE SURFACE, BOTTOM SPACERS ARE USED - SEE FIG. 5. THESE WILL KEEP THE BULKHEADS RAISED TO THE SAME HEIGHT ABOVE THE TABLE AS THE TOP LONGERONS.

FIG. 5. (CONTINUED) - (4) WHEN BULKHEADS ARE IN PLACE AT A, D, F & G, THE MEASUREMENTS AND ANGLES FOR BULKHEAD AT STATION "K" CAN BE OBTAINED. (5) CUT AND INSTALL BULKHEAD "K" AT THIS TIME. (6) FUSELAGE SHOULD NOW BE CLAMPED TO EXACT SHAPE, SQUARED, LEVELLED AND ORIENTED ALONG THE CENTERLINE. (7) - YOU MAY NOW PROCEED WITH THE TASK OF MEASURING EACH BELLY CROSS-MEMBER FOR THE DRY FIT. BY SLIGHTLY LOOSENING THE WINGNUTS AT A GIVEN STATION, THIS ALLOWS ROOM TO MANEUVER THAT X-MEMB. INTO POSITION. YOU WILL NOW SEE THAT THE ANGLE ALONG THE TOP EDGE OF EACH BULKHEAD HOLDS THE X-MEMB. AT THE PROPER ANGLE TO WHICH IT JOINS THE BOTTOM LONGERON ON EACH SIDE. (8) IF X-MEMBERS LYING ACROSS BULKHEADS DO NOT COME LEVEL WITH THE TOP LONG., USE TOP SPACERS AS SHOWN IN FIG. 5 OR BUILD-UP TAPE. IF BULKHEAD IS TOO HIGH, FILE IT DOWN. (9) WINGNUTS ARE TIGHTENED TO HOLD PRESSURE ON JOINTS WHEN X-MEMBERS ARE EPOXIED IN PLACE. (10) - ABOUT NOW YOU'LL BE GLAD YOU DID ALL THE JIG WORK INVOLVED HERE. (11) YOU'LL FIGURE OUT THE REST FROM HERE OUT.

THIS SYSTEM IS DESIGNED TO PROPERLY SHAPE, SQUARE, LEVEL AND ORIENT THE FUSELAGE ON CENTERLINE IN PREPARATION FOR INSTALLING BELLY CROSS-MEMBERS AND FIREWALL MEMBERS. IT WAS DESIGNED WITH COLLABORATION FROM TOM BAGNETTO. THANKS TOM!

DR. BILL GAMBRILL
2302 MEETINGHOUSE RD.
BOOTHWYN PA 19061
610-485-6500 (OFFICE)
610-485-8515 (HOME)

ANY QUESTIONS? CALL ME.

(OR

FOR SALE

KR-2 1975, single place, tri-gear with retract. 227 hours, VW 1834. Trailer included. \$4,500.00. Call:

Marty Saban
1326 S.W. 14th Terrace
Blue Springs, MO 64015
816-229-8847

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

FOR SALE

LORAN - Ray Jefferson, PL-99 handheld,
with charger, 12V supply cable,
instruction handbook. Reason for selling:
Replaced with GPS) \$ 125.00

Ed Fernandez
849 Hawthorne Dr.
Walnut Creek, CA 94596
510-934-5049

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 209 OCTOBER 1994

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN



KR NEWSLETTER

ISSUE NO. 210
NOVEMBER, 1994



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



**MIKE KELLEM'S N94GM, LEWISBURG, TENNESSEE
WON "BEST KR-1" AT THE 1994 KR GATHERING**

Wow!!! If you missed this KR Gathering, you missed the best yet! Even with the strong crosswind on Saturday, we did some flying and a few lucky folks got rides in a KR.

We had 16 KR's at this year's KR Gathering. All in all, this collection of KR's represented some of the best and most creative examples of KR's anywhere with no two alike and each displaying some of the best craftsmanship found anywhere.

Cont'd page 2

In brief, one KR-1 and 14 KR-2s. Three with fixed tri-gear, three with original retracts, nine fixed taildraggers and Don Betchan's totally clean retract (in a class all by itself). Two with rear-side view windows, one with rear-side and back view windows, one with front-hinged canopy, four with gull-wing doors and a KR that had been stretched (not a KR-2s).

Due to bad weather in the west, all of the KRs arrived on Friday with five in the hanger on Thursday night.

Officially, the Gathering started on Saturday with the pilot's briefing but a lot happened on Friday. Displaying our KRs, flying, giving rides and seeing old friends. Friday evening a great cookout was hosted by and at the expense of Raider Aviation (local FBO) showing their support of our KR group and aviation. The cookout included baked chicken, hamburgers, hot dogs, soft drinks and beer - not sure what time the party ended.

Raider Aviation also furnished the chairs, tables and the P.A. speaker system. They also decorated the hanger, provided limousine service to and from hotel and the list goes on and on. They are the best!!

On Saturday, the day started with a fly-in breakfast in hanger #1 (sponsored by the Mt. Pleasant High School Band Boosters). They also served lunch.

After the pilot's briefing, there were seminars all day. Presentations included:

Epoxy, composites and safety Wicks Air.
Cert. process-Ed Hasch (D.A.R.)
Electrical systems-Jim Hill
Interior selection-Jerry Vanetta
Buying a KR project-Bob Muse
KR Report-Jeannette Rand

Dinner and awards presentation was held at the Ramada Inn and door prizes were given away by a drawing. Four door prizes were donated by Wicks Aircraft, a \$50.00 gift certificate by Alexander Aeroplane, KR 1994 Gathering Commemorative badges and a KR Gathering sweatshirt by the Gathering Committee. The "People's Choice Award" was donated by Keith James (coordinator of the KR Gathering in '90, '91 and '92) - a special thank you to Keith.

A KR Gathering sweatshirt, signed by Jeannette Rand and all the KR pilots attending was auctioned off. The highest bidder was Dan Diehl. This sweatshirt is definitely a collector's item.

Jim Faughn asked for donations and passed the hat. \$334.00 was received to help pay for 1994 trophies and help get ready for 1995. Thanks to all of you for your generous contributions.

The 1994 KR awards went to:

Longest Distance	Randy Smith
Best Engine	Jim Hill
Best Cockpit	Don Betchan
Best KR-1	Mike Kellems
Best KR-2	Bobby Muse
Peoples Choice	Troy Petteway
Appreciation Award	Martin Roberts

The Appreciation Award is a special award given to the person or organization that has gone beyond what is asked and contributed to the support and success of the KR and KR builders in general. This year's winner is Martin (Marty) Roberts. Marty's receiving of this award was unanimous based upon the unplanned "Roast of Marty" that followed the presentation of the award.

The non KR activity, coordinated by Gladys Muse was a visit by 16 happy shoppers to the Lewis Merriweather Arts and Craft Show in Hohenwald, TN. The show was mostly country crafts and lots of food enjoyed by all.

Special comment: Our KR Gatherings have always been special but the success of this Gathering was due to the efforts of many supporters, especially Raider Aviation. If any of you get the opportunity, land at Maury County Airport and say "Thank You"!

Plan to attend our 1995 KR Gathering on October 6, 7 and 8 in Columbia, TN—
Ya'll come, ya hear.

Bobby Muse, Jr.
3145 Justin Towne Ct.
Antioch, TN 37013
615-399-9853

Editor's Note: A special thanks to Bobby for his article and photos of the 1994 KR Gathering.



JIM FAUGHN, ST. LOUIS, MO



JERRY VANETTA, NASHVILLE, TN



TOMMY WAYMACK, PINE BLUFF, AR



MARTIN ROBERTS, TULSA, OK



DAVID SHIREY, WASHINGTON, MI



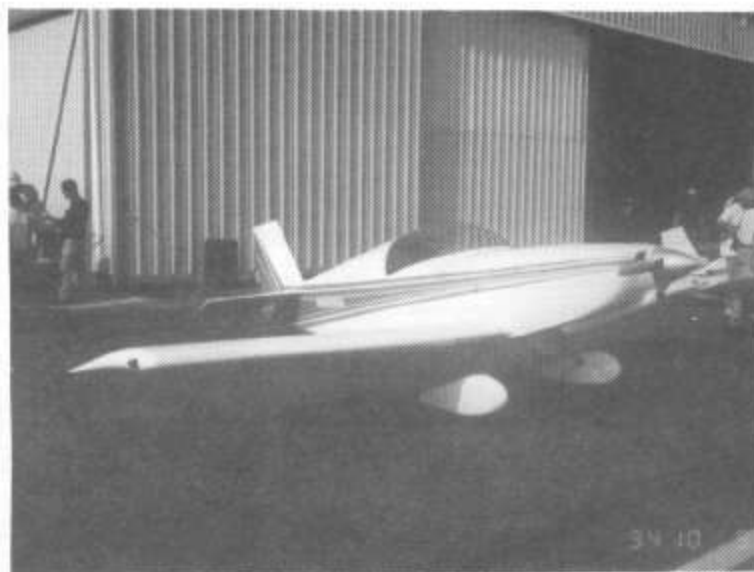
N122B, BUILDER UNIDENTIFIED



TROY PETTEWAY, COLUMBIA, TN



MAX CALKIN, OMAHA, AR



NORM LEONARD, POUNDING MILL, VA



JOE SCHLOTT, SUMMERVILLE, SC



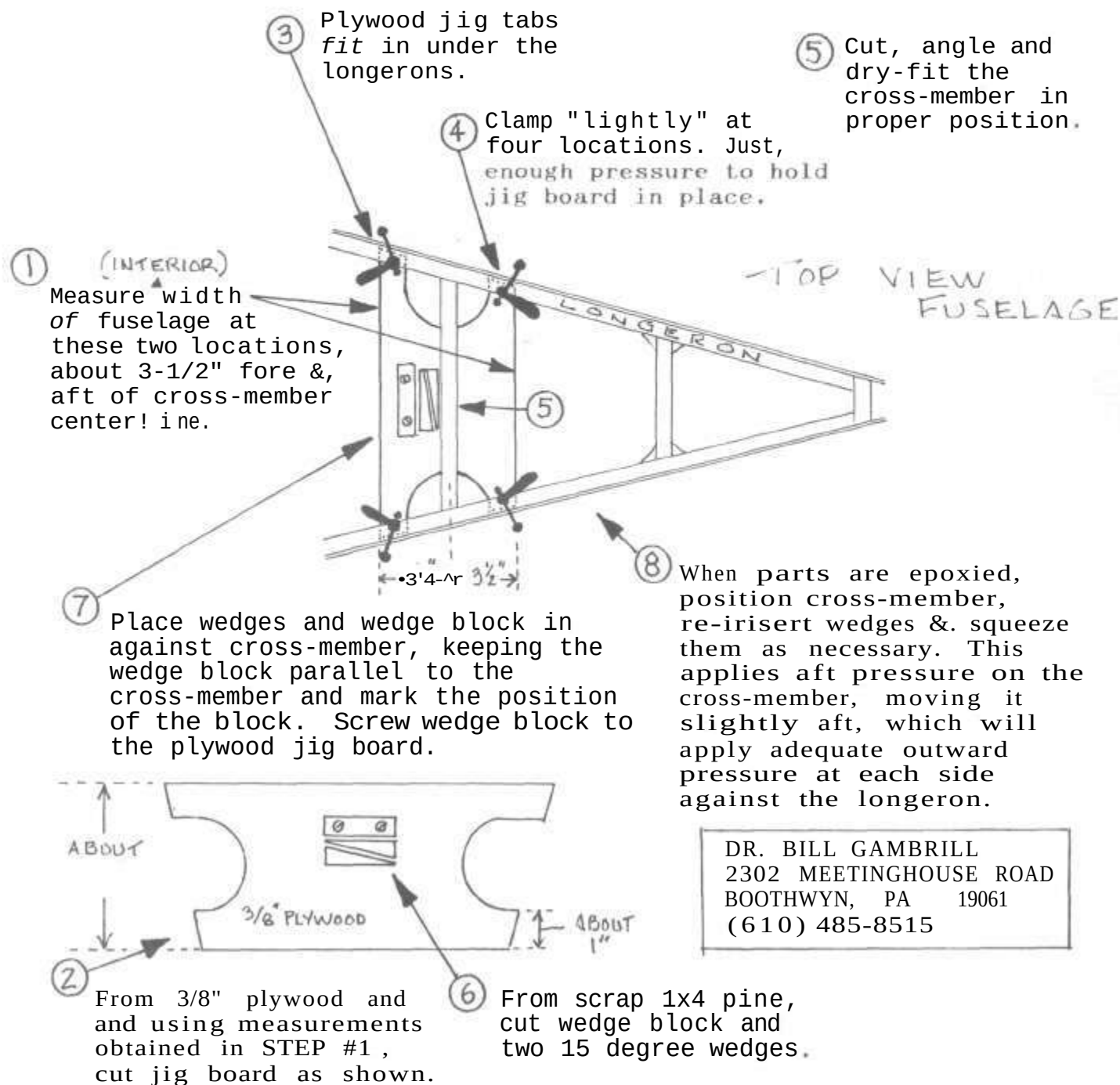
JIM HILL, HUNTSVILLE, AL



DAN HEATH, LEXINGTON, SC

- JIG TO COUNTER-ACT CROSS-MEMBER SLIPPAGE.

WHEN YOU GET TO INSTALLING BELLY CROSS-MEMBERS, YOU WILL NOTE (DUE TO THE EVER-INCREASING ANGLE OF THE LONGERONS AS YOU MOVE AFT) THIS ANGLE CAUSES THE CROSS-MEMBER TO SLIT⁵ FORWARD ONCE EPOXY AND PRESSURE IS APPLIED. BELOW IS ILLUSTRATED A SIMPLE JIG WHICH TAKES JUST A FEW MINUTES TO FABRICATE AND WHICH SOLVES THIS "PESKY" PROBLEM AND AT THE SAME TIME HOLDS THE CROSS-MEMBER SECURE IN EVERY PLANE AND ACTS TO APPLY ENOUGH AFT PRESSURE TO PROPERLY SQUEEZE THE TWO EPOXIED JOINTS FOR AN ACCEPTABLE CURE. IT ALSO LEAVES ADEQUATE ROOM TO WORK ON THE GUSSET BLOCKS, WHILE KEEPING THE PLYWOOD JIG AWAY FROM THE EPOXY.



DR. BILL GAMBRILL
2302 MEETINGHOUSE ROAD
BOOTHWYN, PA 19061
(610) 485-8515

The "Perfect" Landing

In a KR?

After my test flight in my KR-2 I thought every landing would be as good. However, it seems that first landing was my best until I sat down to analyze each and every step before touchdown. The purpose of this article is to present the plan I use before each landing in hopes that it will help KR builders getting ready for their test flight and those having problems with consistent landings.

Each phase of the landing process must be planned and executed if the successful touchdown will be made. I will try to explain each step along with the speeds and altitudes for each phase of the landing. Please keep in mind that those of us who fly experimental aircraft do not have calibrated airspeed systems and your speeds may and probably will be different.

Phase 1 - Approach to the airport - The KR is a very slippery aircraft and you must plan to start slowing down before you reach the downwind leg of the airport pattern. I always try to descend to traffic pattern altitude (800 agl) and obtain a speed of 120 mph on downwind.

Phase 2 - Downwind - When I have stabilized my speed on downwind, 120 mph, my RPM on the 2180 VW with a 52 X 52 prop is around 2000. This is a very comfortable speed to check all instruments, ensure the mixture is at full rich, and plan the touchdown point. Don't forget to plan for either a strong headwind or crosswind component. If you are facing a strong crosswind, this is the time to review what you will do at touchdown. (Which wing will you have low on approach and which wheel will you land on first.) You will not have the time later.

Phase 3 - Base - The base leg will be flown at 90 to 100 mph. I use the turn to aid in decreasing speed and lower my RPM to around 1600. During the base leg, I will descend to an altitude of approximately 500 agl.

Phase 4 - Turn to final - This is one of your great opportunities to decrease altitude. I usually slip on this turn to decrease altitude to 300 agl as I enter the final leg. It is important that you determine your best altitudes for each of the legs and always consider safety. In other words, remember, in case of engine failure, altitude is your best asset:

Phase 5 - Final - Your two most important considerations on final are altitude and speed. You can always decrease altitude with a controlled slip. However, it is extremely difficult to decrease speed once you have let it build up. On final I will fly at 80 mph until I reach mid final, then I decrease to 70 mph. I will hold this speed until short final (cross the end of the runway) at which time I begin decreasing speed.

Phase 6 - Float - The KR is so close to the ground that you will encounter ground effect in a VERY big way. You can and should use this to your advantage in making the "perfect" landing. Patience is a huge virtue during this phase. I will NEVER land my airplane above 60 mph. If I try, and for the first 60 hours I tried all the way up to 80 mph, I will bounce! The reason for this is very simple. When you touch the main wheels down, the tail will lower, your angle of attack

will increase and you will go back up in the air. This will continue until you are at the appropriate speed. What you and I always want to do is to make the landing once instead of getting current (bounce 5 times) every time we decide to land. Remember, we had just crossed the end of the runway decreasing speed out of 70 mph. At this time I pull back the throttle all the way and try to hold my airplane inches off the runway. The more I concentrate on holding it off by inches the better landing I am able to make. I will glance, VERY quickly, at the airspeed indicator until it is below 60 mph and then I will continue to pull back on the elevator concentrating on NOT touching down but instead maintaining the inches above the runway. When the stick is approximately one half the way back, we are now somewhere between 50 and 55 MPH, I will let it settle onto the runway. Then, if the crosswind is not stiff, I will raise the tail to decrease lift and allow me to see over the nose. If the crosswind is stiff, I go to full back stick to ensure the tailwheel is "stuck" on the ground.

If I follow my own procedures, I will make a good landing every time. However, I seem to make exceptions when concentration lapses. For example, if I lower the nose on final I will gain speed very quickly, usually to 100 + mph, and this makes the landing more difficult unless you are very good at using slips to decrease speed. Another point that should be made is that when flying with two people I will raise the speeds on final by 5 mph compensating for the increase in stall speed.

What happens if I bounce? The first thing you have to decide is how bad of a bounce is it? I put bounces into three categories. First is BAD. If this is the case or if everything just doesn't seem right your only real option is to advance the throttle to full and go around. Don't worry about your ego just do it, GO AROUND. Second is a small bounce. If you come back up 6 inches to a foot, then don't over control, just re-land the airplane. The reason for the small bounce was probably that you were going too fast when you let the airplane set down. The third bounce is in-between. The recovery from an in-between bounce will depend upon your skill level with your KR. If you have only been flying for 10 hours, you should probably go around, however, as your skills go up there is another option. To recover, apply approximately half throttle, stop the oscillation, and re-land the airplane. This only works if you stay in ground effect and remember you are very close to a stall so don't try this unless you are comfortable with your airplane and your skills.

I certainly hope that the above information will prove helpful to you as you think about test flying your KR. If you can visualize each phase of the landing process you will be able to make "perfect" landings. Please give me a call if you would like to discuss any of the steps presented.

Good Landings Jim Faughn - 314-647-4012 weeknights or 314-885-4923 weekends

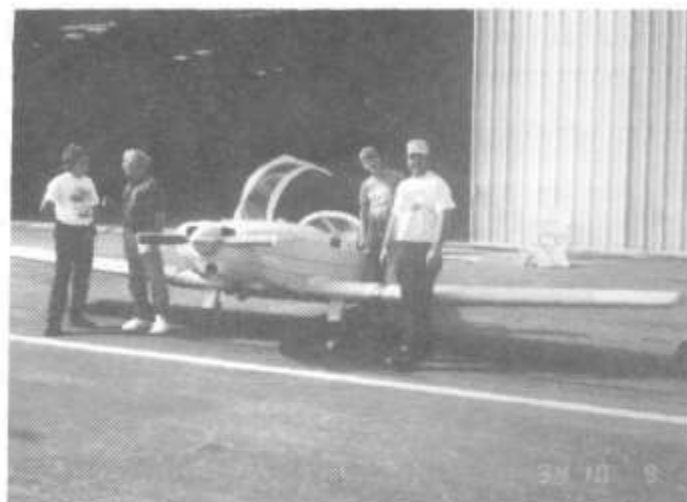
FOR SALE

2100 Engine, originally a 0 hour
Revmaster, reworked by Steve Bennett.
SCAT crank, Slick mag, accessory case with
Revmaster starter, alternator, POA,
Warnke Prop. Set up for oil cooler
(included) and oil filter (not included).
Comes with tuned, crossover exhaust.
Asking \$3,000 or best reasonable offer.

Griff Pickett
P. O. Box 1123
Raymore, MO 64083
816-331-9382



DON BETCHAN, PERRY, OK



RANDY SMITH, DENTON, TX

WANTED

Retractable spring for KR-1.

Keith Eakins, Sr.
4143 68th St.
Des Moines, IA 50322
515-276-0407

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 210 NOVEMBER 1994

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN



KR NEWSLETTER

ISSUE NO. 211
DECEMBER, 1994



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



BOB HAWK'S N685RH, ELYRIA, OHIO

Here is a photo of my N685RH doing its 40 hours. I've had to do a lot of tweaking and fiddling with carb adjustments, timing, valve clearance and a careful eye on the cylinder head temperature. I've increased the cylinder cooling airflow and in the process I've dropped the oil temperature to a steady 150 degrees. I wonder if this is too cool of a temperature. With winter approaching I've been wondering about cabin heat. Do the KR readers have any suggestions, drawings of neat little heater systems?

Robert A. Hawk (Bob)
821 Jamestown Ave.
Elyria, OH 44035-1811
216-365-6867

CLEAVING WEIGHT FROM THE COPIOUS CONTINENTAL

With the development of the KR-2S, many of us are wanting to install the Cont. 0-200 engine in place of the VEE-DUB's. However, a lot of folks are turned off by the horror stories that abound about the Cont's weight.

While it's true that the 0-200 does have a few pounds over most volkswagon aen»-conversions , it is possible to trim the 0-200's weight down to where it compares quite favorably to at least the VW. TYPE 4 (I saw an article in newsletter #141,page2, referring to a type 4 weighing 208 Ibs.)

I've done some research into the subject and have found that a weight variance of up to 58 Ibs. can be achieved from the perkier (just as you'd pull one off of an old Cessna 150) to the lightest(no electrics please-I'll hand prop it)C-85 or 0-200.

Most of the weight difference is in accessories that can either be left off or substituted with another of a leaner design. Two of the most noteworthy items that are available to help us trim weight, but still have a fully functional powerplant are a lightweight starter and alternator available from B&C Specialty Products Inc (see enclosed literature). Their starter is one item that I'd urge anyone running an 0-200 to consider - especially if you now have the key-type starter on your engine; the reason is, the Cont key type has a shaft which turns all the time the engine is running which mounts a clutch that locks (or is supposed to) while starting. When this clutch gives up the ghost (and they will) it'll run \$320 & up each shot to replace the clutch with an O/H unit. But the real nightmare is when this mal-designed little hummer stays engaged after starting.lt only takes 3-4 seconds for the engine (and starter) to accelerate to a speed where the starter simply explodes! This of course causes the starter to lock up, the expensive clutch then shears and sends teeth and other parts tinkling down through your accessory gears (which haven't stopped turning yet) and possibly ruining several thousand dollars worth of gears and accessories. I've heard it several times and it ain't a pretty sound!

So if you are health, safety and value conscious you'll be better off to use B&C's lightweight starter that has a retracting clutch (electrically actuated of course). You might say:"well I'll just use the earlier pull type starter", but the weight comparisons haven't even started yet. Besides, the pull type starter is one oil dripping mother - you'll have to replace the oil seal on the clutch pinion shaft at least once a year (and it'll still drip oil). Also, this change from key to pull type & vice-versa can only be made during engine teardown because the key starter uses a bearing in the case while the pull type uses a pinion shaft. The B&C uses neither of these. If you convert to a B&C starter, you can cut the pinion shaft off. If converting from a Cont key type, the needle bearing must be pulled out & discarded.

Now for weight comparisons: the B&C starter weighs in at just 10.5 Ibs. while the key type Cont starter checks in at 14.5 Ibs and the pull type at 15.5 Ibs. So right here is a 4-5lb savings, (see how easy it is to shed weight - and we're just getting started).

The B&C alternator is another neat unit that'll save us many unwanted pounds. In addition to being much lighter, it's also much shorter which may present many less problems for us fixed tri-gear builders while fitting the upper nose gear bracket in. The 200G alternator puts out 12 amps which should be more than sufficient to operate our day/VFR equipped KR's; especially with all of the solid state radio's ETC. This unit weighs in at just 4.25 Ibs (less gear, which you must furnish) and can save over 10 Ibs. compared to the 35 amp generator.

Another unit that could help shed a pound is the ELLISON throttle body injector. However, the Model EFS-3 was priced at \$999 the last time I priced them, so unless you don't have a carb or you want to do aerobatics without the engine quit-

ting all the time or you're just looking for a way to spend your tax refund -- it'll be an expensive pound!

Before we get too far into saving weight, let's discuss one unit which should be on all engines. This will cost a few pounds but could save the engine. The unit I'm talking about is the oil filter. (I can't believe that people will actually operate a \$6000 - \$10,000 A/C engine without one while they wouldn't even think of buying a \$3000 car if it didn't have one on it). CESSNA sometimes put on an optional screw in unit in place of the oil screen and several other units are available such as AIRWOLF's remote mounted full flow filter. But the one I like the best is available from EL RENO AVIATION & others and is the model TAF. This unit simply bolts on the left side of the case behind #2 cyl. The unit weighs just 3.5 lbs. & could save or at least help, extend the life of the engine and it will double the oil change intervals up to 50 hours.

Now back to saving weight; another 2.64 lbs. can be saved by going to slick mags instead of bendix (just be sure they are the 4200/4300 series and not the earlier 4000 series; which are not repairable). Also the newer 5MM slick harness is 2.27 lbs. lighter than the old black wire original type on some pre 70's 150's (which are 7MM).

Most of us will not want or need a vacuum pump, so don't just omit the pump -- go one step further and remove the vacuum pump drive pad assembly along with the gear. The pump would probably need to be faired in to fit in the cowling anyway. The hole left by the removed assembly can simply be covered over with a plate fashioned from 1/2" flat aluminum plate and doing so will save 1.0 lb. plus the weight of the removed pump; which is 1.9 lbs. for the aluminum AIRBORNE 211CC-9, 3.6 lbs. for the cast iron 200CC-9 or even more for the old wet type (pesco or garwin)

While on the subject of leaving things off, I found that the difference in the weight of the oil sumps between the C-85/90 and the O-200 one was 1.74 lbs. in favor of the C-85/90. Of course the C-85/90 sump only holds 4.5 qts. v.s. 6.0 for the O-200. But - if you use an oil filter - the larger portion of a qt. is held in the filter, so you'll have 5.5 qts, total. Also, the O-200 sump is reinforced at the flange by tubular supports welded down to the sump at several locations and is wider (left to right). Both are the same depth tho.

Now for a little discussion about basic engine weights - for those who definitely don't want an electrical system, you may do well to search for a C-85-8 or C-90-8F (try to find a -F as it has a flanged hub & is 3.35 lbs. lighter than the tapered shaft version with a separate prop hub), but either one can save nearly 10 lbs. from an O-200. Just remember tho, with a C-85-8, or C-90-8F - you can never put a starter or alternator on. They just don't have provisions for them on the rear case, nor are the crankshaft and camshaft gears set up for them. As for using a C-85/90, they are both very good engines, they just don't have the soft LORD mounting rubbers that the O-200 has. There are some C-90-14's out there that have the LORD type mounts, but they are as rare as hens teeth. The C-85/90 series (except for the -14) have the old conical rubber bushings very similar to the VW type mounts. Not quite as good, but adequate.

As a matter of fact -- the C-90-12F is the same basic engine as an O-200, it just lacks the vacuum pump mounting pad (it has a fuel pump pad instead), and the aforementioned LORD mounts and came with a STROMBERG carb (not a bad carb- but no usable mixture control) instead of a MARVEL - SCHEBLER.

While on the subject: most people refer to the O-200 as a 100 HP engine - but that is only at 2750 RPM. The engine, at 2475 RPM puts out just 90 HP and at a tolerable 2625 RPM barely cranks out 95 HP.

So; while the O-200 sounds like it might be too heavy or too powerful for a KR - it can be lightened enough to be usable and as you can see by the above RPM versus HP figures, it's not that powerful.

The engine is (if properly put together & balanced and flown correctly) virtually bulletproof. One feature that makes the C-90 & O-200 so tough is the fact that the crankshafts in these engines are nitrided. The C-75/85's are generally not, but you

CONT'D PAGE 4

can have it done and is probably well worth the investment. You may have noted that I don't refer much to the C-75. This is because the only difference between them and the C-85 is the jets & venturi in the carb and a much lower rated RPM (2275 vs 2575 for the C-85), so in my opinion - C-75's just don't exist in this application, as no one would run one that slow.

So there you have the differences in the basic types of Cont. C-85/90, 0-200 engines, the options available to help trim weight off of them and a chart to help you know in advance what weight you'll end up at.

Maybe this article will entice some of you KR-2S builders to look a little harder at the Cont. four bangers. They are still available in moderate quantities and are not that expensive to buy, (just keep an eye on TRADE-A-PLANE). The last issue had several in it priced in the \$3000's & some still had some time left on them.

I rebuilt one several years ago and the total cost (less accessories) was just \$2100 for all parts, cyl rework, magnafluxing ETC. Not too bad. SUPERIOR AIR PARTS makes just about everything you'll need for the engine and at a much better price than the factory.

So the cost of a core and the overhaul (if needed) should get you an engine for a lot less than the overhauled ones you see in T.A.P. for \$7500 - \$9500.

I know a lot of people are casting an eye towards the SUBARU's - but 'til you buy an engine and all the associated gadgetry to make the thing work right, overhaul it, buy a reduction unit for it and get it bolted on, plumbed and running -- it ain't gonna be too cheap either. Also, you ought to find out what it's going to weigh as it's bolted in place (with the coolant in of course -- that stuff weighs about 10 Ibs per gallon!).

To find the weight that you'll end up at, you can simply start with the basic engine of your choice and add the accessories of your liking, delete and subtract those items you may not want or wish to substitute for others and presto; you'll know if you're going to have a featherweight Cont. , a mid range one, or one of the aforementioned porkers.

As I added and subtracted my engine and accessory's weight on the attached chart, my engine (that I have already) came out toward the low end of the achievable range at 210.09 Ibs. Not quite as low as I could have gotten it , but not too bad for an 0-200.

I'm definitely going to have electrics (B&C) and an oil filter, but I'm not going to get rid of my perfectly good BENDIX mags to get the slightly lighter SLICKS (I'll use the money I save to get the B&C starter and alternator)

No matter what weight you end up at tho; you'll have an engine that is strong and reliable, smooth if balanced properly, trustworthy and very long lived, Especially if you forego the few pounds saved and opt for the oil filter.

CONT'D PAGE 5

Keep building - but build it light!

John A. Sickafoose
642 RAY AVE N.W.
New Philadelphia, Ohio 44663

Ph (216) 343-3964

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

14th Annual KR Gathering Video

is now available. The 1994 video features the following:

- o Composite Workshop by Wicks Aircraft
- o Stretch KR Parts updates by Jeannette Rand
- o Subaru Engine updates by Bob Lester
- o Flight line, fly-bys, and awards

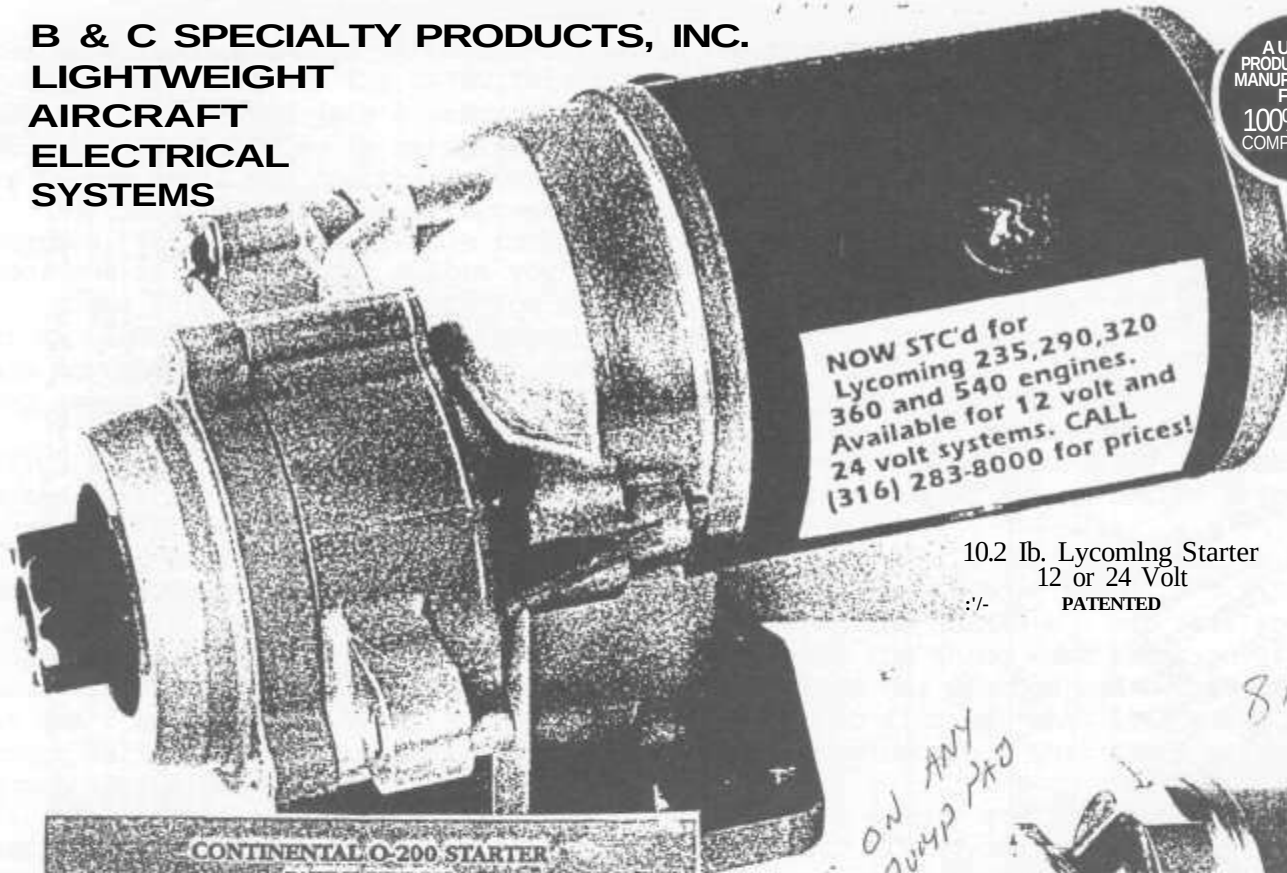
Cost \$19.95 plus \$3.00 shipping and handling.

The 11th, 12th, and 13th KR Gathering videos are also available at the same price. Send check or money order to:

Donald F. Morin P.O. Box 681, Cocoa, FL 32923

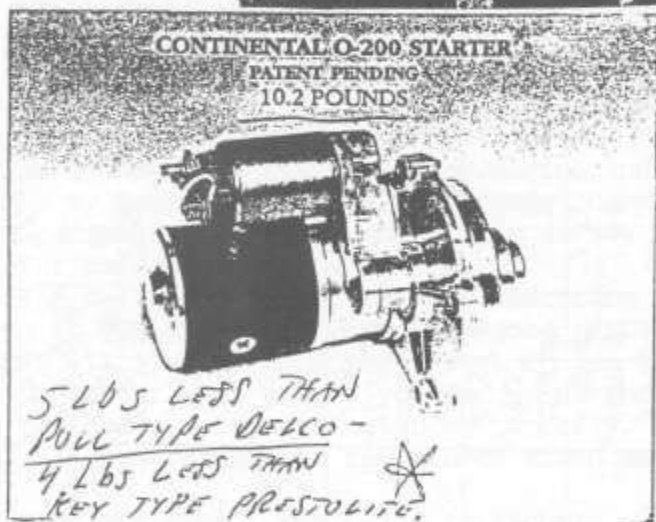
B & C SPECIALTY PRODUCTS, INC.
LIGHTWEIGHT
AIRCRAFT
ELECTRICAL
SYSTEMS

AUB & C
 PRODUCTS ARE
 MANUFACTURED
 FROM
 100% NEW
 COMPONENTS!



10.2 lb. Lycoming Starter
 12 or 24 Volt

PATENTED

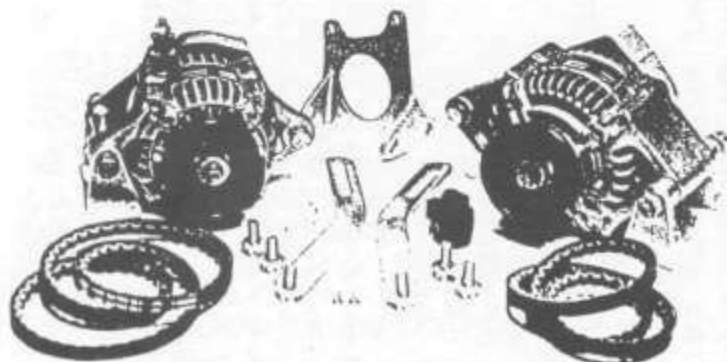


L40 ALTERNATOR

L60 ALTERNATOR

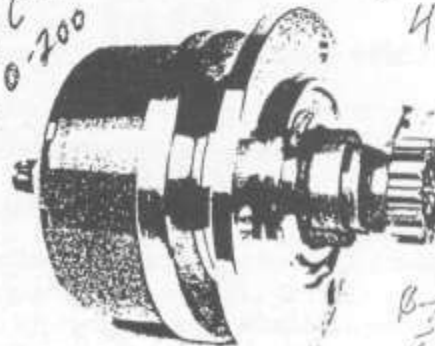


MODEL SD 8
 ALTERNATOR / REGULATOR



WARNING! It is unwise to use belts or any other ligli output alternator unless the correct voltage protection is also installed. The LK-3 Alternator Control is recommended.

FITS CONT C-75
 C-85 & C-90
 AND O-200



MODEL 200G
 ALTERNATOR

from

B & C SPECIALTY PRODUCTS, INC.
 123 E. 4th • Box B • Newton, Kansas 671 14 • 316-283-8000

Tanks a lot! It was easy!

by Mike Stearns, Placentia, CA

Back in April of '93, my good friend Jason Parker and I took delivery of a box of spruce and several sheets of plywood. It was the beginning of a project, now seventy or so percent complete, that would occupy most of the spare time we had. Our KR-2S is now sitting in Rick Hinson's hangar at Santa Paula airport, Continental 0-200A engine hung on the newly available engine mount, awaiting a just-now-being-designed cowl for the engine and prototypical wing skins made of high temp pre-preg epoxy-based composites...pretty high-tech stuff for a simple little airplane. Hinson composites makes all of the 2-S pre-molds available through Rand Robinson Engineering. The quality and care used in fabrication is impressive.

Those of you who attended Oshkosh '94 had an opportunity to see our KR project and some of the pre-molds then available from Rand Robinson. One component we've just completed and I'd like to discuss is the fuselage tank.

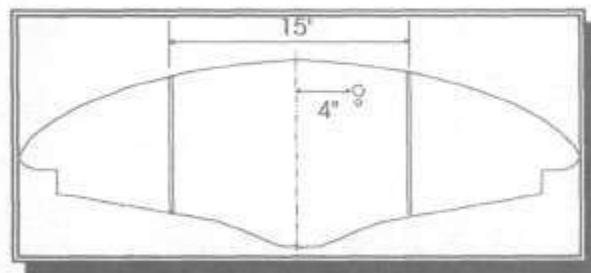
This gas tank kit is manufactured in molds by the wet lay-up method rather than by using prepreps. Hexel Epolite 2410 epoxy with 2183 hardener is used by the factory in the fabrication process, and is what you should use as you're putting the tank together. Jay and I used every last drop of the 1V* quart kit—no more, no less—to complete our tank (Aircraft Spruce part #01-07700, \$19.80).

The tank kit comes in four pieces, a top and bottom half and two pieces of foam that will serve as the core for the baffles. The instructions that come with the tank are well-written and fairly complete, but there were a few points of enlightened discovery we faced as we completed construction.

First, regarding the baffles: The instructions call for the baffles to be 16"-18" apart. This may be too far apart because the canopy hinges are mounted to the outside of the tank where the baffles meet the back of the tank on the inside, and these dimensions may not allow the canopy to clear as it is opened and closed. 14" - 16" will work better and still

provide the necessary rigidity. We made ours 15" apart and fabricated a template from which to cut the foam. I've given the template to Jeannette Rand...if you'd like a copy, I'm sure a phone call to her will get you one. Another note on the baffles: be sure to micro the raw foam edges of any flow-through holes you cut in the foam.

Next, a little bird in the RR skunkworks tells me that a new pre-mold panel will soon be available for the 2S. The preliminary design includes a center avionics stack with a circuit breaker panel in the top center of the panel. If you are planning to use this panel, or if you are building your own and plan to use a center radio stack, be sure to offset your vent, wing tank and sight gauge lines by 4" or so to the left or right. The panel only has 1 1/2" - 12" between it and the back of the fuel tank, and fuel lines in the center of the back of the tank would probably bump up against the back of your radios. As an aside, we opted to "86" the sight gauge and go with a capacitance-type fuel sensor with a panel-mounted gauge; a bit pricey at around \$135 from Wicks, but I think it will make for a nicer panel.



Finally, trial fit your tank *before* you trim V" off the flashing as recommended in the instructions. We found that about half that would result in a good fit. You want about 1/8" between the tank and the top deck when all is said and done.

Our tank is in the airplane, it looks good and it's air-tight. Best of all, it took all of five or six hours to build. I looked at the invoice for the tank, and then I studied the scary pictures in Tony Bingelis' book on fiberglass tank construction. The kit was worth the money.

FOR SALE

KR-2 10 Hours total time, mint condition, beautiful paint job, runs great, flies great. 2000cc Type 4 VW engine, starter, alternator, Zenith carb, carb heat, air cleaner, Diehl Wing Skins, fixed conventional gear, wheel pants, cabin heat, ELT, 7 built-in antennas, speed brake, baggage compartment, dual brake and rudder pedals, 12 gal. main tank plus (2) 4 gallon wing tanks. Starting another project. Can be bought for much less than it would cost to build. \$12,900.00. Call:

Bill Masters 309-662-8481
Tom Swearington 309-452-5025
14 Donna Dr.
Normal, IL 61761

WANTED

Unfinished KR-2S kit,
Call:

Arthur Hanson
25579 Calaroga Ave.
Hayward, CA 94545
510-732-0225

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 211 DECEMBER 1994

Season's Greetings

FOR SALE

Parts taken from KR-2 dismantled after nose wheel collapse. Engine (1835 HAPI kit), instruments, aluminum gas tank, Matco wheels and brakes, misc. hardware and parts. Everything for \$50 (you pick up).

Robert Looker
139 Cook Hill Rd.
Cheshire, Ct 06410
203-272-6821

FOR SALE

Parting out KR-2, never flown just taxi tested. Has a new VW turbo 1700cc, retracts, VFR instruments and trailer. Lots of parts for someone just building. First \$3,000.00 offer takes all. Call:

Steve Ewolhin
463 Ridgefarm Dr.
San Jose, CA 95123
408-345-2278 (work)

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



BOB OFFORD'S N687RL, LA MESA, CALIFORNIA

I have put off writing to you since I felt like such a novice in flying. I now have 124 hours on my KR-2, N687RL and I feel somewhat qualified in describing my experiences. A friend and I first got interested in the KR in 1979 and bought plans, wood, metal and foam kits and were on our way building in the evenings and weekends. I started taking flying lessons and got my license in 198A but my friend, who had a license but hadn't flown since 1947, couldn't make the medical. Needless to say, this put a damper on our enthusiasm and the building slowed down to a standstill until I bought him out. All of this to try and qualify why it took 12 year to finish the plane!

(cont'd page 2)

I had long since decided that renting a C152 once or twice a month to keep current was money down the drain that should be put into the project so I stopped with 77 hours on the log. As the project drew to a close, I got tail wheel instruction in an Aeronca Champ and added 19 hours flying time to give me a total of about 97 hours total. By this time I had moved down to Brown Field, San Diego, into one of the Chapter 14 EAA hangers and was doing some engine runups and taxiing on the 8000 ft main runway. Taxiing was definitely no fun. Trying to keep the centerline in view out the left side made me dizzy and I never did get the tailwheel off the ground. It was about this time that I had to make the decision as to whether I really wanted to fly this thing or was it that I just enjoyed building it? Manny "Sparky" Sparks, the local KR Guru and mentor of so many of us builders took me up in his KR for an hour of basic training and got me so stoked up that the next morning at 8 a.m., December 10, 1992, I flew my own plane for the first time. WHAT A THRILL!!

I took off as I had in the Champ with the stick neutral and let the tail come up when it was ready. Well, it came up right now and I experienced torque like I had never felt before. We were heading to the right side of the 200 ft wide runway and all I could think of was that it was either going to fly or become a weed whacker and I pulled back on the stick. WOW! I felt like I was on the back of a grasshopper and with one big porpoise in the air it was flying down the runway at 120 mph with me not entirely in control but along for the ride telling myself, "easy does it, easy does it, easy does it".

I had cleared with the tower for a left pattern from 26 right so I would be flying over the fields between Brown Field and the Mexican Border rather than a normal turnout over rock quarries and auto junk yards. The CHT was pushing 450 so I reduced climb and brought the throttle back to 2600 from 2900 my maximum RPM. This reduced the temp to 400 and after two circuits of the field I had 3000 ft. What a feeling to relax and enjoy the view of Tijuana to the south, the Otay Mountains to the east, San Diego to the north and the Pacific Ocean to the west. I did some slow flying, shallow turns and general



checking of instruments which were telling me that the engine was doing just fine and I was really flying and then entered a normal landing pattern at 100 MPH slowing to 90 on base and held 80 to the threshold. I had never traveled at 80 MPH this close to the road and there is a certain amount of puckering that occurs but I had held it off as long as possible and made a fairly decent 3 point landing and I have continued the same technique ever since.

My flying has not been without "incident". I ruined my first prop trying a wheel landing so have crossed that off my list and took care of the second one by finding the only rain puddle on an 8000 ft runway on roll out. This put me in a 3 point stance with me looking down at the concrete sliding by in a shower of water. Besides the prop, a little of the air intake was ground off. An admonition that I have read in this newsletter before, if you have a retract KR, install some sort of a GEAR UP warning. Hearing, "no evidence of wheels" from the tower when about 5 ft off the runway makes a mess of your ego and other things. Luckily, this only cost me a couple dozen brownies, chocolate chip cookies and a heartfelt thanks to the tower crew.

It has taken about 120 hours to have real confidence in that little VW engine and I have gained a lot of confidence in myself. The adrenaline I have pumped through my system would have to be measured in buckets and I constantly learn from each flight and extend my flights from home base.

KR2 687RL unmodified retractable
Empty weight 581 lbs
1835 VW built of HAPI parts
Dual electronic Hosier ignition
HAPI Ultra Garb/float bowl/mixture
Ed Sterba 52x44 pitch prop
Max static RPM 2900 gives 185 lbs thrust
Max flight RPM 3000 gives 145 MPH

Bob Offord
5110 Harmony Lane
La Mesa, CA 91941
619-465-6083

Mike Kellems, N94GM, Lewisburg, TN wrote the following article. We would like to express our deepest sympathy to Ralph Smith's family. Our thoughts and prayers are with them.

Earl

IT SADDENS ME TO INFORM YOU _____

of the crash of N95RJ taking the life of my friend KR Builder Ralph Smith, 67 years old, November 12, 1994 at Portland, Indiana.

I have enclosed my notes of what I found at the crash scene. The elevator control horn is hard to inspect and easily overlooked, we all need to be aware of the possible problems in our little planes and this pieces should be regularly check. Ralph loved the KR family and the KR aircraft. I will miss him every time and ifly.

Mike Kellems

ACCIDENT REPORT BY MIKE KELLEMS

My background is as follows: Builder and mechanic and KR-1 N94GM. Past owner of KR-2 N56WC and KR-2 N85JJ. Rating: Pilot ASEL. My total PIC is 785 hours at this time with over 600 hours PIC in KR-1 and KR-2 type aircraft. I have known the pilot and aircraft referenced above for about eight years and knowing the A/C I can make the following statement with confidence.

Looking at the scene the nose of the A/C was heading west the right wing was in and on top of the fuselage with all of the above completely burned •• the left wing and landing gear was basically intact-lying inverted just south of the wreckage putting the fuselage between the wing and runway. Checking the engine I found the crankshaft turning with no apparent problems internally. The throat of the carb was closed with the throttle linkage indicating the same. The prop tip found at the scene indicates it was broken front to rear rather than striking the ground in rotation (indicating again the engine was stopped or in idle).

'^ CO! 1-r-RVL..



Further investigation found all control cables to be intact. The ailerons control loop was closed and intact with no apparent problem. The same was true with the rudder control loop. However, the elevator control loop was broken. The fixed portion on the elevator spar controlling down elevator failed at the attach point giving the pilot up elevator but no pitch down control.

The arrow indicates the failed part that I found in the wreckage. The up elevator cable was laying in place with the aluminum piece melted into the bolt and cable connection. The down elevator cable and connection was found to be forward of that position about two feet. The bolt and lock nut were still intact with the nylon melted out of the nut but clean of all residue (aluminum).

Sifting through the ashes I found the failed part mostly complete and obvious that the control had broken at the bolt hole attach point. This failure left the pilot with no pitch recovery and I believe it was the cause of the accident.

Mike Kellems
P. O. Box 2603
Lewisburg, TN 37091
615-270-9202

COMPUTER BULLETIN BOARDS

Being a newcomer to the KR world and not knowing a lot about what goes on within it, I figured I should order the newsletter which I did. I also got all the back issues and spent the first week skimming thru them all. You see, I have this box of wood sitting out in the garage they say is to start a KR-2S but I'm not quite sure yet just how to go about all this! Since there was no inventory list or anything with it I found myself wondering if I just make the best use of the wood that is there or are most of the pieces cut to near the length I need and I just have to find them? Do I just "go for it" or should I try and get some information? I found some of my questions answered and others still waiting for an answer.

Since I've used computer bulletin boards quite a lot in the past few years, I was very pleased to find mention of a bulletin board system (BBS) for the KR in issue #166. That board was discontinued for lack of traffic about a year and a half ago. So much for a KR BBS. Maybe it was too specific. Then I got to thinking... maybe a BBS with general aviation interests might work for the KR'ers.

There is a FAA sponsored BBS called the Safety Data Exchange which has an 800 number... my favorite kind of number! There are topics on airframes, fuel systems, avionics, propellers, cooling systems, oil systems, composite related items and specific model reports to name a few. The biggest problem I had was not using an IBM computer (I have a Radio Shack TRS80 Model 4) and getting the screen to display good text instead of the ANSI "garbage" which gives codes for color stuff. I told the BBS that my computer was a teletype unit! I have some more experimenting to do with that board. Good thing it's a 800 number! Information concerning a given topic is listed whether it's a problem or discussion. You are allotted 30 minutes during your call during which time you may capture your information in memory for later viewing or browse around the board. Questions may be asked about a given subject and the answer retrieved later.

Another BBS I have checked into is called the North American Sport Aircraft and Ultralight BBS. I first logged onto it a few months ago when it was just getting started. Some of the conferences you can participate in are composite materials, material resources, powerplant conversions, a swap shop and a general help. Other conferences have to do with wood, fly-ins and ride sharing. You can even start a new conference if you want to. Most BBS's have a general message base or E-Mail whereby one can leave a message to someone else listed on the board. I have used this feature frequently over the past 2 years to stay in touch with my son in Ohio, a buddy in New York, as well as my wife's brother in Connecticut. It was really a neat set-up. I would usually get 2 or 3 letters per week this way. A lot of phone calls you say? Yes, but with an average time of 1 or 2 minutes (.11/mn) night/weekend rate, my computer portion of the phone bill was usually less than \$7.00. The trick was to have my letter/message composed before ever getting on the BBS then calling it, logging on, leaving or getting a message and logging off.

The boards are pretty much menu driven. Any computer with a modem and program to run the modem (a terminal program) can get on a BBS. I thought what better way for KR builders with computers to field questions than a BBS. It's cheaper than a first class stamp and the message is available right away to the other person!

The third BBS I have logged on is called The Wolf's Den and they have an aviation section with files and programs available for downloading to your computer and your use. There are programs for aircraft weight and balance, aircraft design analysis, flight planning and others.

The most recent board I've gotten on is the FAA Airport's BBS. It's mainly for airport operators and people in the aviation design and equipment industry but it's open to the public as well. They have a lot of programs available for downloading and I intend to explore this further.

CONT'D PAGE 5

GEAR LATCH/ PROGRESS REPORT

The first time you log on a BBS, there is a series of questions they want to know such as where you live, what password you want to use whenever you log on, what kind of computer you have and such. It will probably take a few minutes to answer everything but thereafter all you do is call, log on with your name and do a mail check or look for some programs to download. Some boards have games to play but that can get expensive on long distance. For me, the E-mail is the most useful.

An older IBM XT compatible will cost from \$50 to \$200 depending on what it has for features and there is usually a friend or friend of a friend that can help that can help you get started if you've never used a computer. A 2400 baud modem is fairly fast and can be had for less than \$30 in Computer Shopper magazine ads. Some faster modems run at 14,400 baud but are also a lot more expensive. You can get a 2400 modem which can also send a fax from your computer. Those can be had for less than \$50.00. Computer Shopper magazine looks more like a Sears catalog than a magazine but it's chock full of computer stuff and vendors. They also list hundreds of BBS to call. Somehow I find it much easier to type a note on the computer and send it to a BBS than write one and mail it. If you've never tried a BBS and have a computer, try it... you'll be surprised. Also, I would be happy to write some more dealing with a particular board based on my own experiences, if anyone's interested. I'd also like to know of other aviation oriented BBS's, especially any which are oriented toward the homebuilder.

N Amer. Sport Acft BBS	908-755-5371
Safety Data Exchange (free)	800-426-3814
Wolf's Den BBS	816-361-7670
FAA Airports BBS	202-267-5205

Jim Hayward
7860 LongView Rd.
Rapid City, SD 5701

A few years ago ('91) at the KR gathering I meet Don Cornwell who flew in his tan KR2 from West Virginia. I was looking for an alternate gear Latch method, to the 'mousetrap' set-up in the plans. Don's latch was similar to the last newsletter. I asked Don some questions and wrote to him months later for more detailed information. He used an idea from the May 1989 KR Newsletter by Roger Hansen which referenced an earlier article by Rex Taylor.

Don made his gear latch rail of aluminum rather than mild steel and used the aluminum box tube that comes with the aluminum kit, instead of the I-beam, to mount the pin assembly.

Don repented, that milling a slot in the latch rail at the gear down position absorbs some of the 'spring' and worked fine for 300 landings! He recommended a slot up 1/2" and keeping the pin assembly as close as possible to the latch rail.

Don also had a different latch handle but didn't provide details.

Unfortunately Don can't provide any more info but I learned that the back issues of the newsletter can be invaluable to current builders.

PROGRESS?

I want to get my KR on the gear before cold weather. I'll try to get ray engine kit built this winter. (I really mean it this time, Steve!) I made a fiberglass header tank of 18 gallons and finished shaping most of the metal fittings out haven't fit them to the airframe. DO NOT drill anything to the plans without trial cutting to the airframe. My stick ass'y is made and installed and I'm almost finished with the seats per Bob Muse's article a couple years ago. After the gear is installed I plan to sit in the 'craft and fit the rudder pedals and do some 'garage flying'! I guess there's a lesson that goes with each part I've made, so I'll try to contribute to the KR News a little more often.

Ken Jordan
328 Green Ave.
Carney's Point, NJ
08069
Ph.# 609-299-0498

CARBURETOR HEAT BOX FOR ZENITH CARB-OR

USE .060 6061 ALUMINUM. WELD 3" SQ. ENDS TO MAIN FRAME. WELD 2"x1/2"

FLANGE TO ONE END FOR HOT AIR AND 1/2" FLANGE TO BACK OF MAIN FRAME

TO FIT GARB. DEFLECTOR ATTACHES TO SHAFT WITH 4-40 BOLTS AND NUTS.

THREAD BOTH ENDS OF SHAFT FOR KASY ASSEMBLY. POP RIVET CAP TO ttrtik

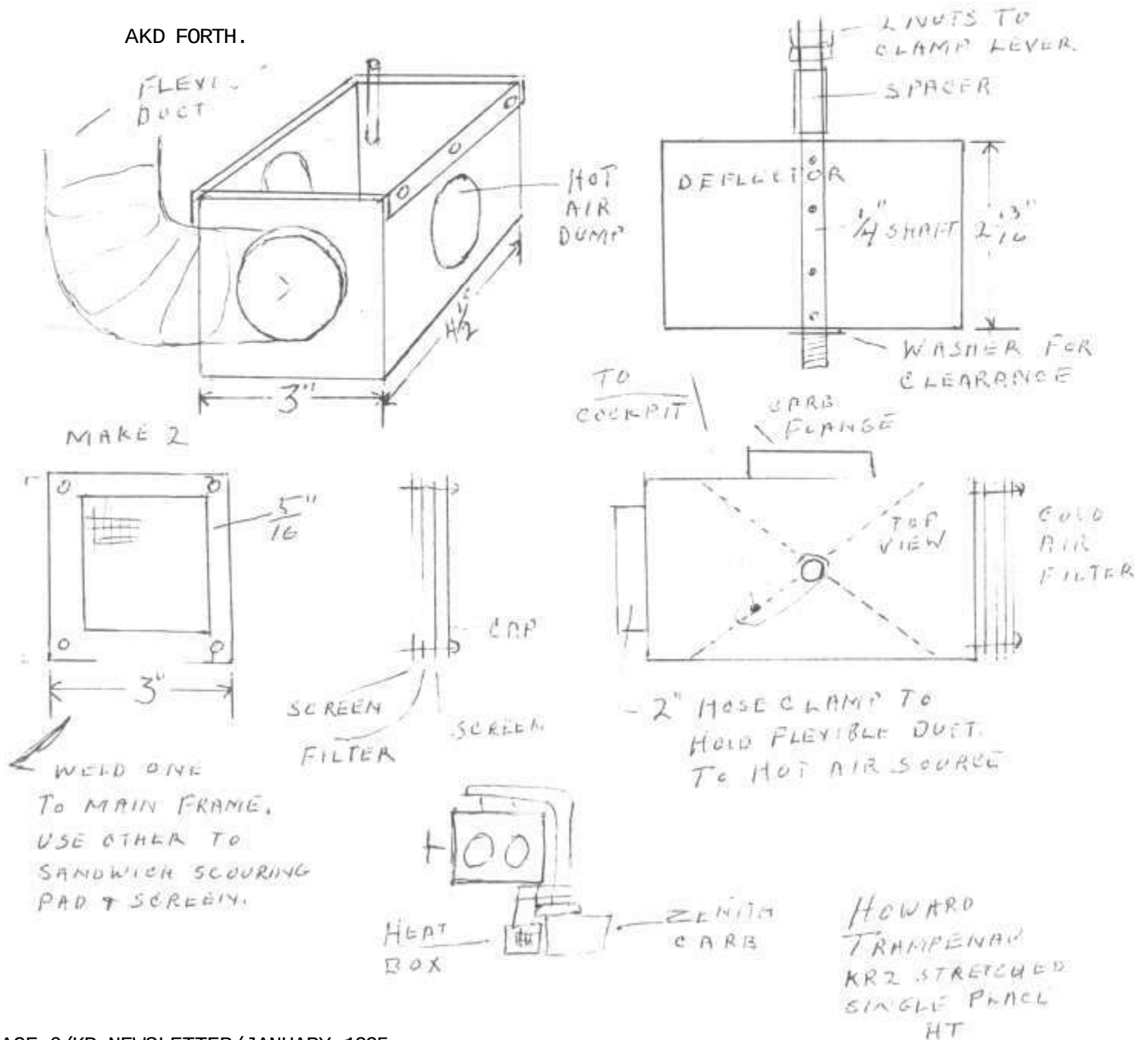
FRAME. AFTER DEFLECTOR IS INSTALLED. USE SCOURING PAD FOR FILTER.

ATTACH WITH 4-40 BOLTS AND NUTS. A BRACKET CAN BE FITTED TO TOP OF

BOX AND THEN ATTACHED TO BOTTOK OF CRANKCASE. FLUSH RIVET BRACKET FROM

INSIDE OF CAP SO DEFLECTOR WILL HAVE CLEARANCE WHEN SWITCHING BACK

AKD FORTH.



FOR SALE

Prop 52x43. Maple, fits Great Plains standard prop hub. Turns 3,000 static on 1835. \$125.0.

Howard Trampenau
924 Scio St.
Elmira, NY 14901
607-732-0517

FOR SALE

One KR-2 canopy (clear) ~~\$90.00~~ and one premolded wing tips \$7.00. Using Diehl wing skins and different canopy. Call

Carl Evers
1827-1 Debutante Dr.
Jacksonville, FL 32246
904-724-0588 evenings/weekends

FOR SALE

KR-2 15 total time. 25 hours since full restoration. 2100 turbo 25 hours. New paint, interior, prop, panel. Has transponder and antennas for nav/com hookup. Intercom, full electrics, landing light, nav/com lights, GPS. Has 11 gallon header and two seven gallon wing tanks. Original retracts with Cleveland disc brakes. Runs and flies smooth and cool. Asking \$12,500, will possibly transport or ferry.

Bill Clapp
2213 N. Forrest B-15
Valdosta, GA 31602
912-241-0478
912-245-0009

FOR SALE

Looking for a Cont. 0-200? I ended up with two. Will sell one to my "KR friends" for only \$4975. It has a new crank, fresh Cermichrome cyl's and oil filter. Built to new limits. Finish with your accessories. This offer good until February issue of the Newsletter comes out...then it'll go in TRADE - A - PLANE at a much higher price.

John Sickafoose
642 Ray Ave. N.W.
New Philadelphia, OH 44663
216-343-3964 (eve.)

14th Annual KR Gathering Video

is now available. The 1994 video features the following;

- o Composite Workshop by Wicks Aircraft
- o Stretch ICR Parts updates by Jeannette Rand
- o Subaru Engine updates by Bob Lester
- o Flight line, fly-bys. and awards

Cost \$19.95 plus \$3.00 shipping and handling

The 11th, 12th, and 13th KR Gathering \ideos are also available at the same price. Send check or money order to:

Donald F. Morin P.O. Box 681, Cocoa, FL 32923

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

1995 KR GATHERING

The 1995 KR Gathering will again be held in Columbia, TN.. Due a scheduling conflict, we had to change the dates selected during our last awards dinner. The dates of the 1995 KR Gathering are September 22, 23 & 24. Since the Friday night cookout was such a success, planned activities will include Friday night and Saturday. The awards dinner(no reservations needed) is Saturday night, make plans to be there.

The host hotel is the RAMADA INN, Columbia, TN. For reservations call (615)388-2720. Room rate is \$36.95 (single or double), if reserved by 9/15. Tell the hotel that you are part of the KR GATHERING.

Hosts: Jim Hill
(205)882-2054

Bobby Muse
(615)399-9853

RAIDER AVIATION
(615)379-5511

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 212 JANUARY 1995

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN

300
MONTE MILLER
1900 PARKSIDE DR.
DENTON, TX 76201





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



CHARLIE EDWARDS' N151CE, HIXSON, TENNESSEE

I purchased the aircraft from the builder, Tom Garverick. The aircraft was originally pictured in newsletter #96 of June 83.

I pulled the wings off and trailered it home to my garage. After the engine was removed, I turned the fuselage upside-down and removed the landing gear. The Dan Diehl fixed tricycle gear was then bolted into place.

(Cont'd page 2)

Some changes were also made in front of the firewall. The nose gear required a different engine mount. The distributor was removed and one of Jeff Rose's electronic ignitions was installed (This is a very popular electronic ignition among home builders - particularly the Canard guys. You can see Jeff each year at Sun 'N Fun and Oshkosh in the booth or phone 615-622-8825.) This electronic ignition working in conjunction with the magneto really smoothed out the ISOcc engine.

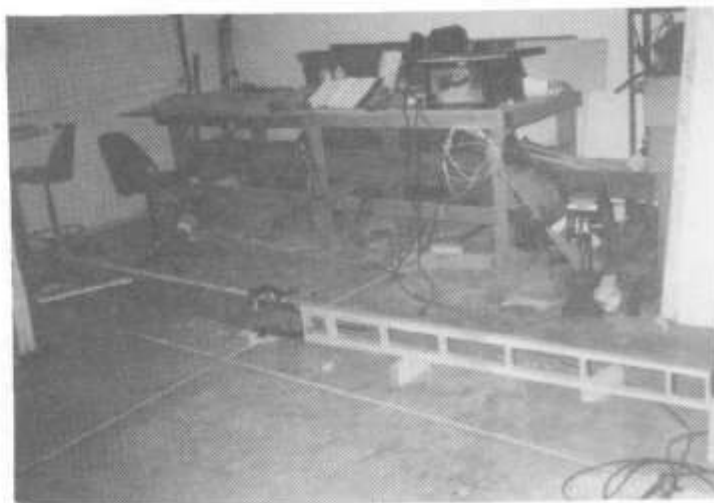
At weight and balance time, the nose wheel was a little on the heavy side. Conferring with Dan on this problem resulted in a new set of main struts which moved the axles two inches forward. In addition to this, the battery was taken from the firewall and placed behind the seat. Dan Also solved another slight problem: The composite nose wheel strut proved to be a little wobbly. Dan sent me a stainless steel strut to replace it. (My thanks to Dan Diehl. I plagued him with countless calls and he always took time to patiently answer my questions.)

I've put my KR-2 up for sale to fund a new project. I began work on a Glassair last summer. But its OK, because I asked Jeanette to forgive me!

Yes, the Cessna 150 in the background is mine also.

Charlie Edwards
787 Sutton Drive
Hixson, TN 37343
615-877-1047

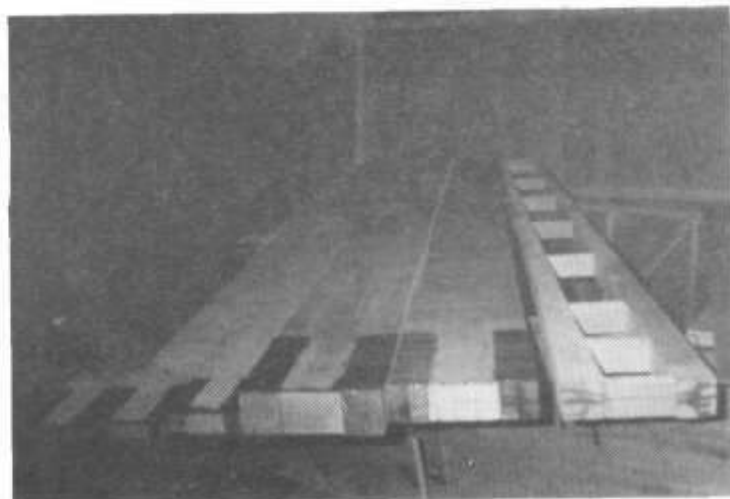
PHOTOS FOR ARTICLE BY ROSS YOUNGBLOOD
"SPARS, SPARS, SPARS" ON PAGE 3.



MEASURE & SET SPAR DEHIDRAL & ALIGNMENT
CHALK LINE ON FLOOR NOT VISIBLE



SPARS ON PLANE (FWD ONLY)



SPARS, SPARS, SPARS

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

E Spars, Spars, Spars

I went through some earlier photos of my project and came up with several on my wing spars. So I thought in the interests of contrubition, I would include these since I was always getting ideas from other folks photos. This series of photos was taken about April 1990 based on my construction log notes. You all have construction logs right?

The manual suggests that the FAA inspect the spars before covering. In my case, the FAA in Phoenix indicated that they no longer do this, so I had an EAA Technical counselor come and take a look at the spars before I closed them. It was worth the visit. Now that I have moved to Oregon, I have to get re-connected with my local EAA chapters.

Photo 1 shows the spars laid out in my garage so I could get a feel for how big this project was going to be. It became clear at that point that building the wings would have to be done diagonally or one wing at a time. I used 2x4 blocks because after all the work that went into making these buggers, I was not going to let the spars warp on a cold concrete floor.

Photo 2 shows early attempts at setting the dehidral angle. One problem was that the spars with the attach fittings clamped did not want to follow the straight chalk line on the floor. Adding an additional 3/16 plywood shim where the fittings mate with the outer spar allowed the spars to be trued up before the dehidral was set. Several chalk lines were snapped on the floor over a period of several weeks before I was finally happy with the forward spar arrangement. I felt this was important before mounting the forward spar onto the fuselage.

Photo 3 Shows my collection of spars in May 1990. Note the spar varnish on the ends of the spar caps and where the fittings will be installed.

Photo 4 Was one of the first shots taken of the project with the spars attached. The forward spar has been mounted into the fuselage at this point. Several diagonal measurements were made to insure that the fuselage and spar were correctly alligned. Unfortunately, on the aft spar, I made a mistake and mis-aligned it so that the right tip was flush with the right forward tip. This looks great until you realize that the aft spar is 1" SHORTER than the forward spar and needs to be indented 1/2" on each side. I discovered the problem when routing the aileron cables, instead of building around it, I chose to cut-out the aft spar, repair the webbing and re-install it correctly.

Hope these photos are food for thought.

Ross Youngblood
1017 NE Diane Pl
Corvallis, OR 97330
(503) 753-7370



PREPARING TO SET SPAR DEHIDRAL

CONVERTING TO A SUBARU ENGINE

This article for the newsletter is long overdue but I didn't want to "Jump the gun" so to speak before I was positive my system worked the way I wanted it to.

I have a KR-2 that has been flying since 1987 and has over 700 hours on it.

I started flying it with a 2450cc Type 4 Porche engine. At that time the only accessories available were from a supplier in North Carolina. It flew well and the engine seemed to run fine. I had the usual oil leaks and valve problems.

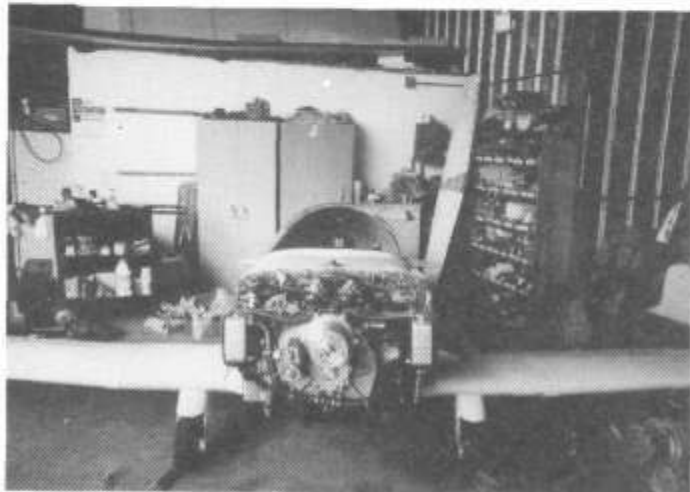
The heads gave me problems, so I decided at about the 200 hour mark to rebuild the engine. New 105mm jugs and a new 78mm forged crank raised the size to 2600cc. The plane was repainted (more weight) and brought to Sun 'N Fun in 1989.

About 210 hours later, while flying at 3000 feet on a clear Florida morning, I felt a strange vibration. I smelled hot oil right away and thought it was a good time to talk to GOD!! I played with the throttle until I found a fairly smooth RPM, all the while looking for a place to land. I made a 180 and headed back to FXE. I followed the X-way and then a canal that ran to the edge of the field. The landing and taxi back to the hangar were uneventful and the engine ran to shutdown.

On tear down, as I put the wrench on #3 connecting rod bolts and started to apply pressure, the last quarter inch of the crank snapped and came off in two pieces. The crank had cracked diagonally and the only thing holding it together was the connecting rod. I now had a 900 dollar door stop! Many reasons for the break were suggested. Press fit hub, oil galleys and spiral grooves creating stress cracks etc. etc.

I rebuilt the engine again with a stock crank and new hub and front bearing from Great Plains. I flew the plane for a while and had no other problems. By this time I had heard a lot of good things about the Subaru and decided I would like to try one.

CONT'D PAGE 5



Out came the VW and was sold to another KR builder. Here we go again with another R & D program. I located the engine I wanted. It is a EA-81, push rod engine, Asian version. This engine is a truck engine in Japan and not imported to the states. I has dual carbs and puts out 100 HP at 5500 RPM.

I decided to go with the NSI spur gear drive and so far it has been a good choice. A new motor mount was made to fit the whole assembly in the R+R Revmaster cowl. I had to modify it slightly, but it fit.

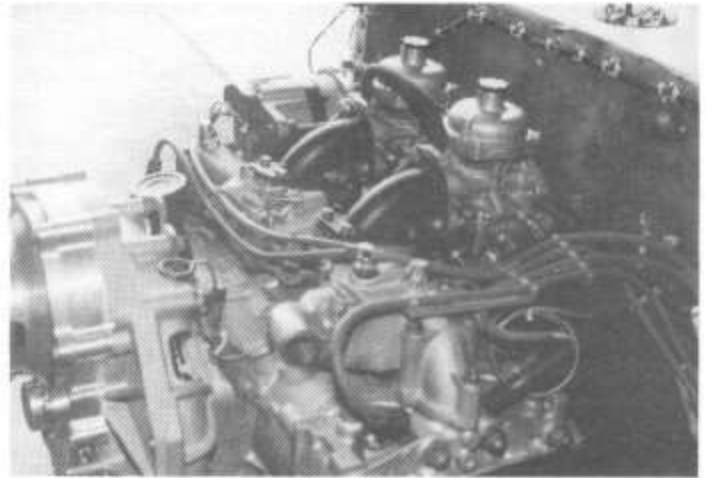
Next came the cooling. Custom radiators were made up and plumbed up like I thought it should be. WRONG!! Water does not flow like you think it should. I finally made the hookup with clear plastic hose (carefully), to see how to improve the flow. It worked great.

I have since switched from brass to aluminum radiators. They are a lot lighter and cool 30% better.

A few words about the Subaru. It is an absolute jewel of engineering. It makes the VW look like Fred Flintstone used it! I have put about 100 hours on the plane since Lakeland '94. I have had no problems at all and I really pushed it hard. Now some stats on performance:

Empty weight	785	Ibs
Cruise speed at A800 rpm	170	mph ind
Cruise speed at 4700 rpm	165	mph ind
Cruise speed at 4600 rpm	160	mph ind
Cruise speed at 4500 rpm	155	mph ind
Fuel consump at fast cruise	is 4.8	gph
Fuel consump at slow cruise	is 3.4	gph
Oil temp	190-200	DF
Water temp	180-190	DF
Water pres	9-11	PSI
Climb solo	1000-1200	FPM
Climb speed	95-115	MPH
Stall	60	MPH
Top speed	180	MPH
Reduction ratio	1.69±1.	
Prop-Warpdrive	3 blade, 60" pitch, 54" dia	
Highest altitude flown	12,500	ft

I am still not certain this is the right gear ratio, or the right prop and am going to try different setups.



I like the Subaru so much I bought a SVX±6 cylinder, 240 hp engine for the Glassair I am building. Another word about rebuilding the Subaru. Use only stock OEM parts, such as water pumps, thermostats, etc. Tolerances on rebuilt parts are horrible and can create problems.

As far as the cooling system goes, I can provide aluminum radiators, if you use the same setup I do. These are not cheap but are of aircraft quality and they work.

I have been asked to do a video of my installation and an explanation of what we did. If there is enough interest in this, I will do one. The price would be about 10 dollars plus shipping. This would probably answer a lot of questions you may have.

There are at least 3 or 4 projects on our field that are converting to the "SOOB" and replacing VW engines. 2 Q-2's, 3 KR's. The KR's include mine, Bob Lester's and Warron Gray who is building his butt off!

Both of these guys are in my hangar and I feel fortunate to be able to discuss and evaluate any problems or ideas that come up. I've included some photos of my installation.

Steve Makish
11418 Chipmunk Dr.
Boca Raton, FL 33428
407-482-5385

GLUE GUN

I discovered the wonderful GLUE GUN method for gluing foam last fall. I had run out of 5 minute epoxy, and decided to borrow my wife's glue gun. It worked GREAT! I ran out and bought a full size one at K-Mart, and some glue sticks, and I've never been happier. One and 1/2 wings completed so far with it and as long as I can keep myself in glue sticks, I'm happy. Five minute epoxy is pricey and is MUCH messier than the glue gun method. However I've BURNT my hand, thumb, and fingers with HOT glue, and it smarts... As Homer Simpson says "DOH!!!" In the photo, the small gun on the left was my wife's

Fuel Caps

I enclosed a photo of my first candidate for a wing fuel cap. It came from a bottle of "lasting pride" cat litter. These were nice and wide, and were my first choice until I found a good deal from Wicks which is what I ended up using. However other builders may want to check these out.

Water Level

I sent some photos of my project in process. The left wing has been glassed and removed, the plane was re-jigged and these photos show the right wing construction. To check the leveling of the plane and the dihedral and washout angles, I used a really simple water level, made with a milk jug, and a length of 1/4" clear plastic tubing. And plenty of your favorite food coloring. I tape the end of the hose to either a ruler yardstick, or my current favorite, a 5/8" square length of spruce. I thought that I would throw some handy trig formulas that I use to calculate the 3-1.2 degree and 1/2 degree washout angles.

For the inboard angle of incidence of 3 and 1/2 degrees, I use the water level to measure the difference in height between the front and rear of the wing at the chord line. With the chord line being the hypotenuse of a right triangle the desired drop from tip to tail of the chord line can be calculated with the following formula:

$$\sin(\theta) = \text{Opp/Hyp}$$

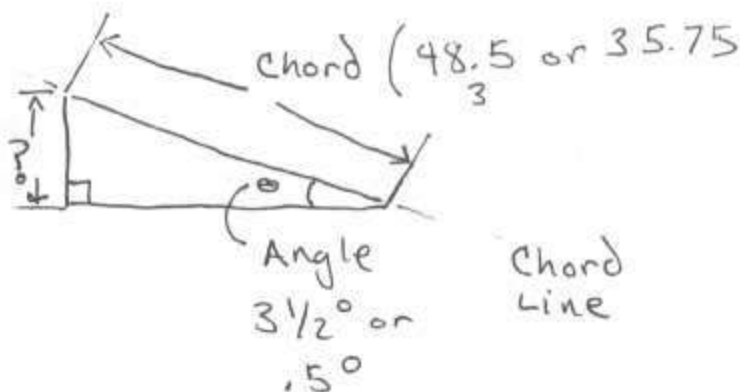
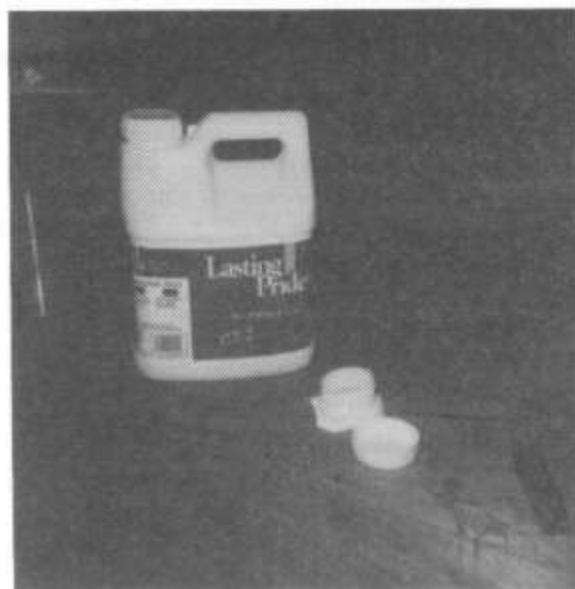
$$\text{Hypotenuse} * \sin(\theta) = \text{Desired Drop (Tip to Tail)}$$

For INBOARD CHORD LINE :

$$48.5 * \sin(3.5) = 2.96"$$

So if your inboard rib chord length is 48.5" the tip-tail drop is 2.96" for a 3.5 degree angle of incidence with the longerons (assuming you leveled the fuselage!).

CONT'D PAGE 7



Similarly the distance for the outboard tip is calculated as
 $\text{Hypotenuse} * \sin(.5) = \text{Desired Drop (Tip to Tail)}$
 For OUTBOARD CHORD LINE:
 $35.75" * \sin(.5) = .312"$
 If you know the drop (leading-trailing) the angle of incidence can be calculated by:
 $\sin^{-1}(\text{Drop}/\text{ChordLength})$. $\sin^{-1}$ is arcsin on some calculators.
 You can also calculate your error. Assuming you eyeball some of the water level measurements, your error. For the leading edge, this results in an angle error of $\sin^{-1}(\Delta S/\text{ChordLength})$. Or. 14 degrees inboard and .2 degrees outboard. So you can get pretty accurate with a water level.

The really good news is that the distances are the same when the plane is UPSIDE DOWN, so it is easy to double check the angles when the plane is jiggled inverted!!

One last item. I discovered a good book "Flight Testing Homebuilt Aircraft" by Vaughn Askue from the Iowa State University Press (1992). I purchased it at Powells Bookstore in Portland Oregon. It is a terrific book on flight testing. Much better reading than the FAA A.C. on the topic.

Regards!
 Ross Youngblood
 1017 NE Diane Pl
 Corvallis, OR 97330
 (503)753-7370
 Email: rossy@San-Jose.ate.slb.com



FOR SALE

KR-2 in late boat stage. Diehl wing skins (Dool toms skins mounted). Also Diehl conventional gear legs and mounts as well as all the wood from the Rand wood kit plus extra plywood. Building a house at a new location and have no room to store project. \$900.00

Dan Wilson
 7301 NE Grand Meadow Dr.
 Claremore, OK 74017
 918-342-2508

FOR SALE/TRADE

Two C85-12's one is aircraft one is GPU.
Both are complete with prop hubs. Mags,
starters alternators, plus some extras.
Too much HP for my ability and KR-1
project. I need a 1835 VW electric start
and fixed gear tricycle preferred!
I have too many projects. Is anyone
interested in a retired military jet boat?
Bueler model 32F. Delivery possible to
Oshkosh '95 area. Mother lives in Pine
River, WI. I can video any item should
anyone want a closer look! Contact:

Robert Peterson
P. O. Box 102
Hudson, WY 82515
307-332-4259 Evenings

FOR SALE

2300cc VW Turbocharged with intercooler,
custom built with all new parts. Has all
accessories, ready to hang on your
aircraft. Is now on my flying KR-2. Has
dual ignition with 60 hours total time,
runs beautiful. Puts out 100 HP at 35"
manifold pressure. Mosler Motors sold
this same type engine for \$7,000.00.
Asking \$3,000.00. You pay shipping or
pick up. Also have (2) Warnke "Almost
Constant Speed" props for this engine.

Walter Melton
16305 N. Oracle Rd.
Tucson, AZ 85737-9114
602-825-9730

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 213 FEBRUARY 1995

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN

500
MONTE MILLER
1900 PARKSIDE DR.
DENTON, TX 76201



KR NEWSLETTER

ISSUE NO. 214
MARCH , 1995



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering Inc.



KERRY RUDYANTO'S KR-2, FROM INDONESIA

The above photo of my KR-2, PK-SKV. Built since early 1990 and first flight on April, 1994. Source of material from Rand Robinson and Aircraft Spruce Specialty.

Flight characteristic is typical KR-2 as reported in KR Newsletter and some magazines, handling is pleasant, stable but very light on control, pitch sensitive. With single pilot cruise speed up to 130 knots.

Have experienced a hard landing and landing gear was bent and peeled from the fuselage. It is now being replaced with the new one and in the same time will modify to tricycle. Nose wheel assembly from Dan Diehl.

Earl,

I've just reached the boat stage with my KR2S and thought I'd let you know what I learned in the process. Having read all of the newsletters, I already had a lot of solutions to problems that I didn't know I had yet. I used the time honored method of laying out the side frame trusses using a chalk line and a large carpenter's square. A long straight 1x4 was then screwed down along the chalk line to define the top longeron reference line. The square defined the verticals using a tape measure along the 1x4. 2x2 blocks were then screwed down at the five locations which define the lower longeron in the plans, leaving about 1/8" extra space to wedge a builder's shim (available at your local home supply store) between the longeron and the block. The screws through the blocks were loosened slightly to allow for free rotation. The gradually tapering shims allowed precise control of the amount of pressure applied to the joint during gluing.

Once the lower longeron shape was defined, the verticals and diagonals were cut out using a power compound miter saw equipped with a fine toothed blade. I consider this tool to be invaluable, as I cut out all of my members in about an hour and a half. Measurements for the required angles were made simple using a high quality clear plastic protractor. This method yielded perfect joints time after time. It can't get much simpler than this! I even cheated a little, and drew up a full size CAD plot of the truss using a bspline curve to represent the lower longeron. Each intersection angle was dimensioned and each member's length and angles were detailed. This really didn't help much, because all measurements made with the protractor and tape measure turned out to be identical!

The gussets were easily made using the miter saw and a 45 degree "angle increaser" made from a 1x6 clamped to the saw. I'd be embarrassed to tell you how long it took me to come up with this concept. By flipping the spruce over and cutting the second half of each angle, the proper gusset grain direction was obtained.

After reading newsletter reports of the top longeron bowing up as much as half an inch from the table top while curving the trusses (during the boat forming stage), I decided not to skin them with plywood until after the boat was formed. This was not the brightest idea I've ever had. Two joints popped loose in the middle of the night even though I spread out the process over several days. I've since skinned the trusses and have completed building my boat with no other problems. As long as they are symmetrical,

who cares if the top longerons are not straight? I suppose if I had to do it again I could measure my boat's top longeron's deviation from straight and use the numbers to compensate when laying out the side framework. But life is pretty short...and all of those nice 90s would turn into 89.3s and 88.8s...

Also, I too experienced a problem installing the firewall bottom plywood shelf. It simply can't be done per plans, unless the plywood shelf is installed before the two 3.5" x 5/8" braces. But if you did that, you couldn't guarantee a perfect, tight fit for the even more critical x-braces! The alternative double layer of 1/8" is probably the only way to have the shelf extend all the way to the skin on each side.

My KR2S is stretched about 2" at the top and bottom longeron (measured at the rear spar), leaving the firewall dimension the same as in the plans so that the R/R cowling will fit without too many modifications (is that you laughing, Monte?). In addition to the extra 2" of shoulder room, I carried the widest part of the fuselage farther aft before the taper to the tail begins. Here again, I cheated by drawing it up full scale and plotting a full size drawing to tape down to the table top. Jigging the sides (2x2 blocks and builder's shims again) along the plotted lines ensured that both sides are symmetrical. A centerline and plum bobs assured that it's all square. I also extended my fuselage 4" farther aft in an effort to improve pitch stability.

I am contemplating using a more efficient airfoil. Unfortunately, I should have thought of that before I constructed the fuselage sides. Now that I am stuck with the spar location structure that I have, I am considering concocting a modified NACA 63 series airfoil with the stock KR2S spar thickness. This will yield a more efficient wing, despite the thickness, and will allow the spars to be built per plans. Realizing that laminar flow wings must be very smooth, I plan to use more wingribs (foam/glass sandwich) cut undersize so that I can stretch 1/4 foam over them. I am hoping to avoid contour sanding the large flat surfaces entirely. We'll see. As always, don't try this at home unless you're a serious student of aerodynamics and mechanics.

Anybody out there using the Zenith carb that the Model A used (sucessfully)?

Thanks,

Mark Langford
296 Taylor Denton Lane
Harvest, AL 35749

205-851-9902

SAGA OF THE BOLTS

SINCE MY LAST LETTER ABOUT THE KR2-S RUDDER MEASUREMENTS AND THE SUBARU INSTALLATION THAT MY HANGAR BUDDIES ,STEVE MAKISH AND BOB LESTER HAVE DONE, SOME OTHER THINGS HAVE OCCURRED TO ANOTHER HOMEBUILT BUDDY THE "SAGA OF THE BOLTS".

IT SEEMS THE "TAPE MEASURE GODS" HAVE LOOKED DOWN AT MY FRIEND AND SAID "LET THERE BE HAVOC ON THIS MERE MORTAL", AND THERE WAS.

MY BUDDY WHO SHALL REMAIN NAMELESS, AND WHO ALSO MAKES HIS LIVING USING A TAPE MEASURE, ORDERED A SPACER PLATE TO MOVE HIS PROP FORWARD FOR THE COWLING HE HAD FROM HIS OLD ENGINE INSTALLATION .HE MEASURED AND FIT AND MEASURED AGAIN AND WROTE THE NUMBERS DOWN FOR THE SPACER THICKNESS HE NEEDED. AT THE SAME TIME HE ALSO MEASURED FOR THE BOLTS.

AFTER WAITING SOME TIME FOR THE MATERIALS TO ARRIVE HE FINALLY GOT THESE HOLY TRINKETS OF THE GODS AND LO AND BEHOLD, THEY FIT, EXCEPT FOR THE OLD COWLING. THE ORIGINAL BUILDER OF THE AIRCRAFT FELT THE PLANE WOULD FLY BETTER AND SLOWER WITH RIGHT THRUST AND DOWNTHRUST BUILT IN. MY BUDDY WHO IS ABLE TO REMAIN CALM UNDER THESE SITUATIONS SHRUGGED HIS SHOULDERS AND SAID, "OH WELL". ONE OF MY OTHER FRIENDS HAD ANOTHER COWLING THAT WOULD FIT HIS AIRCRAFT SO HE BOUGHT IT.

THE COWLING FIT PERFECTLY EXCEPT THE GODS DECLARED "LET THE SPACER AND BOLTS NOT FIT", AND THEY DIDN'T. SO HE WHIPPED OUT THE ROYAL RULER AND MEASURED IN HIS BEST PROFESSIONAL MANOR AND WROTE THE HOLY NUMBERS DOWN. HE ORDERED THE PARTS AGAIN AND THE GODS OF SUPPLY SAID " LET'S SCREW WITH THIS MORTAL AGAIN, LET THESE BOLTS BE SPECIAL ORDER AND LET IT BE BACKORDERED" AND THEY WERE. AFTER A MONTH OF WAITING AND ANTICIPATING, THE PARTS ARRIVED AND THE GODS SPOKE AGAIN AND SAID "LET THESE BOLTS NOT BE OF THE CORRECT LENGTH" AND THEY WERE LONG -ENOUGH TO REACH INTO THE NEXT GALAXY. MY BUDDY NOW SLIGHTLY PERTURBED REMARKED "OH WELL".

I DECIDED TO COME TO THE RESCUE TO HELP IN THE MEASURING DEPARTMENT. I LOOKED FOR A THREADED ROD WITH A NUT ON IT, TO INSERT INTO THE HUB AND SPACER TO ACCURATELY MEASURE THE LENGTH OF THE NEEDED BOLT .HOWEVER, BECAUSE I AM THE MOTHER OF ALL PACKRATS IT WAS HARD TO LOCATE THE ROD IN TIME, IN MY NEST OF GOODIES. MY BUDDY SAID HE SOLVED THE PROBLEM WITH A PIECE OF WIRE TO SLIDE IN THE HOLE. BEING THE WAY I AM I WALKED AWAY SHAKING MY HEAD AND LET HIM CONTINUE HIS MERRY WAY. HE MEASURED AND POKED AND WROTE THOSE NUMBERS DOWN. CALLING THE GODS OF SUPPLY AND VERIFYING THE CORRECT NUMBER AND SIZE, THE NEW BOLTS WERE ORDERED.

THE SHINY GLEAMING BOLTS ARRIVED AND GUESS WHAT?, THEY DIDN'T FIT. AFTER MY BUDDY REPAIRED THE HOLE HE CREATED IN THE SIDE OF THE METAL, HANGAR WALL WITH HIS HEAD, WE FOUND OUT THAT THE SUPPLIER SENT THE WRONG SIZE BOLT , WHICH IF THE CORRECTLY ORDERED NUMBER WAS SENT IT WOULD BE TOO SHORT ANYWAY. I FINALLY FOUND THAT THREADED ROD AND NUT SLIPPED IT IN THE HOLE AND IT WORKED TO MEASURE THE LENGTH. IF YOU THINK THIS SAGA IS OVER, YOU'RE WRONG. THE NEW BOLTS WERE A BACK ORDER ITEM, WHICH WOULD PROBABLY TAKE TILL THE NEXT MILLENNIUM TO LOCATE ACCORDING TO THE SUPPLY GODS. SO TODAY MY FRIEND DECIDED TO SPARE THE BOLTS AND SHORTEN YE OLD (NEW) COWLING , WHICH WOULD HAVE SAVED 2.5 MONTHS AND A WHOLE LOT OF SHIPPING EXPENSES.

P.S. ONE PROP SPACER FOR SALE AND SOME WRONG LENGTH BOLTS TOO.

WARRON GRAY (447WG)
7300 WEST MC NAB ROAD
SUITE 215
TAMARAC FL. 33321
H. 305-749-6783
BUS. 305-722-1350

THE EXHAUST GAS TEMPERATURE SYSTEM (E.G.T.)

I've been active as a Corporate pilot and an A&P-mechanic since before the venerable E.G.T. gauges were invented; so I kinda understand the system. Matter of fact, I date back to when VOR's were just coming in (I'll bet few of you know that the first VOR's didn't have a needle, but used an oscilloscope instead). But enough of my antiquity.¹

In reading back thru various KR flight reports, I always seem to run across the same phrases: "in cruise, climb or on takeoff etc my E.G.T. was ____°F." Are these facts or falacies?

An S.G.T. system consists of a sensitive gauge which usually reads from 1200° to 1800°F, a probe (or probes) mounted to the exhaust pipe(s) and wiring connecting the two together.

Most good E.G.T's do not have temp markings on them, only the real cheap ones (I don't know why) and the real expensive ones that are actually calibrated, hence, we don't really know what exact temp the E.G.T. is, nor do we care, just so we know where it is in relation to the peak or maximum attainable temperature. I've seen gauges that peak low while some will run off the top of the scale, so all of our references to E.G.T. should state "____° below peak."

An E.G.T. normally tells us at what temp the fuel/air charge we're burning peaks out at, and this varies with: 1-compression ratio, 2-fuel brand, 3-density altitude, 4-carb air temp, 5-percentage of power we're demanding from the engine. 6-ignition timing, 7-number of spark plugs that are firing etc., 8-the actual ratio of fuel to air that's going into the cyl's.

The point at which the E.G.T peaks is of great importance to us because it is the hottest temp, attainable on that day, at that altitude, at that temp., with that brand fuel, at that percentage of power etc and is then used as a yardstick from which we want to conduct all other operations. Or, in other words, it's the temp, we want to stay away from. Operation at or near peak E.G.T. at high power outputs can lead to detonation (that pinging we hear in our cars but can't hear in our planes because of all the wind noise) and ultimately to that destructive pre-ignition, which can & will bum exhaust valves, burn holes thru pistons or just plain blow cylinder heads off.

Finding peak E.G.T. is something we don't want to do at any other place except in cruise, or on the ground while setting up a carb, at reduced power (normally at 75% power) and once established is usually used for the peak for the day and then is good for a rough idea where peak is for several flights to come, as good S.G.T.'s don't drift around too much.

To find peak (assuming you have a mixture control) you should slowly lean the engine cut over a 20 - 30 second period to where the E.G.T. needle will not climb any higher. You may or may not notice a little roughness as you approach this temp., this is normal. Notice on the graph below how power drops off before peak S.G.T is reached. After establishing the peak S.G.T., the mixture should then be richened to the appropriate E.G.T. reading for cruise (see chart). If you don't have a mixture control, you could slowly close your fuel valve down to find peak (try this on the ground—a dead stick landing in your KR may ruin your whole day).

As I mentioned earlier, the E.G.T will vary due to quite a few factors. Only some of these do we have a bearing on. 1- compression ratio is fixed, 2- fuel brand - we don't see much variance in avgas, but with auto fuel - who knows] (but do use fuel with high enough octane rating), 3- density altitude, again not much we can do about that, 4- carb air temp- just keep it as cool as you can - and don't fly around with the carb heat on (this would actually make it run richer, but put out less power), 5- percent of power - this is one of the major factors we have control over. 6- ignition timing, definitely something we can control here. keep your ignition timing set correctly. A late timing will act just like #7 below, 7- number of spark plugs firing -I'm not saying to shut any of them off in flight (they sometimes take care of that themselves) but you guys running single ignition will always see higher E.G.T.'s than those who have dual ignition. This is due to the fact that with single ignition, (the fuel/air mixture burning at a constant rate), when the mixture is ignited at one point only, when the exhaust valve is opened, the exiting charge is still burning, (same symptoms as late timing), 8- fuel/air mixture, the major factor that we can control.

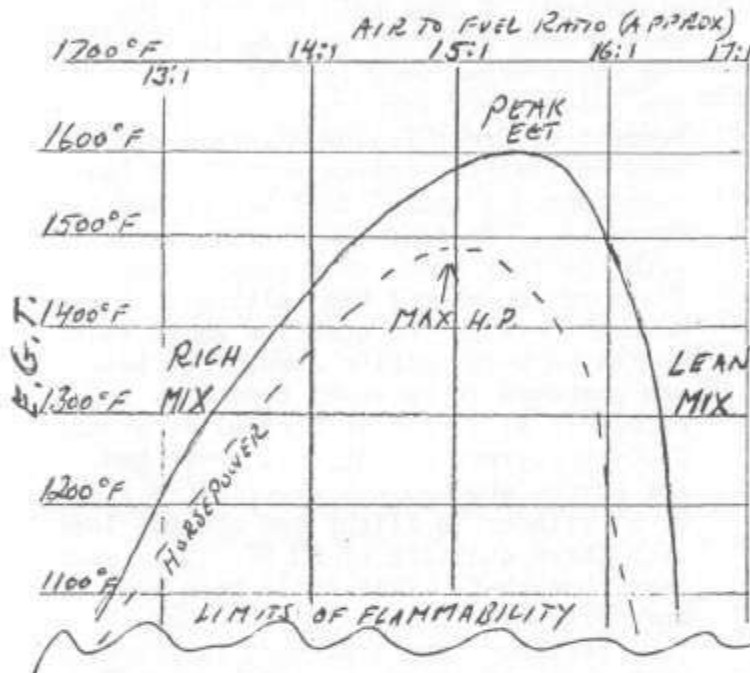
Heedless to say, we shouldn't be messing with mixture too much or. takeoff and climb unless we're at such a high density altitude that our carb. is running so rich that our engine is rough and/or we can't get full power. But rather we need to know where it is running normally (this is especially important to those of you operating carbs that have to be set for

the correct mixture throughout all power ranges.) (POSA etc). Setting up one of these type carbs should only be attempted with the aid of an E.G.T. gauge.

A normal float type carb, if it's too rich or lean, can only be changed by installing a larger or smaller main jet, - but you should check it out with the aid of an E.G.T. so you at least know where it's running.

Even if you have to borrow an E.G.T. to set up your carb, do it. But, if you have a mixture control, I'd recommend installing one permanently. If you lack the panel space or the ** weight carrying capability - get rid of the rate of climb or the chrome plated panic button or some other less needed trinket, because an E.G.T. can be a very valuable performance and diagnostic tool.

See the graph below for an approximation of power output vs. E.G.T. - note that peak power output is around 125°F on the rich side of peak. Normal operation of an air cooled engine dictates that extra fuel be consumed (richer mixture) at higher power outputs to help cool the engine, hence the lower desired E.G.T. readings at full power and climb compared to cruise readings (see second chart, flight condition vs. desired E.G.T. readings).



flight cond	percent power	desired E.G.T. reading
takeoff	full power (up to 100%)	150-200° rich of peak
climb	75-85%	125-150° rich of peak
cruise	70-75% at-tainable up to 7500'	75-100° rich of peak
cruise	60-65% at-tainable up to 9500'	50-75° rich of peak
economy cruise	50-55% at-tainable up to 11,500'	25-50° rich of peak
letdown	usually under 50%	25° rich to peak

As you can see from the above charts - too rich is almost as bad as too lean. Too rich a mixture can cause, 1- lack of power, 2- spark plug fouling, 3- oil contamination, 4- valve sticking etc. It's important to get the mixture set in the correct range for maximum performance and engine life.

I hope my food for thought hasn't confused too many of you. But like I said in the beginning, I've heard so many people state that their S.G.T. was such and such and without knowing where it peaks at, that they could be operating at a dangerously high (near peak) E.G.T. or at a power robbing, fuel guzzling low S.G.T.

Many people think they can set their mixture properly by sound, but I don't think the majority of us can get very close that way. Some even think they can set the mixture correctly by observing the cyl head temp, but mixture changes only affects cyl head temp, approximately 9°F for each 25°F change in E.G.T. and only after 3 or 4 minutes, so it's not a good way to set your mixture. Besides, not many can detect 9° or even 18° difference on a cyl head temp, gauge and that could be the 50° too high E.G.T. that's causing your valves to burn.

I don't want to sound like an alarmist, but without the E.G.T. system, we're still no better off than 1-a. bur and Orrville were!

John A. Sickafoose
6h2 Ray Ave N.4.
New Philadelphia, Oh 44663
(216) 303-3960

I want to relate two experiences I had this summer with my KR-2 because there may be others in this position and not know it yet. I will relate just the facts and you can form your own opinions.

I have a MAPI 1835cc engine with HAPI case and alternator. On June 11, the alternator quit during a flight. I have a voltmeter and was able to monitor the battery during my half hour fight back to home base at Stanley. I have dual electronic ignition. Upon landing, I could hear something scraping in the engine when I turned the prop. I removed the engine and discovered the problem was the magnets in the alternator had quit. At 221.5 hours, Steve said I did much better than most people. Steve sent me a new alternator and flywheel and with \$25 worth of machine work to the case I was back in business. The moral of this story is that if you have a HAPI alternator that hasn't failed yet, it will and the cheapest way I could find to fix it was to call Steve.

This story goes back to June, 1991 when I read an article in the Canadian General Aviation News (similar to AOPA). The article also appeared at the same time in an American magazine and I can't remember which one. This was just after Hosier bought out HAPI. The article states "Hosier learned that these engines were assembled using an undersize valve guide reamer when the Taylor family was assembling them". The article contained more information but this is the only thing of importance here. I was naturally concerned so I called Hosier and talked to Tim Kern to get the details. He told me to take the heads to an engine shop and have the guides reamed out .004" to .005" larger than the valves. In this case. .316" to .317". This job cost me over one hundred dollars because they didn't have the reamer and I had to buy one. The engine had 68.5 hours on the clock at this time. The engine worked fine except that the compression was erratic when I turned the prop by hand. On October 26, 1994, I left Stanley alone and was climbing through 2000 ft when the power dropped off, the engine shook and made about twice as much noise. Being fully awake by now I pushed the nose down, did a 180 and headed back to Stanley.

I expected the engine to quit when I reduced power so I didn't quit and the landing was uneventful. A compression check quickly told the story. I had a burned exhaust valve on number 1 cylinder. I took the head off and tried to remove the valve but it was stuck solid. When I did get it out, the stem was full of carbon and the guide was worn out. The engine now had a grand total of 251 hours since new. I took both heads to the engine shop and they told me that all of the valve stems were full of carbon and the guides were worn out. I called Steve Bennett of Great Plains Aircraft and he told me that the valves should not have been reamed larger. HAPI had reamed them correctly. He said the Hagnum engines with the four heads were reamed undersize. I assure you when I was talking to Hosier Motors there was no question as to which engine we were talking about. My heads are supposed to be ready tomorrow and I expect it will cost me a total of around \$500 to correct a problem I never had. For anyone who has not experienced a loss of a cylinder in flight you are not left with three quarters of 60 HP, it is much less than that. This could have been much more expensive because my wife and I had just returned from a weekend in Haine.

Our flying season here goes from May to October. In 1993 I flew 65 hours. I expected to fly at least 100 last year but even with the loss of two months, I still flew 53 hours. Better luck in 95 I hope.

If you are looking for small GPS for your KR, the Garmin 55 AVD is excellent. This is one piece of equipment that was worth every cent. I have mine panel mounted using 12 volt aircraft power. It can be installed and removed in two seconds.

There are a number of ground adjustable propellers on the market now and if anyone has tried one on a KR, I would be very interested in hearing from you.

Kevin Layden
25 Pondicherry Cres.
Dartmouth, Nova Scotia
Canada, B2W 5C4
902-462-5813

Pin Gear Latch Concerns

I've recieved some correspondance from some other KR builders as well regarding the Photos of the retract mechanism shown in an earlier newsletter. Two of these letters mentioned experiences of failure with similar mechinisms, and I thought I would pass the information on to the other readers. First, the photo shows a gap between the latch pin assembly and the plate. The latch pin brackets mounted on the spring bar, should be closer to the latch plate than shown in the photo. This will reduce the moment arm on the latch pin and decrease Jhe rotational forces applied to the "I" beam latch brackets, which failed in one readers unit. Another reader reported failure of the AN-3 bolts at the wheel casting to spring bar attach point upon rollout. In my assembly. I have longer bolts due to a 1" spacer, so I went to AN-4 bolts for the wheel castings. Added weight too. I havent had time to reply to the KR builders who wrote me with comments/suggestions, but hope to soon.

To other readers considering the latch-pin retract system, there were some good newsletter articles submitted several years ago on problms with the latch pins locking etc. So the system is defmately not perfect. I would defmately recommend the FIXED GEAR option to new builders. I just happened to be well on the road at the moment, and am willing to accept some additional RISK in flight testing this assembly.

Regards
Ross Youngblood
1017 NE Diane PI
Corvallis, OR 97330
(503)753-7370

FOR SALE

Subaru engines: 1 1985 EA82 Turbo engine, COMPLETE with EFI, computer, wiring harnesses, turbo, belt drive accessories (alt, AC, starter, etc.), 5 SUBARU repair manuals for car and engine. This engine came from a test vehicle and has approximately 10,000 miles. The turbo is water cooled for extra reliability. VERY clean? \$1,400.00 for all.

ALSO a 2nd EA82 non-turbo engine, TBI injected. Car ran but engine may have gotten weather in it. May need work? Make offer.

VW 1835 engine, all new, Hyd lifters, split (scat) heads, HAPI ace case & flywheel with built-in alt. prop hub installed, dual electronic ignition, Zenith carb and extra misc parts, never been run. Might separate. Apart now for your inspection. Can assemble

Bob Stieg
174 Fox Run Lane
Byron, IL 61010
815-397-1533 days
815-234-2283 evenings

WANTED

Set of used hydraulic brakes for the KR-2.
Call:

Bill Jones
210-899-7697
210-899-4989

BULLETIN BOARD

Some articles have appeared in the newsletter concerning computer bulletin boards. Did you know that America Online has a section specifically for KR's? Also some of us communicate regularly through E-Mail. My mailbox is CompuServe 74056,250 and perhaps others would like to publish theirs through the Newsletter.

Paul O'Reilly
9 Craven Terrace
Derry, NH 03038

FOR SALE KR-2

Diehl wing skins, gear legs and mounts.
Rand wood kit and wheels (fuselage in late
boat stage). 1834 VW engine (some parts
required). Posa Garb and dual port intake
system (new). Some instruments airspeed,
alt, tach, compass, new strobe kit (not
assembled) and misc. other parts.

Russ Barnett
1153 S. Farm Rd. 201
Springfield, MO 65809
417-865-7218 evenings

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 214 MARCH 1995

FOR SALE

Collection of KR Newsletters with indexes.
Issue #1 dated 7/75 through Issue 206
dated 7/94, plus quarterly magazines by
Steve Bennet and some seminars which were
taped and transcribed.

Joe Wallace
515-782-8190 evenings

1995 SUN 'N FUN

The 1995 Sun 'N Fun KR Dinner will be held
on April 11 at 7:00 p.m. at the Holiday
Inn South, Lakeland, Florida. Dinner
options are: Roast beef, baked ham or
chicken at a cost of \$13.00/per person.
Sign up at the KR booth. For more info,
contact:

Virgil Salisbury
5445 SW 89 Place
Miami, FL 33165
305-271-3608

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN



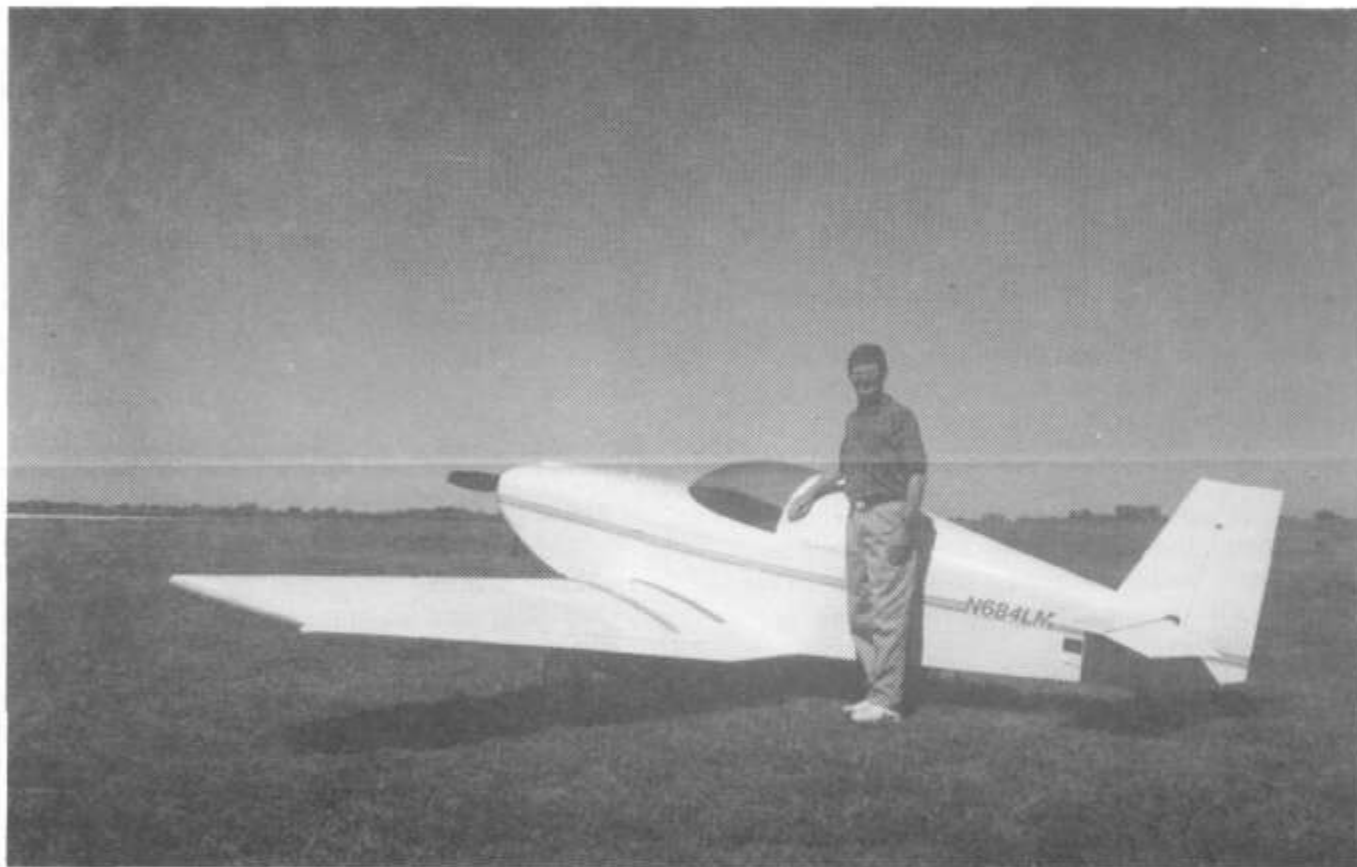
KR NEWSLETTER

ISSUES 215 & 216
APRIL & MAY 1995
SPECIAL INDEX ISSUE



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



N684LM, MONTE MILLER, DENTON, TEXAS

One of the great KR builder mysteries involves the decision as to what pitch prop to hang on the nose of our soon to fly aircraft. Most everyone agrees on the 52-inch prop diameter for the 1600 based VW powerplant...most everybody...but what pitch?

CONT'D PAGE 2

I recently removed a Hegy 52 x 48 that proved to be too much club for 684 LM's 1835 V-dub. Sure, top end was a thrill; it just took a few days to get there.

A former Sonerai driver gave me a slim, trim Great American 52 x 45 to try. Replacing the Hegy, which many of you know has a thick hub, left enough spinner cut out space to all but permit prop bolt replacement without removing the spinner...only slight exaggeration. So, buy and fit a new spinner to match the prop. Sorry, Honey, but we can't buy groceries this week, either.

Here's where things got interesting. After the spinner trim work, prop installation and tracking and everything buttoned up, the prop felt loose; check that, not felt loose, was loose.

Pull everything off while fighting a fairing stout anxiety attack. What the "hey" is wrong? Pull the cotter pin that passes through the cross drilled hub and prop hub bolt; slight fretting noted on the pin. Slip a 30mm socket on the hub bolt and sure enough, not even finger tight.

My engine manual specs 90 ft/lbs torque for the prop hub bolt. My trusty beam-style wrench read slightly over spec after lining up the cotter pin holes during engine assembly.

So, what gives? My best guess is based on my examination of the parts prior to initial assembly. Both the crankshaft and the prop hub require a matching taper. I recall feeling machine marks on both parts; tiny ridges formed as a result of the matching operations during manufacture. I'd bet the components, even though torqued to specification during assembly, experienced a "bedding in" effect, smoothing down the small machined marks, and effectively loosening the fit. As I said, it's just my guess.

This problem was noted after twenty-two hours of engine operation and luckily, before anything traumatic occurred.

I would suggest and encourage anyone using a tapered hub to spend the required time and recheck the torque value of the prop hub bolt. A cotter pin and a woodruff key were the only things between me and a really bad day.

Monte Miller N684LM
190 Parkside Dr.
Denton, TX 76201
817-566-5871

NEW FUEL DELIVERY SYSTEM

Have all new fuel delivery system on the KR. Removed the Posa, although I'm not really mad at it, and installed a Zenith from Gracs. That short sentence represents weeks of work to machine a carb flange, build a carb heat box and heat muff, install all the required cockpit controls, modify the cowl and refinish ...Now we get to go through the tuning drill again.

Was able to correct 684LM's nasty habits during the landing rollout by checking and adjusting the gear alignment. Had some toe-out that made touchdowns really exciting. Now, with the wheels pointing straight, I can't blame the plane for runway jitterbuggin'.

Took the tiny KR tailwheel and let 'em put it back on the grocery cart where I stole it. Found a six-inch wheel that fit the tailwheel yoke, so that was easy.

Soon as our spring crosswinds drop below 25 it'll be time to roll outta the hangar. 'Til then I think I'll just polish my spinner.

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871

OTHER IGNITION OPTION

From The Dragonfly Builders and Flyers Newsletter

Mark Snow of Carlsbad, NM reports that MSD Ignitions out of El Paso, TX makes a complete line of ignition systems popular with the Big Buck car racers. Buck designed an interface circuit to get these two parts to talk to each other and found that they are compatible with a MAPI trigger unit that plugs into the distributor hole. It is also compatible with the original coils. After 50 hours, the unit has worked flawlessly. The benefits in using this type of ignition are:

- 1) Complete control of timing. The three adjustments for timing are initial startup, rpm and slope. Setting these adjustments is easy and takes about 15 minutes.
- 2) Through much less current drain, the MAPI system would use 6 to 7 amps from the system buss whether the engine was running or not. The new system uses less than 4 amps at 3500 rpm and less than 1.12 amp when the engine is off.
- 3) The ability to automatically advance the tim-

ing at altitude by sensing manifold pressure, which increases engine efficiency.

Also, the ignition unit has the plug-in rev limiter which will limit max rpm. Because of the electronic advance, he can run about 6 degrees more total advance than the 25 degrees the mag runs, so he feels the engine develops a little more power. He says he would be glad to help others, and although his system is on a VW, it would work just as well on any other horizontally opposed 4-cylinder engine using a crank trigger set-up.

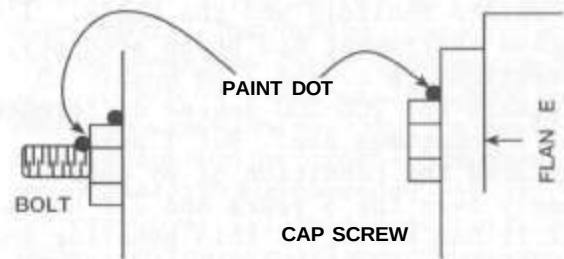
The best prices he's found on MSD parts are from Summit Racing, Tel 216/630-0200. Parts wanted would be the MSD Timing Computer, Part No. 8981 at \$156.00 and the MSD CI Motorcycle Ignition, Part No. 4210 at \$183.69. They will not work together right out of the box. He anticipates a cost of \$80.00 to install the interface board in a timing computer. You can contact Mark Snow at 704 N. 3rd, Carlsbad, NM 88220, Tel 505/885-9105 day or evening,

NAIL POLISH TRICK

from Stuart L. Faber of Cincinnati, OH

For a number of years I owned a Sportavia RF-5B motorglider made in Germany. The workmanship was typical of German craftsmen. As a WWII bomber mechanic and inspector, I was impressed with a detail used on the motorglider.

Nearly every fastener was marked with a small dot of red paint placed so that any movement would show up easily on any inspection of the parts. In addition to showing up any movement, it would also be a very useful method of checking off a final inspection of the fastener. I know most mechanics have had a few experiences of finding one of a set of fasteners not completely tightened or of wasting time checking and rechecking fasteners several times to be sure they were tight because it could not be remembered if



they had been checked.

Most of us have found that with multiple fasteners on a component, it often pays to just snug them up until all are fitted and then torque them up to specs. At that point, the paint dot is applied and indicates the job has been completed and checked. No need to keep rechecking. Later, if the paint line is broken, it indicates something was moved.

It seems like it could speed up final inspections and relieve some doubts about loose ends.

**EGT- PLAY IT SAFE!
GET THE WHOLE PICTURE!**

Just a note to say how informative John Sickafoose's article (Issue #214, March 1995) on EGT systems was. I fully agree with the importance of this instrument in assuring reliable operation of our experimental motors. There are a lot of us out there being creative with power plants and fuel systems and it just doesn't make sense to exclude the one instrument which gives you an instant picture of how your mill is running. I have installed a 4 way selectable system in my KR-2 and it has proven to be valuable not only for setting up the carb but also for diagnosing problems with the induction system.

It consists of a single EGT instrument connected through a 4 position rotary switch to an EGT probe in each of the four exhaust stacks. The readings I get during different phases of flight are quite interesting. Each of the four cylinders behaves differently in climb, cruise and let-down. I am constantly adjusting the mixture to achieve a reasonable compromise peak. This difference in readings is, I am sure, related to variations in the fuel charge being delivered to each of the cylinders. I have fiddled with the carb, the intake manifold and the heads. I've checked instrument and probe accuracy, connections, etc. and I am unable to eliminate the 200-300 degree difference that I sometimes see. But I have monitored the condition of my engine closely over the 5 years and 275 hours that it has exhibited this behavior and I am happy to say that my engine has run clean and smooth with negligible plug or valve accumulation. I aggressively, but intelligently, lean my mixture at all times during engine operation. This is not out of necessity as my engine will run OK on rich mixtures but out of a desire to stretch the life of my engine and minimize plug and valve maintenance. I could not do this without a full EGT system.

The point is that even a single EGT probe placed on an arbitrary cylinder or at the juncture of cylinders in a manifolded exhaust system may give you an

erroneous picture of how your engine is behaving. The same caution applies to CHT probes. Variations in compression, fuel charge, cooling air flow, etc make a single cylinder head temperature gauge a roll of the dice. As with my EGT, I have coupled four CHT probes through a 4 position switch to get the low-down on cylinder temps and I have seen the same quirky variations.

You can't have too much information on your engine. Play it safe! Get the whole picture!

Howard Kaiser N39HK
1339 E. Carmen St.
Tempe, AZ 85283
602-839-6387
CompuServe 74267,3454

!!!!!!!!!! HELP !!!!!!!!!!!

I APPRECIATE EVERYONE WHO HAS CONTRIBUTED ARTICLES IN THE PAST. I AM IN NEED OF MORE PHOTOS AND ARTICLES. IF YOU HAVE NEVER CONTRIBUTED OR IT'S BEEN A WHILE SINCE YOUR LAST CONTRIBUTION, PLEASE TAKE A FEW MINUTES AND DROP US A LINE.

THANKS!

EARL

BACK ISSUE INDEX

Items from Newsletters

Oct 1, 1989	Air Vent	Installation of a NASA air duct
Mar 1, 1994	Balance	*509 lbs empty, CofG (7.77") 197.35 mm aft of datum
Mar 1, 1994	Balance	*Main Gear arm 5" (127mm), Fuel arm 2" (50.8mm)
Mar 1, 1994	Balance	*Pax arm 28.5" (723.9mm), firewall 12" (304.8mm)
Apr 1, 1977	Bolts	Better bolt list - with location diagram
May 1, 1977	Bolts	Bolt list
Apr 1, 1979	Bolts	Thread and a half protruding from locknuts
Mar 1, 1978	Canopy	Dan Diehl's canopy design
Feb 1, 1981	Canopy	Fitting Gull Wing and fixed windshield
Mar 1, 1983	Canopy	Rollover bar made out of spruce
Oct 1, 1989	Canopy	Latch mechanism from Cozy
Jan 1, 1990	Canopy	Canopy Installaton
Jan 1, 1990	Canopy	Fitting premoulded canopy
Mar 1, 1990	Canopy	Gull Wing canopy door installation - worth reading
Mar 1, 1992	Canopy	Canopy stay - better than retaining chain
Jan 1, 1993	Canopy	Instructions on how to fit canopy
Mar 1, 1994	Canopy	Latching mechanism
Jul 1, 1994	Canopy	Sanding techniques for windshields
Jul 1, 1994	Canopy	Use Plexiglass for windshield as it is not affected by auto fuel
Oct 1, 1975	Controls	Elevator +30 deg, - 20 deg. , Rudder +- 30 deg.
Oct 1, 1975	Controls	No control stops - ailerons inboard 1-1/2" up, 3/4" down
Aug 1, 1977	Controls	Trim tab slack should be less than 1/16" to avoid flutter
Aug 1, 1977	Controls	Vne unbalanced ailerons 160 IAS, balanced 200 IAS
Nov 1, 1977	Controls	Elevator cable goes through fin spar - 1/4" dia hole
Nov 1, 1978	Controls	Add strong spring to rudder and incorporate rudder trim
NJV 1, 1978	Controls	Use fishing line sinkers as aerodynamic balance weights
Dec 1, 1978	Controls	First flap design
Apr 1, 1979	Controls	Dual Controls - good design
Feb 1, 1981	Controls	Connect Rudder Cable to rudder pedals 4-1/2" from hinge
Feb 1, 1983	Controls	Not very good example of dual controls
Mar 1, 1983	Controls	Rand Rudder pedals operate with toe brakes on top for cables
Aug 1, 1983	Controls	Aileron limits: +20 to -10 deg
Aug 1, 1983	Controls	Elevator limits: +30 to -20 deg
Aug 1, 1983	Controls	Rudder limits: +30 to -30
Nov 1, 1983	Controls	Use castellated nuts and split pins in all control bolts
May 1, 1985	Controls	Make control column a few inches higher to lessen sensitivity
Sep 1, 1989	Controls	Trim Tab control panel
Feb 1, 1991	Controls	Spacers on Aileron pushrod - 1/8" long
Apr 1, 1991	Controls	Mount rudder pedals with nylon blocks
Jun 1, 1992	Controls	Dual Controls
Nov 1, 1992	Controls	Dual stick design - the good one
Sep 1, 1993	Controls	Oilite bushings for controls
Oct 1, 1993	Controls	Hinge bushings
Nov 1, 1993	Controls	Throttle quadrant with friction nuts
Mar 1, 1983	Controls 1	Rand offer a revised control stick with a pushrod to the rear
Mar 1, 1983	Controls 2	of the rear spar
Aug 1, 1983	Controls	Rudder cable exit: 19" forward of vert stab spar
Aug 1, 1983	Controls	Rudder cable exit: 4" up from longeron
Feb 1, 1982	Cowl	Inlet 30 sq ins, Outlet 90 sq ins.
Nov 1, 1989	Cowl	How to make a cowl, lots of photographs
Mar 1, 1990	Cowl	Entry area 35 sq in, exit 44 sq ins.
Jan 1, 1992	Cowling	How to attach a cowl - good photographs and drawings

Aug 1, 1984	Electrical	Use copper foil for antennas
Apr 1, 1990	Electrical	Hapi alternator only able to deliver 17 amps at 3,600 rpm
Jul 1, 1990	Electrical	RST's "Pastic Plane Antenna anthology
Apr 1, 1991	Electrical	Method to make wing light covers and tail light
Feb 1, 1992	Electrical	Wiring a Honda alternator - Mosler Motors
May 1, 1992	Electrical	Noise eliminator JC Witney & Co No. 03-7093N \$17.95
Apr 1, 1993	Electrical	Route cables through skins and wing fillet out of cockpit
Apr 1, 1993	Electrical	Routing cable through wing fillet
Jul 1, 1994	Electrical	Strobe light capacitors fail after storage
Jul 1, 1994	Electrical	Wiring solenoid to avoid damage to electronics
Sep 1, 1989	Elevator	Fairing between stabilizer and elevator - how to do it.
Oct 1, 1977	Engine	Use VW bellows to control cowl flaps - get one
Sep 1, 1978	Engine	Mount Gascolator at nearly the same height as carb to stop vapour I
Sep 1, 1979	Engine	Check for too rich, turn off fuel if engine speeds up too rich
May 1, 1983	Engine	Revmaster cast crankshaft breaks
Jun 1, 1983	Engine	Put a curved guide at the exit of the engine cooling air
Jun 1, 1984	Engine	Engine will run with wrong ignition sequence
Sep 1, 1984	Engine	Great Planes 1835 cc, 160 lbs, \$3400
Aug 1, 1985	Engine	Use filtered air on the ground, ram in the air
Oct 1, 1985	Engine	Use 3" x 3" angle for engine mount backup plates for 0-200
Dec 1, 1988	Engine	Great Planes, P.O. Box 1481, Palatine, IL 60078
Feb 1, 1989	Engine	Great Planes 2600 cc, 92 hp, 20 amps, complete 208 lbs
Sep 1, 1989	Engine	Mounting back plates - 1-1/2 x 1-1/2 angle - Dennis Seal
Dec 1, 1989	Engine	Teardown of Revmaster 2100, had cast iron crankshaft
Feb 1, 1990	Engine	Ellison Needs 5 psi pressure
Feb 1, 1990	Engine	Mercury outboard engine cables, stainless and teflon, no rust
Feb 1, 1990	Engine	Mount rubber bushins 71032
May 1, 1990	Engine	George Toths: Revmaster 2100D 75 hp
Oct 1, 1990	Engine	Test fuel flow at at least 18 degrees nose up
Dec 1, 1990	Engine	Mosler supply throttle cables use solid core cable.
Feb 1, 1991	Engine	Heat box for Ellison carburettor
Apr 1, 1991	Engine	Good photographs
Apr 1, 1991	Engine	Rex Taylor's "How to build a reliable VW aircraft Engine"
Jun 1, 1991	Engine	Baffles made out of glass and GE Silicone caulking
Jul 1, 1991	Engine	Engle W-100, .42 lift, 270 degree duration
Oct 1, 1991	Engine	Compression Ratio = Cyl Displ + Deck Volume + Head Vol
Oct 1, 1991	Engine	Deck Volume = Bore x Bore x Deck Height
Oct 1, 1991	Engine	Displacement = Bore x Stroke x .0031416
Nov 1, 1991	Engine	Baffles use 6061 x .032, good photographs
Jun 1, 1993	Engine	Timing VW engines
Jul 1, 1993	Engine	Notes on timing
Mar 1, 1994	Engine	Setting the Posa carburettor
Feb 1, 1981	Epoxy	Put microslurry on foam before glassing, glass while micro is wet
May 1, 1983	Epoxy	Need to sand cured epoxy to remove wax layer left after cure
May 1, 1983	Epoxy	Squege wet micro over foam before glassing
Aug 1, 1988	Epoxy	RR epoxy is Sheel Epon 813, and General Mills Versamid 125
Apr 1, 1990	Epoxy	Methanol weakens West System Epoxy, normal fuel doesn't.
Jul 1, 1994	Epoxy	Post heat cure epoxy
Jul 1, 1994	Fibreglass	Repairing fibreglass damage
Nov 1, 1988	Finish	Don't use featherfill in humid conditions
Jan 1, 1991	Finish	Scotchbrite pad with Alumiprep #33 and Alodine #1001
Jan 1, 1991	Finish	Then epoxy paint

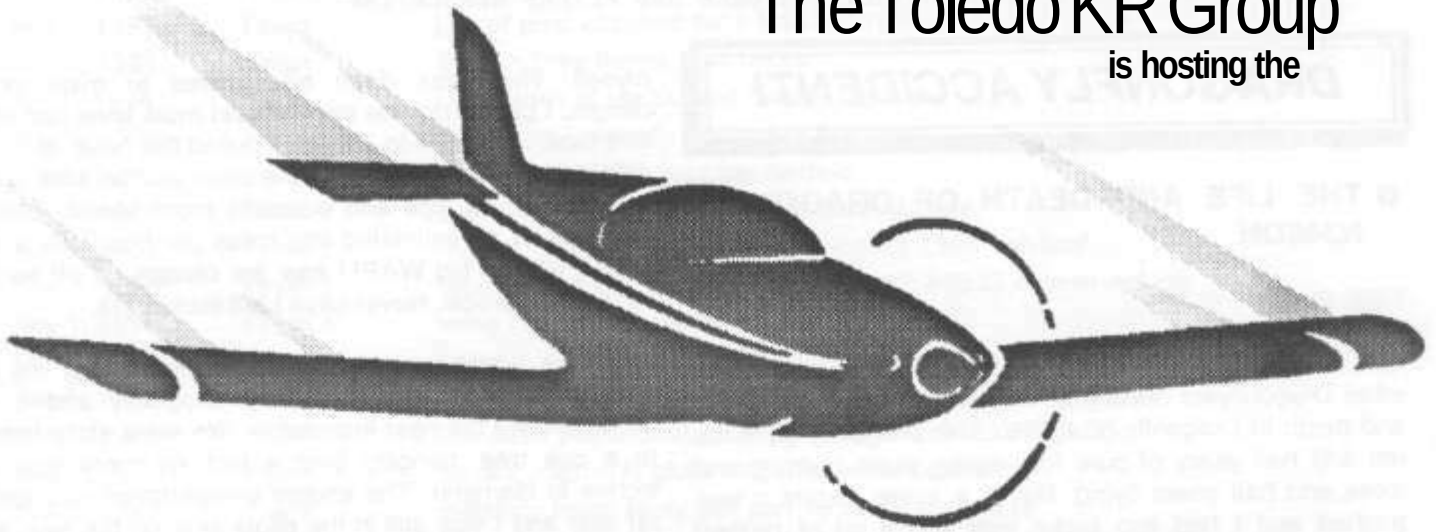
Jul 1, 1992	Finish	Scotchbrite, Aluma Prep, Alodine; blue crepe masking tape
Sep 1, 1993	Finish	List of products used for a total finish
Dec 1, 1993	Finish	System Three Resins, test notes
Jan 1, 1994	Finish	Description of the Dupont finishing system
May 1, 1994	Finish	The Viking Dragonfly method of finishing
Jun 1, 1994	Finish	More of the Viking finishing method
Nov 1, 1988	Finish 1	Use epoxy and glass spheres to finish surface
Nov 1, 1988	Finish 2	Dupont "Grey Fill and Sand" acrylic then 1986 Valvseal
Nov 1, 1988	Finish 3	then Dupont Centari Acrylic enamel with 8093S enamel reducer
Nov 1, 1988	Finish 4	using 793 Centari hardener
Oct 1, 1977	Foam	Leave trailing edge at least 1" thick while glassing first side
Apr 1, 1983	Foam	Liquid Polyurethane expands within 15 to 20 sec of mixing
Apr 1, 1983	Foam	Use liquid polyurethane foam to glue foam blocks in position
May 1, 1983	Foam	Instant foam only glues to gether while expanding
Nov 1, 1983	Foam	Installing foam: apply one part to each face and fit.
Dec 1, 1990	Foam	Don't join foam blocks with polyfoam
Jun 1, 1982	Foam 1	Joining using instant foam, paint one surface with one
Jun 1, 1982	Foam 2	component, the other surface with the other then join
Jan 1, 1983	Fuel	RR Tank is made out of polyester, use polyester to fit
Feb 1, 1983	Fuel	Fuel flow minimum 12 gal per hour during test
Aug 1, 1983	Fuel	Run a vent line to the gascolator to keep it cool
Nov 1, 1983	Fuel	Fual flow should be capable of at least 6 gph
Aug 1, 1984	Fuel	Use ester base polyurethane tubing or Tygon F-404-A
Oct 1, 1988	Fuel	Use Safety Poxxy with fuel tanks, not RR epoxy
Aug 1, 1989	Fuel	Assembly of RR Fuel tank
Oct 1, 1989	Fuel	Make sure the gascolator is wire locked
Dec 1, 1989	Fuel	Don't use sealer on aluminium tanks
Feb 1, 1991	Fuel	Fuel system including fuel pump and bypass
Feb 1, 1991	Fuel	Fuels system diagram for Posa - includes pump and bypass
Apr 1, 1991	Fuel	Removable forward deck instructions - detailed no drawings
Jul 1, 1991	Fuel	Fuel system using wing tanks and small header
May 1, 1992	Fuel	Complete diagram of fuel fittings
Nov 1, 1992	Fuel	Ellison carb uses -4 fittings. Fit Facet with -6 and -4 out
Nov 1, 1992	Fuel	Use -6 3/8 fittings with Aeroquip 303 hose
Jul 1, 1994	Fuel	Conductive fibreglass Lundy Technical Centre FL
Jul 1, 1994	Fuel	Don't use MIL-H-6000 for auto fuel
Jul 1, 1994	Fuel	Ground tanks using metallic screening
Jul 1, 1994	Fuel	Use auto lines, Stainless from EARs Perform. Products CA
Jul 1, 1994	Fuel	Use aviation grade sealants for fuel tanks
May 1, 1979	Fuselage	Vertical intersections - correct way to do it - Ray Creed???
Oct 1, 1975	Fuselage	Gussets made out of 5/8 x 5/8 or 3/32 ply
Sep 1, 1976	Fuselage	Belly plywood grain for and aft direction
May 1, 1977	Fuselage	Scarf ratio 10:1, 3/32 -> 15/16" scarf
Dec 1, 1977	Fuselage	Inspection ports from 1/16" plexiglass
May 1, 1979	Fuselage	Turtleback attached by strips of fibreglass to skin
Sep 1, 1979	Fuselage	Thrust line is .8" +-.2" below top surface of to longeron.
Aug 1, 1981	Fuselage	Firewall should be 3/4 + 1/4 above main longeron
Jan 1, 1983	Fuselage	Fit clear plastic inspection holes in fuselage sides
Apr 1, 1990	Fuselage	Access panel out of bottom rear
Jul 1, 1990	Fuselage	Photographs of building the frames
Dec 1, 1990	Fuselage	Use 5/8 x 5/8 for gussets
Feb 1, 1991	Fuselage	Method of bracing fuselage sides during boat assembly

Oct 1, 1991	Fuselage	Glue verticals in place before diagonals
Nov 1, 1992	Fuselage	Setting the firewall square with longerons - read it
May 1, 1993	Fuselage	Notes on making fuselage frame
Mar 1, 1994	Fuselage	Building the fuselage
Aug 1, 1994	Fuselage	Installing the lower engine mount shelf
Aug 1, 1994	Fuselage	Jig for fuselage sides
Aug 1, 1977	Gear	Tyre pressure 22 to 24 psi
Feb 1, 1981	Gear	Ensure toe out rather than toe in.
Apr 1, 1986	Gear	Fit gear to spar before mounting spar in fuselage
Apr 1, 1990	Gear	Dn Diehl Tri Gear details - 15 lbs
Jun 1, 1990	Gear	Dan Diehl on gear, good photographs
Dec 1, 1991	Gear	Disk Brakes thin out towards the rim
Feb 1, 1992	Gear	How to fit hydraulic brake cylinders - using RR pedals
Feb 1, 1992	Gear	Hydraulic Brakes and rudder pedals
Nov 1, 1993	Gear	Tailwheel spring and wheel mounting bracket
Jul 1, 1986	Gear 1	Fixed Gear mods: 3/8" firewall, hang rudder pedals from top
Feb 1, 1989	Gear 2	Three mounting castings, bolt holes different from retract.
Feb 1, 1989	Gear 3	Fixed Gear mounting 1/4" doubler on Spar, 3/32 ply on sides
Jul 1, 1986	Gear 4	don't install floor until you have the gear
Jul 1, 1989	Index	Index to Newsletters
May 1, 1979	Instruments	Static port location 12" aft of cabin, 6" below top longeron
Oct 1, 1989	Instruments	Don't change the lengths of cables of EGT or CHT
Oct 1, 1989	Instruments	For every 10 deg over 210 deg, oil life is reduced by half
Oct 1, 1989	Instruments	Oil Temp range 180-190 deg., no lower
Oct 1, 1989	Instruments	Take oil temp from rear of oil sump.
Jun 1, 1990	Instruments	Instrument Panel installation, .063-6061
Jun 1, 1991	Instruments	Static system diagram
Aug 1, 1991	Instruments	Radio Shack No. 63-842 digital thermometer with probe
Jul 1, 1991	Instruments	Fibreglass instrument panel, wood mould covered with
Jul 1, 1991	Instruments	Johnstons floor wax then 5 layers of 9 oz
Aug 1, 1980	Performance	605lbs, 2100 Revmaster, 145 IAS cruise
Nov 1, 1980	Performance	572 lbs, 1834 VW, 52.45 prop
Feb 1, 1983	Performance	Empty 463 lbs, Gross 793 lbs, 1700cc, 140 mph
Jun 1, 1983	Performance	455 lbs, 1800 VW, 135 mph cruise at 3200 rpm
Aug 1, 1983	Performance	Vmax man 135 mph IAS
Jan 1, 1984	Performance	575 lbs empty, Revmaster 2100D,
Sep 1, 1984	Performance	580 lbs empty, Revmaster 2100, 160 mph at 3500 rpm
Jan 1, 1985	Performance	Revmaster 2100, 558 lbs empty, 140 mph true cruise
May 1, 1985	Performance	628 lbs, 165 mph max., Hapi 60-2, cruise 140 mph
Aug 1, 1985	Performance	625 lbs, 1835 VW, 124 mph indicated at 8,000'
Sep 1, 1985	Performance	628 lbs, 1835 Hapi, 180 mph true
Apr 1, 1986	Performance	502 lbs empty, 1834 VW, 155 mph cruise
Mar 1, 1988	Performance	560 lbs, 145 mph at 2900 rpm, gross 960
Mar 1, 1988	Performance	639 lbs empty, 140 mph, Hapi 60-2
Dec 1, 1988	Performance	2180 cc VW, 155 Cruise, 404 lbs
Jun 1, 1989	Performance	1835 VW, 562 lbs, Cruise 155 mph at 3100 rpm
Jun 1, 1989	Performance	1835 VW, 160 mph cruise, 635 lbs
Jun 1, 1989	Performance	2180 VW Great Planes, 575 lbs
Jun 1, 1989	Performance	550 lbs, VW 1835,
Aug 1, 1989	Performance	Empty 524 lb, 160 mph at 3400 rpm, rate of climb 1100 fpm
Jan 1, 1990	Performance	540 lbs, 170 mph with 2 up, Hapi 1835cc VW,
Feb 1, 1990	Performance	530 lbs, 1835 VW, Cruise 140 mph, max 150 mph, 48 in pitch

Mar 1, 1990	Performance	1835 VW, ISOmph
Sep 1, 1990	Performance	670 lb empty, Hapi 2180, 3100 rpm 150 IAS
Oct 1, 1990	Performance	3000 rpm gives 150 mph
Apr 1, 1991	Performance	630 lbs, 2180 VW, 192 mph on race circuit
Jul 1, 1991	Performance	600 lb empty, 1835 VW, 54 x 44 prop, 145 mph max
Aug 1, 1991	Performance	688 lbs, 2100 VW, 80 HP, 129 kt cruise
Feb 1, 1992	Performance	634 lbs, 2100 cc VW, 3,000 RPM 125 mph, 52 x 50 prop
Jun 1, 1992	Performance	555 lb, 1835 cc VW, 54 x 57 prop, 3200 rpm 160 mph
Feb 1, 1993	Performance	Vmax 65 hp = 164.7 mph, 75 hp = 172.7 mph
Feb 1, 1993	Performance	Vmax = $K(HP/wing\ area)^{1/3}$, K = 175 for KR2, 145 for C172
Nov 1, 1993	Performance	1835 VW, 550lbs, 3200 RPM -> 150
Apr 1, 1976	Propeller	How to make a spinner
Aug 1, 1981	Propeller	Great American or Bernhard Warnke give best performance
Mar 1, 1983	Propeller	Maximum extension for standard VW is 3"
Feb 1, 1990	Propeller	Max speed at 3,000 rpm = $2.5 \times pitch$; $S = (P \times R)/12$ [12% slip]
Aug 1, 1984	Safety	Cover yourself with baby powder before sanding glass
Feb 1, 1989	Safety	Rubber Gloves BL73010, Best Manuf. Co. Menlo, Georgia, 30731,
Nov 1, 1978	Seatbelts	Make tapered tail block for shoulder strap attachment
May 1, 1990	Seatbelts	Shoulder harness mounting points
Jan 1, 1991	Seatbelts	Suggest connect to tail
Jun 1, 1990	Seats	Seat Installation
May 1, 1983	Spinner	Diameter 9-3/4", Length 12"
Mar 1, 1991	Spinner	Follow Tony Bingelis method to make a spinner
Oct 1, 1978	Tail	Horiz. Stab. Incidence table - ISOmph -1.5, 170 mph -1 deg
Oct 1, 1978	Tail	Horiz. Stab. Incidence: 130mph -2 deg, 120mph -2.5 deg
Apr 1, 1979	Tail	Use nylon shoulder washers from electronics shop for bearings
May 1, 1979	Tail	Forward spar of horiz. Stab, may be raised 1/8"
Jul 1, 1979	Tail	Trim cable should go over elevator spar.
Jun 1, 1983	Tail	Mount hinges on either side of tail surfaces.
Feb 1, 1984	Tail	Balance elevator
Feb 1, 1984	Tail	Make rear bulkhead out of 1/4" ply
Feb 1, 1984	Tail	Use gusset blocks on stab spar to longerons
Dec 1, 1988	Tail	Technique to glue triangular pieces to spar
Feb 1, 1989	Tail	Tail Ribs: make 90 angle from wood for clamp blocks
Apr 1, 1992	Tail	Use three hinges on tail for redundancy
Oct 1, 1975	Test Flight	Stress limits +/- 7G
Aug 1, 1977	Test Flight	How to determine where vibration is coming from
Feb 1, 1979	Test Flight	Forward Limit, 15%, Aft 40% - 7.2" and 19.2"
Apr 1, 1989	Test Flight	Don't attempt to turnback at less than 800 ft.
Oct 1, 1990	Test Flight	Glide ratio of 12 : 1 at 5 deg nose ?
Oct 1, 1990	Test Flight	Safe CofG range is 7.6" to 14.18" for a 950 lb aircraft.
Aug 1, 1991	Test Flight	#AC-90-89 Amateur Built Aircraft Flight Testing Handbook"
Aug 1, 1991	Test Flight	U.S. Govt. Printing Office, Washington DC 20402
Apr 1, 1993	Test Flight	Rate of Climb graph and Rate of Sink graphs
Feb 1, 1994	Test Flight	Notes on flying techniques
Nov 1, 1988	Tools	Drilling long holes in foam, use a tube in your drill
Aug 1, 1983	Weights	Horizontal stabilizer 7 lbs, elevator 5 lbs
Aug 1, 1983	Weights	Rudder 3 lbs, Horiz. Stab. 7 lbs, Elev. 5lbs
Aug 1, 1983	Weights	Wings 28 lbs with ailerons, no balance
Oct 1, 1975	Wing	RAF 48 Airfoil coordinates
Feb 1, 1976	Wing	Flapless Reynolds No. 7 mill. Flapped 3.5 million
Sep 1, 1976	Wing	Varnish surface where foam will attach

Aug 1, 1977	Wing	Airfoil shape - chord x numbers on rib drawing
Dec 1, 1977	Wing	Make outboard spars long enough to meet inboard
Sep 1, 1978	Wing	Fillet 1 ft behind fwd spar to 8" from fuselage at TE
Oct 1, 1978	Wing	Attach fittings: main - middle, rear lower - centre
Oct 1, 1978	Wing	rear upper - 1/8" above lower surface
Jul 1, 1979	Wing	Aileron spar held in by epoxy only with good contact with skins
Nov 1, 1979	Wing	Wing light cover from 3/32 lexan
Feb 1, 1980	Wing	Front and rear spars should rest on bottom longeron
Aug 1, 1981	Wing	Make drain holes 3/16" diameter
Apr 1, 1982	Wing	Dan Diehl Wing tip construction technique
Apr 1, 1982	Wing	Maximum winglet length is 18"
Jul 1, 1982	Wing	Leave trailing edge foam thick until glass on one side has set
Mar 1, 1983	Wing	Wicks Spar caps need to be laminated
Apr 1, 1983	Wing	Attach fitting holes should be reamed with straight reamer
Jun 1, 1983	Wing	Use 2 layers of glass on wings, three on LE, first layer at 45 deg
Aug 1, 1983	Wing	Maximum extension 18" each side
Dec 1, 1983	Wing	CofG between 15% - 35% of wing cord, 8" to 16" aft of LE
Jun 1, 1984	Wing	Build jack points into the wing
May 1, 1985	Wing	Using Birch Ply, ensure fuselage uprights further apart.
Apr 1, 1986	Wing	Aileron balance arm mounts 41" from inboard end
Apr 1, 1986	Wing	Mount aileron pulley brackets before foam
Apr 1, 1986	Wing	Mount horns and hinges on aileron spars before foam
May 1, 1989	Wing	Use 2" foam for wings, make a wing walk using foam ribs
Dec 1, 1989	Wing	Method of sanding spar caps to correct glassing angle
Apr 1, 1990	Wing	Drilling wing attach fittings accurately
Oct 1, 1990	Wing	Airfoil is RAF 48, developed in early 1920's
Apr 1, 1991	Wing	Suggestion to epoxy wing attach bolts in wing holes
Dec 1, 1991	Wing	Make a rib mask to align rib sections see diagrams
Sep 1, 1992	Wing	Washout: raise tip leading edge by .31"
Oct 1, 1992	Wing	Setting incidence and installing spars - good ideas
Jan 1, 1993	Wing	Aileron fittings, use countersunk screws instead of pan head
Feb 1, 1993	Wing	Aileron spar installation - worth reading
Jul 1, 1993	Wing	KR-2S wing spar and fuselage side construction
Oct 1, 1993	Wing	Incidence using degree reading protractor
Jan 1, 1994	Wing	Intermediate wing aerfoil sections for outer wing
Dec 1, 1993	Wing	Modified wing attach fittings, spacer between fittings

The Toledo KR Group
is hosting the



4th ANNUAL MIDWEST KR GATHERING

in conjunction with EAA Chapter 582's Fly-In

JUNE 17-18,

Fiberglass & Woodworking Forums

Awards • Banquet • Saturday, June 17

Early Arrival Party • Friday, June 16

Special Rates & Shuttle Available from the Comfort Inn South (419*666*2600 - mention KR Gathering)

METCALF AIRPORT (TDZ)
Toledo, Ohio

*for more information, contact Ron Smolinski at 419*882*8478*

DRAGONFL Y ACCIDENT!

• THE LIFE AND DEATH OF DRAGONFLY N345DH

Hello Spud,

This is a letter I never wanted to write, but I owe it to all the other Dragonflyers out there. This is the story of "The life and death of Dragonfly N345DH". This Dragonfly gave me ten and half years of pure fun, seven years building and three and half years flying. But in a single instant it was trashed and I had two broke legs and a lot of bruised feelings.

To start at the beginning, Sunday, September 18th, 1994 at 11:00 hours I took off from Tyler County Texas Airport. This was to test some airflow changes inside the engine compartment to determine the effect on CRT and oil temperature. I also had made a new fuel gauge for the feeder (header) tank. This gauge was similar to one defined in a previous newsletter with a visible float. Several obvious mistakes were made. I took off from an un-attended airport. This was to be a very short, local flight test. My ELT had a brand new battery installed, BUT was at home on the bench, that was my first mistake. During the flight I turned off the fuel pump to the feeder tank so I could observe the visibility of the float in the bright sun light. After running my temperature checks, I headed back to the airport, four miles away, I descended on a long, low approach, that was my second mistake. 2000 feet over the southeast Texas "Big Thicket Country" is not enough altitude. The engine quit, then I made my third and biggest mistake! I let my previous problems cloud my brain, I did not pull my head out in the sunshine soon enough and recognize the float was stuck at the top of the gauge, giving me the indication of a full (header) tank, which in reality it was **bone dry!**

Altitude had slipped away. I finally hit the fuel switch, but it was too late, the tree tops were coming up fast, restarts failed. I then knew that I had to do the impossible, hang this Dragonfly in these eighty foot trees without killing

myself. Then shut down all systems to minimize fire danger. I picked out the thickest and most level part of the tree tops. Just prior to impact, I pulled the nose up to stall attitude, hoping it would slow me down and be able to slide across the tree tops and dissipate more speed. I hit the tree tops at an estimated fifty miles per hour, felt a wap, Then I felt the big WAP! I saw the canopy go off and the canard go vertical. Never have I felt such a jolt.

When the whole mess stopped shaking. I knew my legs were broken but we, My trusty Dragonfly and I, had accomplished the near impossible. **We were sixty foot up in a oak tree**, hanging over a limb no more than four inches in diameter. The engine compartment was on the far side and I was still in the pilots seat on the near side. Across the limb were two battery cables (rear mounted battery) and two rudder cables. Everything seemed to be secure but the size of these tree limb gave me a few gas pains.



I checked my arms, neck, back, knees (which were artificial already) and everything looked OK. All I could say at that moment was **"Well, I'll be damned, We did it"**

The greatest concern was my legs, it was obvious that the tibias were broken about mid-point between the knees and ankles. The feet were both laying at ninety degrees to the rest of my legs. It was a bit disconcerting, to say the least, and I knew I

had to jack-leg some splints to prevent further damage. I'm no Me Guyver, but I did some rapid thinking. The carpet on the shelf behind the seat was pulled out, folded, and wrapped around my left foot and leg. No tying strings were available so I decided to sacrifice my shirt. I ripped it into strips, tied the carpet in place and set the foot in the elevator controls channel. The right leg splint was made from an aluminum scuff plate that I has siliconed to the topside of the canard. I was able to pull it loose, formed it into a trough and work it down to include my foot. With what was left of my shirt, one shoestring, (the other shoe was missing) and a piece of wire, I tied the channel. I then decided to relax and go into shock as any other human would do. I was getting light headed and sweating up a storm so I fixed the cushions in place so I could lie back, pass out and not do any more damage. A cool breeze a

few minutes later snapped me out of the semi-shock. I then tried to communicate with my sister, who lives with me, via TELEPATHY! that didn't work. I tried yelling for help, that didn't work either. I resigned myself to an afternoon communing with nature in the tree tops. All was going fine until a flock of huge Texas size buzzards started circling. I vocalized a bit, telling them to get the hell out of here! I'm not ready for you yet. They left.

After many hours (so it seemed) about dusk, I heard a chopper in the distance in the direction of the airport. I presumed the search had started. A turboprop plane passed directly overhead, turning toward the airport but it was too dark for them to see me. Eventually, all was quiet on the tree-top front, except for the normal night sounds. It was a clear night, full moon, and I watched it go from horizon to horizon, I wasn't a bit sleepy.

Dawn came, I was a bit cold up there but I used the cushion covers and foam inserts, plus a curved piece of fuselage to cover up, not too bad.

At about 8:00 am, I heard the chopper again up toward the airport. Back and forth, back and forth, but not far enough south. Finally it started the cross grid search, it passed close but not close enough. On the reverse track it came through an opening that would make my right wing visible. I was waving the white painted piece of fuselage to provide some motion. The chopper passed alongside, and after I uttered a few expletives, it stopped, turned toward me and moved in close. That had to be one of the finest moments of my young life (this is true, I'm only 75). I could see the face of our big old sheriff in the window and he looked like an angel. He notified the ground rescue team and hovered overhead to give them guidance to my location. They had to trek about three quarters of a mile through the thicket. The sheriff's rescue operation was tremendous. It consisted of two deputy sheriffs, two EMS people, one state trooper, five firemen (with a ladder, rope & pulleys), the local game warden, the hospital med-link chopper (from Beaumont, fifty miles away) and the customs department from Houston who performed the night time search using heat seeking equipment. The civil air patrol out of Houston was also alerted but not required.

The chief deputy climbed the tree at 0900 hours, Monday morning, he bought up water, rope and a snatch block, a second deputy helped get me into the survival jacket (a modified straight jacket, I think!), tied my splints tighter and hoisted me up and out of the cockpit, lowered me through the branches to the terre firma. I was placed into the basket and carried for about one fourth of a mile to the game wardens 4X4, then through more trees, a small stream and up a hill to the waiting med-link chopper. I was immediately flown to Beaumont St Elizabeth hospital where the emergency room was ready for me.

Surgery was performed the next day, rods were pushed down each tibia, from the knee to the ankle, and put in casts for the next six weeks. I was in re-hab for three and half weeks, learning to walk in a walker. I could only bear weight on the right leg. After the casts were removed, strap-on leg stabilizers were required for another six weeks

with weight very slowly and progressively applied to the left foot and leg. Four months were required to start walking without the braces. It is now five months since the accident, my legs are solid, but are still weak. A full recovery is expected. I'll see everyone at the big Labor Day Dragonfly fly-in.

What can I say to try and make something good come from my Dragonfly's death that would help everyone else?



1. I think a standard type gauge should be installed in the feeder (header) tank, such as the Cessna wing tank float/dial gauge, They never fail!
2. Never turn off the fuel pump when making other tests.
3. Rig up a direct fuel line from the main tank to the gascolator, with another fuel pump (elec. or mech.) or a squeeze bulb, that alone would of saved me. DBFN has given of plenty of ideas in this area, I recommend you do something.
4. Don't remove, or deactivate your ELT. I now am a believer!

JIM HARRIS
WOODVILLE, TEXAS

DESIGN

SPRUCE VS. DOUGLAS FIR — INFORMATION

Characteristic	Spruce		Douglas Fir		Compared with Spruce Douglas Fir is:
	lbs./in. ²	kg./cm. ²	lbs./in. ²	kg./cm. ²	
STATIC BENDING					
Fiber stress at prop. limit	5300	37.3	5900	41.5	11% stronger
Modulus of rupture	9400	66.1	10,900	76.5	16% stronger
Modulus of elasticity, EI	1,380,000	9701	1,480,000	10,404	7% stiffer
COMPRESSION PARALLEL TO GRAIN					
Fiber stress at prop. limit	3530	24.8	4220	29.7	19% stronger
Max. crushing strength	4700	33.0	5600	39.4	19% stronger
COMPRESSION PERPENDICULAR TO GRAIN					
	740	5.2	1020	7.2	38% stronger
SHEARING STRENGTH PARALLEL TO GRAIN					
	990	7.0	950	6.7	4% weaker
TENSION					
Strength parallel to grain	9400	66.1	10,900	76.6	1 6% stronger
Strength perp. to grain	170	1.2	140	1.0	21% weaker
WEIGHT					
	27 lbs./ft ³ 348	,434gm./cm. ³ 152	34 lbs./ft ³	.545 gm./cm. ³ 140	8% weaker per lb. or kg.

REFUELING DANGERS

By Wayne G. Anderson From the 170 News

There are very real hazards in refueling your airplane. I had a gas can explode while filling it from a gasoline station pump. The grounding wire in the hose was probably broken. They would never tell me. I was filling my 5 gallon cans on the back of my pickup truck when I heard a whomp! Gas blew 16 feet out of the can on everything except me. The station employees tried to put it out but their four extinguishers didn't work. Another patron put it out.

Things I did wrong:

I didn't place the cans on the ground, thus static electricity couldn't discharge — instead it built up.

Never refuel in or on a vehicle.

I let the fuel fall down the center of the can.

Gasoline falling through the air builds static. The fuel nozzle should touch the lip of the can at all times with the least free fall of fuel.

When transferring fuel to an airplane:

Cans must be on the ground when using a pump. Fuel hose in can should be at the bottom.

If you pour gas (I don't recommend), ground plane and can to reduce static buildup.

Make sure the hose is in the fuel tank and can for no free fall of gas.

Technical Counselor News 7

EPOXY UPDATE

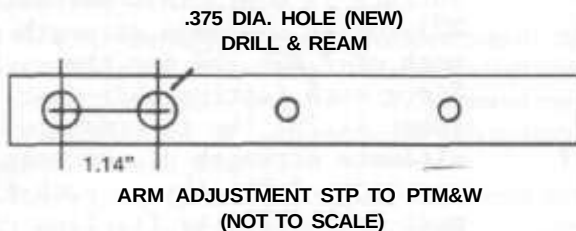
From The Dragonfly Builders and Flyers Newsletter

The Great Epoxy Caper or Just What the Heck Epoxy Should I Use?

The following is a collection of excerpts, comments and facts taken from Dragonfly builders, several other composite aircraft newsletters, and a follow-up call to Hexcel themselves.

I hope everyone has been following the changes that have occurred to the epoxy system that we use during construction of our Dragonflies; if not, I suggest everyone refresh by reading Dragonfly Builders and Flyers Newsletter #46, page 4. "In a nut shell". Hexcel's Epolite I & II (alias SAFE-T-POXY I & II) has been discontinued because it had a chemical MDA which has proven to cause cancer in laboratory testing. The Rutan Group (these guys be the pro's) had intensely researched all available epoxies on the market at that time and came up with a suitable replacement called PR2032/PH3660-2 or now known as PTM&W.

One of the only negatives of the PTM&W is that it requires a scale or pump change. The old Hexcel had scale ratio of 100 to 47. The PTM&W ratio's are 100 to 31.3. I've had numerous requests on how to change over the Michael's Engineering Stick Stuff Dispenser. Please find below an excerpt from the 1994 Wick's catalog:



Change Pump: To change from 47/100 to 31.3/100 by volume: Move the pivot 1.14 to the right. Drill a new .375 dia. hole for the pivot bolt, using a 23/64 dia. drill and a 3/8 or .375 dia. reamer. Drill a new 5/16 dia. mounting hole in the steel bracket 1.14 to the right of the original. Measuring upward at the an-

gle of the operating handle is best but moving horizontally is alright. Make sure that the connecting links are aligned straight up and down when the operating arm is horizontal. This will convert your pump from SAFE-T-POXY to the PTM&W.

Following is a letter from Dragonfly builder David Morris out of Garland, TX with his comments on PTM&W:

"My wife likes me again! She thinks I've quit working on the Dragonfly. Actually, what's happened is that I've started using one of the new epoxies. PR2032 and PH3660 or what is sometimes referred to as PTM&W, recommended by Rutan to prevent cancer, kidney and liver failure and all the other nasty little side effects predicted by the EPA for SAFE-T-POXY. The hardener (PH3660) will remind you of dirty baby diapers (if you're stupid enough to sniff it in the can), but after it's been mixed with resin, it's practically odorless. Thus, our house is no longer saturated with noxious (and, now we know, carcinogenic!) fumes every time I do a layup.

PR2032 and PH3660 produces a much clearer mixture that doesn't discolor your white foam after its been laid up. So your parts end up staying whiter even after cure. That might be a blessing when you start the exterior finish. The mix ratio is radically different, but it took me only about 10 minutes to build a new epoxy scale for the new ratios. The resin is much more viscous than the hardener, you have to be more careful to stir it up completely — you don't get any visual clues. I've also noticed that knife trim stage doesn't develop until several hours later than with the older epoxy, but overall cure time seems to be about the same.

Hopefully, the new epoxy will be kinder to us in the long term, healthwise. In the short term, it has allowed me to sneak out into the garage and do layups even when the house is occupied. I'm not the one to perform any kind of engineering analysis on it, so I hope it's as strong as Rutan says, but I highly recommend it for "environmental" reasons!

WING ATTACHMENT FITTINGS

In response to Joel Utz's letter in the August '94 (Issue 207) Newsletter concerning wing attachment fittings, the spacing of the 3/16" bolts is not as critical as he would think. The minimum center-to-center spacing for a 3/16" bolt in a nominal 2" thick spruce member is approximately 0.7" along the grain and 0.375" across the grain in order to develop full bearing strength. Any more distance does not gain any bearing strength. The statement about the "24G" main attachment fittings troubles me since I believe it is not accurate.

In the original KR-2 design, the main spar caps are 2-5/32" by 2" with a center-to-center spacing of 5-3/16". When the wing spar is loaded, one spar cap will be in compression, the other cap will be in tension, and the plywood web will carry all of the shear load that is developed between the two. Assuming that the spar cap would fail in compression at 4,700 psi and neglecting the area reduction for the beveled surface, each main spar cap could carry a total of 20,269 lbs at failure. This load acting on a 5-3/16" moment arm would be the result of a total moment of 8,712 ft-lbs.

Assuming that the half wing span is 10.333' with a semi-elliptic load distribution the load centroid will be at 4.39' out from the centerline of the wing. This means that the main spar, by itself, will fail at 1,996 lbs total load on each wing half. For a design gross of 900 lbs, the main spar alone will carry approximately 4.43 G's at failure. The rear spar will carry about 1-1/2 G's, and the fiber glass wing skins will also carry compressive and tensile loads of 1/2 to 1 G's, so the overall effect is a wing designed for approximately 7 G's at 900 lbs gross.

Again, assuming a semi-elliptic load distribution on the wing and a spar that will be subjected to a moment of 8,752 ft-lbs, the total moment outboard of the wing attachment fittings on the main spar will be 5,061 ft-lbs. With the same 5-3/16" spacing between the spar caps centers, there will be approximately 11,707 lbs on both the top and bottom wing attachment fittings pairs if the spar is to be uniformly strong throughout its length.

That is, the wing attachment should be able to carry at least 11,707 lbs in both the top and bottom pairs or the attachments will be weaker than the spar itself.

There are four individual components in the wing attachment; they are, the 3/8" bolts joining the two wing sections, the eight 3/16" bolts holding the fittings to the spar, the metal fitting itself, and the spar material that is bearing the load.

Each of the four 3/8" bolts and the bearing surface of each metal fitting must carry at least 5,854 lbs. With 0.1104 in and 120,000 psi, the bolts should carry 13,253 lbs at ultimate load. The bearing surface of the metal fittings is $([1-1/2" - 3/8"] \times 0.125")$ and at 90,000 psi, they should carry 12,656 lbs each. The eight fitting-to-spar bolts must carry at least 11,707 lbs. The eight 3/16" bolts have a total area of 0.2209 in and should carry a total load of 26,507 lbs. In other words, these three components of the attachment have more than enough strength.

The 3/16" bolts through the nominal 2" thick outer spar have a length to diameter ratio of approximately 10.7 to 1. This means that the ratio of bolt bearing stress to ultimate crush strength in the spruce is approximately 0.56. That means that the spruce will fail by crushing at approximately 2632 psi over the bearing surface of the bolts. This bearing surface is 0.375 in per bolt (3/16" x 2") for an ultimate strength of 987 lbs. each of 7,896 lbs for the eight bolts. Since each fitting pair must carry at least 11,707 lbs in order to reach the ultimate strength of the spar the remaining 3,811 lbs on each fitting pair must be carried by friction clamping of the fitting to the spar. This means that if you, the builder, forget to torque the wing attachment fitting bolts on the spar, the spar will only reach about two thirds of its ultimate strength. On the other hand, if you torque down the bolts to the point that the wood fibers are damaged, it is probable that the spar will also fail early. As the gross weight of the aircraft is increased, either the strength must increase or the safe load factor must decrease.

When I decided to build a KR-2S, it was

CONT'D PAGE 17

not entirely for the same reasons as most people. In my case, one of the deciding factors was that the design and construction methods would allow modification to suit my own purposes. At 6'-9" tall and 240 pounds, there are not very many planes that I can fit in with any degree of comfort. As a part of the modification process, I have calculated all of the critical loads that I can. My plans include increasing the normal gross weight to at least 1200 pounds. As a part of this, I looked at the wing attachment fittings and decided that they would need revision.

In my own revision, with its longer wing, higher gross weight, and my desire to carry all of the load in bearing strength, I am using five 5/8" bolts with a center-to-center spacing of 2-5/8" where the original design called for the eight 3/16" bolts. These should develop an ultimate strength of 6,250 lbs each. The fitting thickness is increased to 0.190", and the fitting-to-fitting bolts are NAS spec at 160,000 psi. Other design modification include increasing the leg room by 5" (7" longer than the original KR-2), 6" longer in the tail and adding an additional longeron both top and bottom from the fire wall to aft of the cockpit so that there are three on top and two on the bottom. Wing area will be 100 ft with a 26 ft span and the spars have been strengthened.

In all of these calculations, I used data from ANC-18, Design of Wood Aircraft Structures, 1951. There are assumptions used that simplified the calculations but I believe that all of them are conservative without being overly so. As a Nuclear Engineer, I do not have any direct training in this type engineering calculation, so if I am wrong, I would like to know about it.

In closing, I must also repeat what we all should know; that is, Rand-Robinson does not recommend making any modifications to their design. In addition, any change that you do make will always affect something else in the aircraft.

Donald Reid
Rt. 2, Box 3275
Bumpass, VA 23024
804-883-6828

WANTED

Retract KR-2 builder searching for gear attach set (3 castings plus 3 hinge brackets). Would like to purchase from anyone switching to fixed gear.

Sam Roberts
413-533-3483 (home)
413-535-4382 (work)

FOR SALE

KR-IS (stretch) fuselage in boat stage with KR-1 parts form a ground-looped KR-1: PLANS, instruments, wheels, tires, tubes, extra tires, brakes (including landing gear), 2 spinners, 2 VW engines with prop extensions, mag covers/adapters, engine mount, carb, stick, throttle, exhausts, spars, spar fittings, resin, 12 partial sheets of aircraft plywood and foam from Aircraft Spruce. Must sell as package. Madison, WI \$500.00

Mike Holomb
Rt. 1, Box 190
Douglas, AZ 85607
602-364-4078

KR-2 FOR SALE

Fuselage in late boat stage, wings, 60% complete (Diehl Wing Skins) 1834 VW engine and some instruments & misc. other parts. Fixed gear with tailwheel \$2,900.00

Russ Barnett
417-865-7218 evenings

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.
SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

1995 KR GATHERING

The 1995 KR Gathering will be held in Columbia, TN. The dates of the 1995 KR Gathering are September 22, 23 & 24. Since the Friday night cookout was such a success last year, planned activities will include Friday night and Saturday with the awards dinner on Saturday night, so make plans to be there. No reservations are needed for the KR activities.

The host hotel is the RAMADA INN, Columbia, TN. For hotel reservations call (615)388-2720. Room rate is \$34.95 (single or double), if reserved by 9/16. Tell the hotel that you are part of the KR GATHERING.

Contact(if needed):

Jim Hill
(205)882-2054

Bobby Muse
(615)399-9853

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 215-216 APRIL-MAY 1995
SPECIAL INDEX ISSUE

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN



KR NEWSLETTER

ISSUES 217 & 218
JUNE & JULY 1995



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide



RICK HUMAN'S KR-2 FROM HOUSTON, TEXAS

This photo is a current (July 2nd) picture of my project. It is a much modified KR-2. I have not used any preformed glass pieces, its about a close to scratch built as you can get. Some of the things I have done are:

Cont'd page 17

'AJell. I've -finally gotten started on mv KR--2S project and have one of the fuselage sides laid out. I had an idea about using T--S8 epoxv instead of- the Resorcinol adhesive which had been recommended for me to use. I wanted to reduce my inventory of materials by using just one adhesive so I sent a Question to one? of the computer bulletin boards I'd written about last year and got the following reply:

<PUBLIC>

Number : 403 of 410 Date: 05/24/95 12s00
Confer : GENERAL PURPOSE: Misc comments, etc
From : Art Bianconi
To : Jim Hayward
Subject : T-88 Vs Resorcinol

Not being experienced gluing wood with either T-88 or Resorcinol, I chose to make some inquiries of our "older" ElAA chapter members. One of them is very experienced in building and restoring wood aircraft components and has a PhD in chemistry.

T-88 has better capability for bonding surfaces with less than perfect alignment. It will fill in gaps and provide good adhesion even when the joined surfaces are as much as .125" away from one another, even though the manufacturer suggests that gaps be kept smaller.. With Resorcinol,, by contrast, the parts must be fitted very closely so that the glue joint is thin; not greater than .005". This need for accurately fitted, close tolerance parts suggests that assemblies joined with Resorcinol will take many more hours to fabricate and carefully fit.

Resorcinol requires high clamping pressures during the curing process, a demand that appears to be again driven by the need for thin glue lines. While parts joined with T-88 may benefit somewhat from clamping, the need for it is not as apparent. One thing that should be remembered: it is not always possible to clamp wood parts together. Size and shape may preclude that.

T-88 doesn't become really hard when cured. T-S8 will "creep" to some degree under stress and allow the relationship of parts to shift slightly. This plastic-like behavior reduces the onset of stress in glue joints because of changes in geometry due to humidity, thermal contraction and expansion, etc.

Resorcinol, however, cures harder and appears to be slightly stronger than T-88 but the high tensile strength appears to come at the expense of brittleness and its inability to yield. Parts that can't yield (low modulus of elasticity) often are stronger but fail suddenly, whereas parts that can and do yield might lose some of their maximum load carrying capability when subjected to high stresses but will continue to function satisfactorily at reduced loads.

Resorcinol is alleged to possess slightly greater resistance to water than T-88. This could make it necessary to use additional sealant on exposed T-88 glue lines to isolate them against water. If the plane is to be parked outdoors in an unprotected environment, the exposure to rain could be a major factor in deciding which to use. I personally doubt it. For the glue lines to be exposed, the wood would also have to be exposed and this would violate other common sense rules no matter what adhesive is chosen.

Neither adhesive appears to have any significant temperature advantage. While Resorcinol needs temps consistently higher than 70--F to cure properly, T-88 is slow to cure (a week) and does benefit from higher ambient temperatures. It's important to remember that resin systems like those common to aircraft construction cure by providing

their own heat,, That's the purpose of the hardener. These resins are still thermoplastic, however. If you heat, them enough, they go "plastic" ie, they soften somewhat. This is why you rarely see a Long-Ez or other composite aircraft painted anything other than white. Generally speaking, the higher the temperature at which the glue cures, the more heat it needs to go plastic.

For examples if one part is cured at a room temperature of 70--F, it might go plastic when it's temperature is elevated to say 155-F. If, however, another of the same part is cured in a room whose temperature is 90--F, the epoxy matrix might not soften until perhaps 200/205-F, (these temp numbers are arbitrary for the purpose of demonstration). The difference is due exclusively to the fact that the second psi I was allowed to reach a higher temperature during the curing process. Some builders of composite parts will actually paint, or cover the parts with black materials and park them outdoors in the sun so that the temperature of the matrix can be elevated artificially. Others will use infra-red lamps to apply heat locally. Either process does work but must be used with generous amounts of common sense and caution. Lastly, Resorcinol is alleged to need a constant humidity while curing,, 40 to 60X was said to be ideal. Since aircraft grading methods for wood use a standard that is predicated on moisture content that I remember being much lower than that, I'm not clear how this moisture requirement is dealt with.

Given the assertions just mentioned here, I find myself leaning heavily towards T-88 for any joint made of wood in an airplane,, It's still a good idea to check with some others, especially the manufacturers,, to satisfy yourself that the information is accurate. Regardless of your choices, be sure to prepare dated glue samples. One set for the FAA inspector to destroy when testing the sample and signing off the airplane, the others to set aside to test yourself, randomly a few years later,, Some people prepare a third set and place them outside of their house on the roof to weather them in a manner similar to what the actual aircraft sees,, This may be over-zealous but it can't hurt provided the subsequent tests and interpretations are made properly. Hope this helps some.

Regards: Art Bianconi

=====

Art turned out to be an EAA Technical Advisor as well as sysop of t.i")is BBS,, The phone number again is 908-755-5371 if anyone is interested,, Below are the conferences available on his BBS:

- 1 • GENERAL PURPOSE: Misc comments,, etc
- 2 • SAFETY; Items of Urgency
- 3 • 51% Rule: Public Dialogue on the rule.
- 4 • COMPOSITE CONSTRUCTION:
- 5 • MQNOCOOUE CONSTRUCTION:
- 6 • TUBE * < FABRIC CONSTRUCTION
- 7 • ULTRALIGHT AIRCRAFT; Both 1 and 2 place
- 8 • HELP! Requests for assistance & answers
- 9 • SWAP-N--SELL: parts, projects, etc
- 10 • EDUCATION: Classes,, books, forums
- 11 • MANUFACTURER'S CONFERENCE
- 12 • FUEL SYSTEMS: Tanks, Garbs, Fuel Ini*
- 13 • ENGINES: Aircraft & Converted Auto
- 14 • IGNITION SYSTEMS: Battery and Magneto
- 15 • PROPELLERS: Wood, Metal, Composite
- 16 • PAINT & UPHOLSTERY: Incl interior trim
- 17 • LANDING GEAR: Includes brakes & floats
- 18 • AVIONICS: Includes wiring * <: Instruments

- 19 -• RESOURCES; Distributors,, suppliers
- 20 -• EAA TECHNICAL COUNSELORS (Private Conf)
- 21 • GOVERNMENT ACTIVITY; Fed, State & Local/
- 22 • CALENDAR OF EVENTS: Fly-ins, Shows, etc
- 23 • EMPLOYMENT; Not just in aviation

Here is another epoxy related question answered by Art:

<PLIBLIC X HAS REPL. IES X RECEIVED>

Number ; 25 of 28 Date; 04...23-95 07;; 54

Reply To: 23

Confer : COMPOSITE CONSTRUCTION;

From : Art Bianconi

To : David Burkhardt

Sub.jec:t:E!poxv

DB>I switched to the new PTM&W 2032 Epoxy and 3660 Hardener
 DB>11 wets out a little slow (what doesn't in the winter in Wisconsin)
 DB>but cures up great when making a layup. The mixing cup, however,,
 DB/-remains very slightly sticky, looks like forever., Anybody
 DB>have any comments on this?

I've not used the 2032/3660 product yet but here are some ideas you might consider

When you are finished making a layup, pour some left over epoxy into a small plastic cup like the kind you see used at fast food chains for dispensing ketchup and mustard. You only need to pour about a 1/4 to 3/8" deep. Let it cure thoroughly. When you are sure that it's cured, take an awl or sharp scribe and try to scratch the date into the cured epoxy disk. You should get powder or small chips from the scratching. The scratching sound should be sharp and distinct and you should see white scratch marks in the epoxy. If you get all of these, the odds are good that the epoxy has cured properly.

If, however, the attempt to scratch produces a dull sound or no sound at all, or if instead of dusting and flaking, the epoxy appears to pile up on either side of the scratch or if the scratch mark doesn't contrast noticeably with the rest of the "cured" epoxy, there is a likely chance that the epoxy has not cured properly.

If the disk tests described above pass muster, then it really doesn't matter too much what occurs in the mixing cup although I must admit I'm puzzled by this. I do understand your concern about what matters, ultimately, is how the stuff works with your layup not some discarded cup. The slow cure in the cup could be caused by a number of things,,

1. Not scraping the sides during the mixing will leave un-catalized or poorly catalized epoxy on the walls of the cup. If this is the cause, you have reason to be worried about the integrity of the layup. Poorly mixed chemistry is not good.
2. If the mixing cup has traces of epoxy from a previous mix that hasn't cured, the combination of the old with the new sometimes causes the newer mix to "kick" prematurely. The whole mix starts to get "stringy" and the viscosity gets inconsistent. I throw these out.
3. There is a tendency by some people to economize on disposable mixing containers and use coffee drinking cups instead of industrial cups. The wax used to seal drinking cups has been known to dissolve into the mixes which use MEK based hardeners. While I don't believe the 3660 hardener

uses such catylizers,, that doesn't, mean you are NOT getting softened wax in the cup.

One more thing about the epoxy disks: I've urged people for a long time to drill a hole in their epoxy disks, tag them with cardboard key-tag's and serialize them. A log book containing the manufacturer's name and batch number, the date you used their product and on what parts can save you a nightmare later on.

The FAA has never issued an AD on epoxy applications that I know of. But, that doesn't mean that they won't. If same manufacturer discovers one day that the formulation on a particular batch of their product was screwed up and they issue a public notice, how will you determines if and where you used their product? And, to compound matters further,, what will you have to protect your investment if the FAA grounds all composite A/C until you produce **satisfactory** evidence that the structure is OK?

Those disks and a complete log may cost, you an additional hour or two over the life of a project. Even if it costs you 5 hours to maintain that log,, that's nothing compared to the total time and money invested and a small price to pay for the peace of mind it represents.

Lastly, be careful when using high viscosity resin systems on heavy or densely woven fiberglass ravings like triweaves. I was forced to use vac:cum bagging to insure total saturation of the weave and even then, I still had to exercise caution,, I use a different system for those weaves now, the stuff is almost like water pouring on! Keep us posted.

Regards: Art Bianconi

I thought I'd send this along in case anyone else was just, starting to build as I was. Sure would like to see more of us KR people on the BBS. I read where America On Line has a KR conference. I think that's about. \$10 per month to subscribe. A lot of these BBS's cost only the price of the phone call. I'm usually on 2 to 5 minutes a call which is 20 to 50 cents at the niant/weekend rates.

Jim Hayward
7860 Long View Rd.
Rapid City, SD 57702

FOR SALE

KR-2 70% complete; all parts needed to finish; Diehl fixed gear; Revmaster 2100d engine with new forged crankshaft, bearings, lifters, pistons, rings, cylinders; Ed Sturba prop; Cessna spinner, instrument panel complete with compass, A/S, alt, oil temp, oil pressure, tach, CHT; 4:1 exhaust; Matco wheels and hydraulic toe operated brakes; 13-14 gallon header tank. \$5000.00.

Len Johnson
303 Rayburn St., Apt. 21
Lafayette, LA 70506
318-264-9495

FOR SALE

Wing sections, with gas tanks installed, droop tips, wiring for lights, primed, ready to paint and bolt on. Gives wingspan of 22 ft, \$900. Also boat section with wing stubs and tailfeathers, canopy and partially finished turtle deck and a few instruments, \$500. Reasonable offers accepted.

Andre Stephani
78 E. 10th St.
Saint Paul, MN 55101
612-292-9542

HELPFUL HINTS FROM NEW ZEALAND

I have under construction my own KR-2S and I have noticed a couple of newsletters that one or two are having problems getting in the 1/4" plywood lower shelf at the firewall.

The answer is simple:

1. When you make up the fuselage sides, leave out the blocking that goes above and below the shelf.

2. Go ahead and skin the sides and complete up to and including the two engine mount rails, right through to the boat stage.

3. To fit the shelf, you can now bevel the top blocking to suit and epoxy in place. (The bevels can be found by drawing them full size onto the firewall: see drawing.)

4. Cut two 1/4" scraps (In my case I used 6mm coversheets available from most timber merchants i.e. customwood or hardwood.)

Approximately 19" long by 7-1/4" wide and fit one each side, using the firewall engine mount front edge as our reference line.

5. Next, holding the two pieces in place, mark where one overlaps the other and cut that end off. Recheck fit and you now have your lower shelf template complete with proper fit and angles. Transfer these to the 1/4" plywood to be used and cut to match the template. (It will be one piece, not two.)

With a little bending in the center, the shelf can now be fitted and attached and at the same time epoxy the lower blocking, which should also be bevelled to suit.

From this I also applied the same principal to fit the seat back, the cockpit floor and the 1/4" plywood floor.

Another small hint when making up fuselage sides at stations "N" and "O". Use scrap timber 5/8 x 1/2", uprights (see drawing) with a small amount of PVA glue, making sure that you have one opposite to the other will ensure top and bottom longerons are in the correct position and also the ply sides will not stick to them.

After the sides have dried and just prior to cutting out the scrap uprights, transfer the marking to the sides and longerons of where they will come out for future reference of stern post and bevelled uprights.

Trusting that this may be of help to someone and if anyone has a problem or would like some advice I can be contacted at the below address.

I am qualified joiner and have nearly 15 years working in the woodworking industry.

DIAGRAM ON PAGE 7

Wayne Rayner
31 Colchester Cres.
Newlands, Wellington 6004
New Zealand
04 477-1235

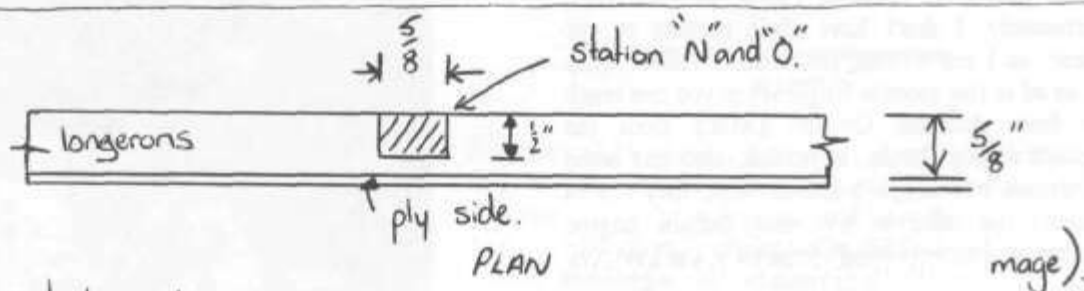
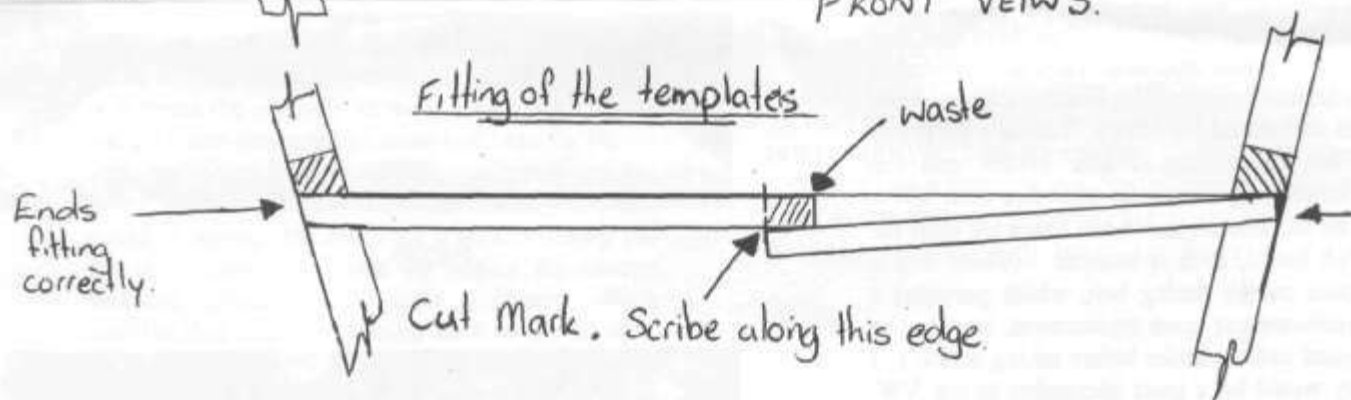
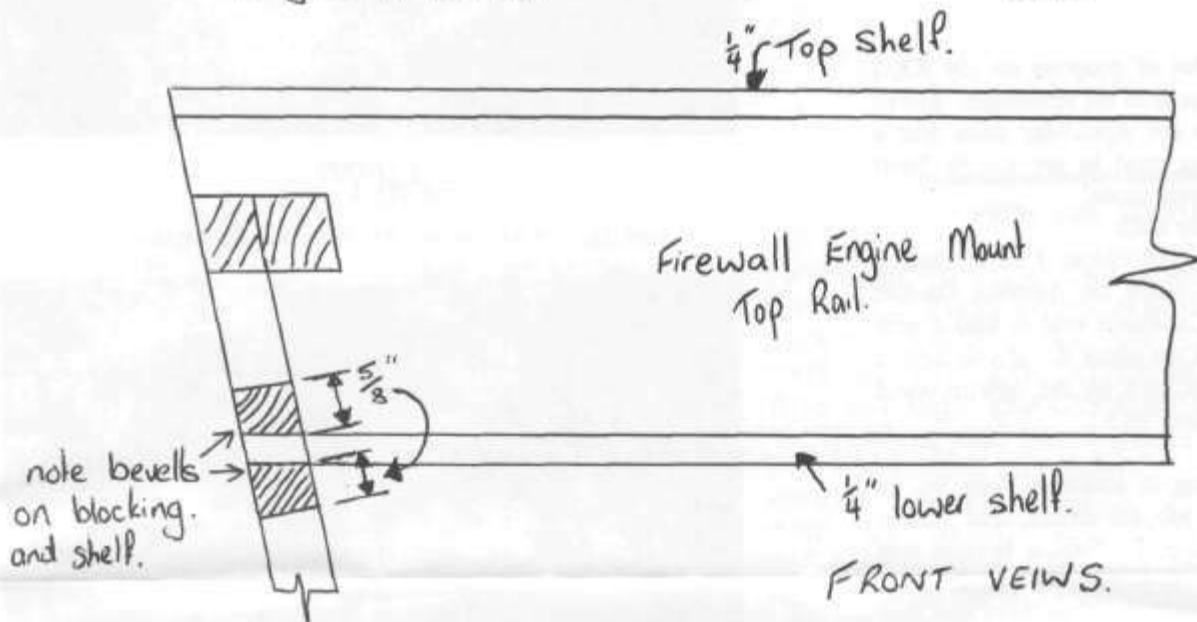
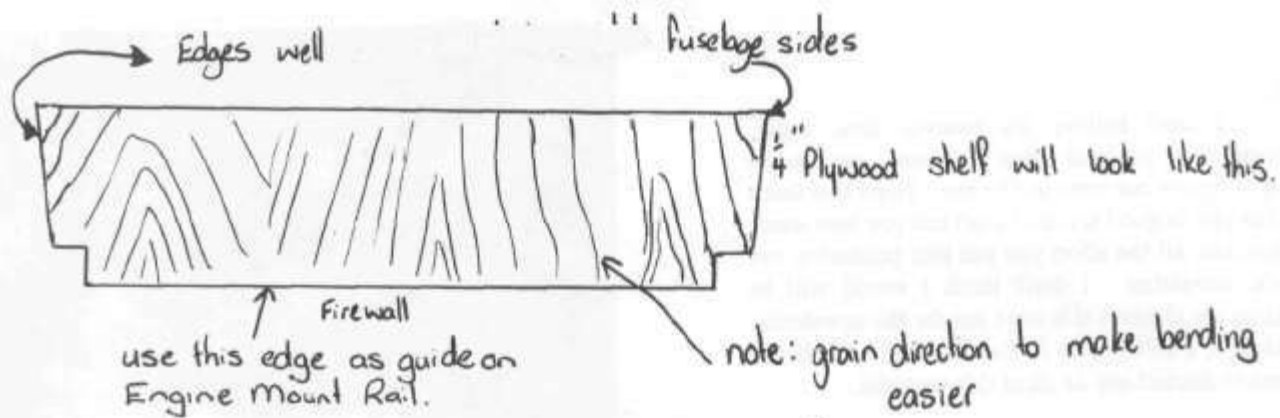
FOR SALE

Sorry about the incorrect phone & address in last month's issue.

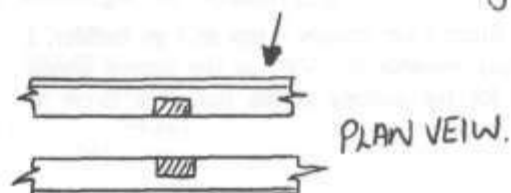
KR-IS (stretched) fuselage in boat stage with KR-1 parts from a groundlooped KR-1: PLANS, instruments, wheels, tires, tubes, extra tires, brakes (including retractable landing gear), 2 spinners, 2 VW's with prop extensions, mag covers/adapters, engine mount, stick, throttle, exhausts, spars, spar fittings, resin 12 partial sheets of aircraft plywood and foam from aircraft spruce. \$500 or best offer

Mike Holmcomb
2050 E. Main St.
Madison, WI 53704
608-242-8808

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$20.00 PER YEAR- U.S., \$25.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS. SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN INDIVIDUAL COPIES \$2.00 EACH.



Note: Drawing not to scale.



Earl,

I can't believe it's renewal time again, enclosed is my renewal along with some new photos of my progress out here in Oregon. Hope this letter reaches you in good spirits, I can't tell you how much I appreciate all the effort you put into producing our terrific newsletter. I don't think I would still be building my airplane if it were not for the newsletter. As always, I will not be in the least offended if you choose to discard any or all of this material.

Thanks Monte!

I've made a lot of progress on my KR-2 since my last contributions to the newsletter. Monte Miller's submission in the April/May issue was a welcome sight. It was good to see you in Sport Aviation Monte, Congratulations!

More on Computers for KR2

Since my last submission, I have found a terrific KR-2 bulletin board on America On-line (AOL). A friend in California who is also a new KR-2 builder informed me about it. If you have a computer and a modem, look for the bulletin board section under the keyword "FLY".

Subaru vs. VW

I am beginning to seriously shop for an engine/and or engine sub assemblies, and I have found a couple of sources for Subaru engines that other readers may wish to investigate. One firm is called Stratus (206) 783-3845. Call them and they will send you a small brochure. They sell a complete turnkey Subaru engine, including starter, carb, manifolds and mount for \$5995. This is a bit pricey for me, but the engine is near 100HP and I'm hearing that Subaru's run a lot smoother than VW's. I owned an 87 Suburau and it ran like a top until the timing belt broke, then it stopped. (There was a recall notice on the timing belt, which provided a small reimbursement upon replacement, needless to say, I waited until it broke before taking action.) I think they would be a good alternative to the VW. Another source is Formula Power in California. Unfortunately, I don't have their number at the moment, as I am writing this from a Hotel They have an ad in this months Kitplanes or you can reach them from America On-line (AOL) from the homebuilt engine forum. Skystruck, also has some nifty engine workshops 1-800-sky-strk, they are in Oshkosh, and offer a VW and Subaru engine workshop that sounds good, I can't get out that way though.

Since I am mainly a pay as I go builder, I am leaning towards the VW, as the largest single expense for the Subaru is the reduction drive at



PHOTO 1



PHOTO 2



PHOTO 3



PHOTO 4



PHOTO A



PHOTO B

\$1,500. My concern is that I will invest heavily into the engine, only to encounter problems mating a reduction drive from a firm that has gone out of business. I know Great Planes has been around a long time, and will probably be around some time longer, so I am more comfortable buying partial lists of components from Steve for the VW.

Wings Wings Wings

PHOTO 1 See it does fit in the Garage! This photo shows that you can get a KR2 to fit in the garage with one wing installed, upside-down no less! This photo was taken just after I jiggled the plane upside down and rolled it back into the garage. The wing had been glassed and it was DIFFICULT to flip the plane over (Hint! Don't get in a hurry and glass the forward deck, or install the firewall)

PHOTO 2 What wing tanks look like if you do them per plans....mine leak. **Recommendation.** build the tank, leak test it. then install inside the spars. Or another recommendation, don't build wing tanks. I'm using wing tanks to reduce the size of my header tank.

PHOTO 3 Smooth! Ready to glass. It will sure be nice to walk around the garage again. Wonder where I'm at on that long hangar waiting list at the airport.

PHOTO 4 Ahhli, the wing is cut free, now to finish all those tilings that need to be done with the plane upside down. Flaps, sand wheel wells, re-do rudder pedals per Monte Millers contribution, (Flox bolts from underside). The next time it will be harder to flip the plane over, as the forward and ail decks are next.

AFT DECK & CANOPY

I decided to take the top end of the fuselage and do my "own thing". KR fiberglass is 3.8oz per yard, at about \$4.00 a yard. Kevlar much stronger in tensile strength so a lighter weave of 1.5oz per square yard is as strong as KR fiberglass, for only \$17.00 a square yard. Those nifty scissors are only another \$65.00. In short, its an expensive route, to possibly save a couple of ounces in weight. I felt that after my wing tanks, my plane needed to go on a diet. Kevlar has poorer adhesion properties to wood, so I wouldn't use it for the primary flight surfaces unless you really want to go and be a test pilot. I feel that using it for the upper deck pieces was a risk I was willing to take.

I have been using Aeropoxy resin since December, and I love it. I believe it is the same as the PTM&W material in last months newsletter. (PH2032/PH3660-2). It wet's out much better than

the DOW-DER epoxy I was using from Wicks previously. Wicks sent me some of this by mistake or substitution, around Christmas, I used it, and have been converted since. It wets out glass easier than the DOW, and does a much nicer job wetting out the Kevlar.

I have played with both the fine and coarse weave of Kevlar cloths available from ACS and Wicks, and felt that the fine weave needed two plies to give me the stiffness I wanted on the forward deck, so I switched to the heavier weave on the aft deck. My lay-ups came out pretty wet on these components, so I don't know if I saved any weight over an ideal glass lay-up, or the pre-molded components. I will weigh the individual components and send that information for a future newsletter.

I have done a rough weigh-in so far with the following results: 1181bs on both main wheels and 551bs on the tail wheel for an empty weight of 291 pounds. I used bathroom scales which were not level, so I expect that there could be a rather large error, but wanted to get a stake in the ground for a weight reduction program. Allowing 200 pounds for the engine and another 50-100 pounds for the remaining flaps and avionics installations, I feel pretty good about meeting an empty weight in the 550-600 pound range. We shall see.

PHOTO A This photo shows the 1/4" masonite and plywood bulkheads I started with on the build up of the aft deck. I played with different contours until I liked what I had, then used a poster board template folded along the vertical axis to check the bulkheads for symmetry. I then foamed between the bulkheads using 1" foam and a glue gun.

PHOTO B This photo shows the aft deck after the rubber meets the road... or the resin meets the Kevlar. In the right foreground, you can see the 1/4" plywood bulkhead that follows the seat back angle.

PHOTO C1 After the newsletter detailing a failure of an elevator fitting, I added this inspection cover modification to my aft deck. I haven't finished but the plan is to use cam lock fittings or tinnerman fasteners to allow easy inspection of the elevator and pulley. There is also an inspection hatch to inspect the lower bellcrank arm on the lower side of the fuselage, its the dark rectangle under the elevator in the next picture.

PHOTO C2 After approximately 700 hours of what my wife calls "playing in the garage", here is what the project looks like. I installed the wings and bought a couple of new bathroom scales (we actually needed), and weighed. I haven't calibrated the



PHOTO C1



PHOTO C2



PHOTO D



PHOTO E

measurement technique, but I now have a rough idea of what the weight is. Each main wheel weighed in at 118 lbs, the tail weighed in at 55 lbs. For a current empty weight of 2911bs. Allowing 200 pounds for an engine, and from 50-100 pounds for everything else I need to add, it looks like the plane might weigh from 550-600 pounds empty when I complete it. My target is to get as close to 500 pounds as I can. Going over past newsletters gave me the feeling that 600-630 pounds empty is not too unusual, so I feel good at this point. The most effective weight reduction will probably be to work with the future pilot to cut 20 pounds.

Photo D This photo shows the contour of the canopy as it meets the aft deck in more detail. I sat in the cockpit when fitting the plywood bulkhead for the aft deck, and chose a canopy height. When fitting the canopy. I wore a bike helmet to insure that there would be enough clearance for a helmet during the test flight phase. I ended up raising the canopy bulkhead template 2" to clear a helmet, which required that I fair the contour back to the aft deck height. Not what I originally planned, but I think it looks pretty good. I will know for sure when I have sanded and primed the top, some time in the future. The good thing is, this was fun to do and I can always change it some time in the future.

Photo E The last photo this submission is a shot of the inside of the canopy. I used a 3" stiffener made from foam per plans, and a IBID layout of Kevlar on the inside. The outside of the canopy uses 2BID Kevlar. Cutting the canopy free after the first layout used up all my disposable dremel cutting wheels, and wore down my cutting bit. It's tenacious stuff!

Happy Building this summer!
Ross Youngblood
1017 ME Diane PI
Corvallis OR 97330
rossy@San-Jose.ate.slb.com (email)

FROM THE EDITOR

FROM TIME TO TIME, THE NEWSLETTER MIGHT BE PUBLISHED EVERY OTHER MONTH AND DOUBLED IN SIZE (16 PAGES). WE PUBLISHED APRIL/MAY 1995 AND THIS NEWSLETTER IN THIS MANNER. THIS NOT ONLY REDUCES COST OF POSTAGE BUT PRINTING... ONE WAY TO KEEP THE COST OF THE NEWSLETTER AFFORDABLE. IF WE ARE RUNNING LOW ON ARTICLES, IT ALSO GIVES US MORE TIME TO GATHER INFORMATION FROM BUILDERS. IF ANYONE HAS INPUT ON THIS, PLEASE DROP ME A LINE. THANKS FOR ALL OF YOUR SUPPORT!

I APPRECIATE EVERYONE WHO HAS CONTRIBUTED ARTICLES IN THE PAST. I AM IN NEED OF MORE PHOTOS AND ARTICLES. IF YOU HAVE NEVER CONTRIBUTED OR IT'S BEEN A WHILE SINCE YOUR LAST CONTRIBUTION, PLEASE TAKE A FEW MINUTES AND DROP US A LINE.

THANKS!

EARL

WANTED

Retractable gear, wheels, brakes, hinges, all nuts, bolts, cable, etc. for the KR-2, Please call the Logan Roller Rink between 8 p.m.-10 p.m. Mountain Standard Time or leave message on answering machine.

Jerry Harris
425 N. 4th East
Logan, UT 84321
801-752-9261

B- Moving the Project Damage Control, and tips from experience

My project has been in STORAGE (UGH) since I moved from Arizona to Oregon last year. Something about a promise I made to my wife about parking cars in a garage I believe. At any rate, the new garage began to fill up with old furniture and I decided that paying \$80 a month for storage so that we could put more stuff in our garage didn't make sense. Keeping the faith through a year of storage rental, and recovering from damage was a bit of a chore, but now I have all of this wonderful experience to share with my fellow KR builders... here goes!

First of all, if you are considering moving, sell everything you own, including your clothes and cars, then catch a plane to wherever you are going, and buy all new stuff. Thru's is much easier than getting moved. In my case, I was fortunate to have a wonderful moving company pack all of my household goods, excluding that scrap stack of wood under the workbench, and that box of scrap foam in the garage. Oh yes, and all of that expensive epoxy is hazardous material, and stays. Except I did find that they packed an empty container of fiberglass resin which had leaked out before they packed. An empty container that used to contain hazardous material can be covered with wrapping material and boxed with no problem. The new owner of my old house found the garage full of aircraft quality spruce and urethane foam that failed to make it on the truck. Unfortunately, I was flying back and forth between states, and did not have time to LABEL everything in the garage that I WANTED! (At this point I could mention that my wife did not have my aircraft supplies on the top of her priority list.) So if you want it, LABEL IT, and don't ask your wife to do your dirty work for you. If you can be there on loading day, that would help too.

My moving company recognized that this assembly of wood in the garage was not just average playground equipment, and when the word PLANE was mentioned, dollar signs appeared in someone's head, and I ended up forking out \$150 to cover a "bulky-item" charge. It turns out that most corporate relocation packages don't consider an airplane normal household goods. Don't expect the movers to handle the plane with kid gloves. It's a bulky item, so it gets loaded, and bulky items get thrown into it and on top of it once it's in the truck. In my case, the recently installed 5/8" square cross members at the instrument panel, and immediately forward of the instrument panel became epoxy test blocks. I was happy to find that the joints did not fail at the epoxy, but the forward longeron split due to the excessive weight of something placed on top... perhaps it was the wheelbarrow. Actually that damage wasn't too bad, I filed a claim for \$60.00 to cover the cost of some new spruce and epoxy and crating, and came out even excluding the labor.

I did do some significant preparation in the one day I had to prepare the plane for the move, this I believe saved me significant damage. In my case, my plane was in the "boat" stage with the tail feathers installed. First I made sure that anything that wasn't securely bolted or otherwise attached to the plane was removed. Then I got some nylon re-enforced tape, and cardboard, and build protective covers for anything that protruded. Both forward and aft spar center spar tips were covered with thick cardboard "caps" which were attached with the tape. The wing ribs were taped to the side of the fuselage. The control horns of the rudder (which was loose) were also protected with cardboard and tape as well. On the horizontal tail surfaces, I took four strips of wood approximately 1-1/2" wide and long enough to span the elevator & stabilizer and sandwiched a cardboard cap between them, and secured each end with an AN-3 bolt and locknut. This went a long way in preventing hanger rash during the 1 year the plane spent in

storage. Unfortunately, a small chair did fall from above onto the elevator making a 2" gash in the top right which I will have to work on. If I enclosed the entire surface in cardboard, I might have gotten away with a smaller dent.

Not only did I have the pleasure of movers moving the plane, I also had the pleasure of moving it myself- twice, into and out of storage. Since I sold my truck, I was faced with renting something. This also seemed to be a good idea since rental trucks have ramps anyway. I discovered quickly that the stub wings are WIDE. Photo 1 shows the plane en-route to storage from our first (temporary) house in Oregon and you may note that the opening of the truck is less than the width of the plane. It took several not two nice exclamations to get the plane into and later out of the truck. Photo 2 shows the plane in storage, and the trunk of the nice two sealer car that replaced my truck. Note that the right side has the cardboard "cap" in place and the left side does not. Also the forks are labeled "L" and "R" so I know what goes where. On the move from storage, I rented a LARGE Ryder truck, and had plenty of width for the spars.

For future reference I noted that the spar fitting to fitting width is 7'3" and the tire to tire width is approximately 5'2". I am considering that it would be nice to have a trailer for the plane before my next move. It needs to be at least wide enough for the tires, but could potentially "bulge" out where the spars go. Now that the plane is back in the garage where it belongs, I need to find a place to keep my cars out of the rain for the upcoming rainy Oregon winter. A lot different than the hot dry Arizona climate...did someone mention RUST? UGH!

- Regards

Ross Youngblood
1017 NE Diane Pl.
Corvallis, OR 97330
(503)753-7370

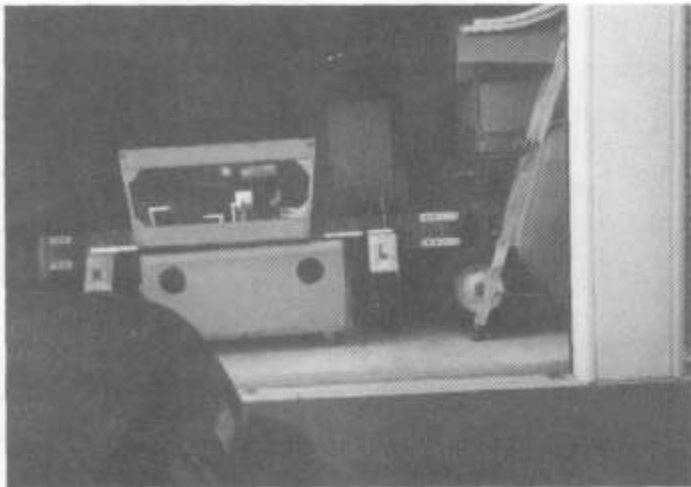


PHOTO 1



PHOTO 2

Tail (Installed)

Here is another series of photos from my KR construction saga. These cover the evolution of the birds "tail".

Photo1 - First off, this photo can't show all of the hours that were spent drilling, sanding drilling and re-sanding the tail section hinges. A friend of mine had a computer controlled milling machine, so I went over to his shop to play with it. We figured out how to program and make one hinge in wax, then decided to double the recipe on the computer and make two at a time. We took the new program and a piece of C channel, and the mill went through one pass perfectly, then on the return pass, cut right through the meat of the hinge, wiping out the C channel and a cutting tool. After that I decided to do them by hand, wastes less material.

Photo! -1 started with the horizontal stabilizer then moved from that to the elevator and rudder. On retrospect, I had more difficulty with the stabilizer, since the foam and the rib were nearly the same thickness. The photo here shows that the stabilizer has a lot of micro on it as filler. Probably heavier than necessary. If I were to do it all over again, I might start on the rudder first. But then, my rudder might not have been so nice. Installing the trim tab nyrod was a significant amount of work. But using the plans the trim tab installation went very well. The black spraypaint technique worked very well during the later finishing stages.

Photo3A - Same situation, with me making airplane noises in the plane. The same friend who had the computer milling machine found some WWII flying goggles at a garage sale. Too bad you can't tell that I'm wearing them here.

Photo4 - Here you see the beginnings of the vertical stabilizer foam work. Masking tape worked wonders here while waiting for the 5 minute epoxy to set. All other tail surfaces have been filled, sanded, filled, sanded...so they look pretty good in this photo. Also the beginnings of the control system have been installed here. One thing the plans don't note is that ALL ROTATING PARTS SHOULD HAVE COTTER PINS. I've had to go back and re-install hardware on anything that moves.

Ross Youngblood
1017 NE Diane PI.
Corvallis, OR 97330
503-753-7370

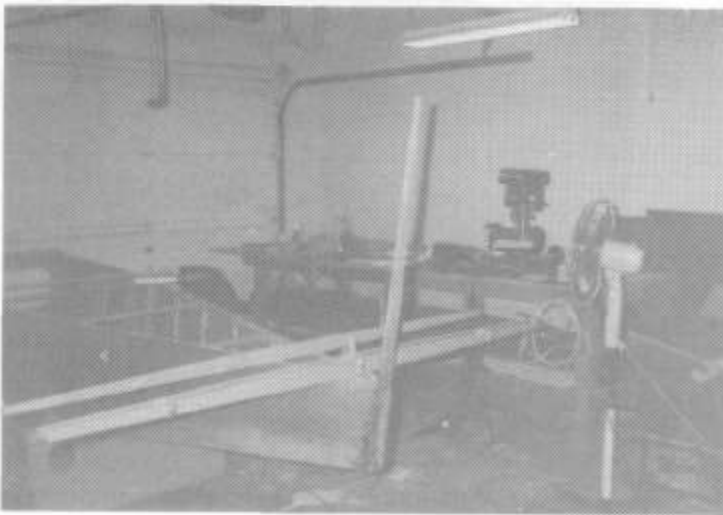


PHOTO 1

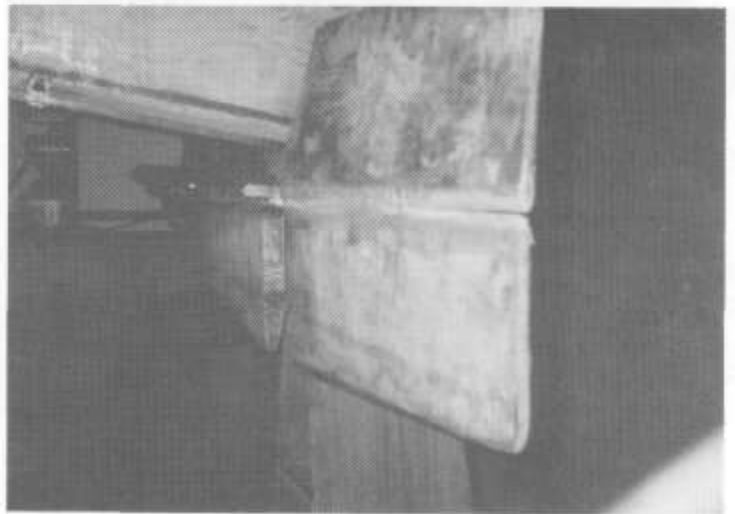


PHOTO 2

PHOTOS CONT'D PAGE 15



PHOTO 3



PHOTO 4

ORIGINAL FUEL TANK TROUBLES

by Mike Smith

900 Primrose Lane
Henderson, NV 89015
702-565-4010

I have a KR-2 originally built by Ted Larson between 1976-1981. The fuel tank was made with foam sandwich walls using the Dynel and Rand-Robinson epoxy resins. I got involved in and have been flying the airplane since mid-1983 and have extensively modified it to improve "flyability" and performance. None of these "mods" involved the fuel tank.

About 4 years ago, during my annual inspection, I found some flecks of dark brown putty-like material in the screen of the gascolator. I examined the tank interior with a flashlight looking through the fill hole for any sign of debris. Finding none, and having had no trouble with fuel flow or engine performance, I assumed something had gotten into the tank from "dirty" fuel or during refueling and let it go at that. (Little did I know what was to come.) It must have been a year and a half later during run up for take-off that I couldn't get full power.?? It took only a short time to ascertain I had a fuel starvation problem at high power/fuel demand. The interior of the tank looked as it always had, with no debris clogging the intake screen or sloshing about so I started removing fuel lines, beginning at the tank outlet. Upon closely examining the first section, I noticed a substance that looked just like molasses and had the consistency of "cold" molasses or maybe even "stiffer". Noticing the tank interior was the same color, I got a long scraper to feel the bottom of the tank. To my surprise, the first eighth inch was somewhat "soft" like putty and could be scraped off. This "unknown" material was slowly sloughing off and "worming" its way down into the fuel system.

Ted died some eight or ten years ago, so I can't ask him if he had a leakage problem during construction and fixed it with some type of sealer he poured in and sloshed around before installing the tank or not. But, if he didn't, then the original resin system was deteriorating and starting to flow, thereby clogging the fuel lines. I'm sure glad I found it on the ground and not in some critical flight phase! You other "old" timers might check this out in your tanks.

I've since replaced my tank with a RR prefab made of polyester resin and fiberglass. No easy task when it's built in. Happy flying!

MODIFICATION IDEAS

Well, here I go again. Building my stretch version has given me a privilege to not only build what I think is the best bang for the buck airplane but has allowed me to meet one hell of a fine bunch of human beings. Not only the KR people but the other homebuilders out there... we are unique.

We have a desire to help others and express ourselves to the doubting world at large, the ones who say "you're really going to fly that when it's done? Aren't you afraid you'll get killed in it?" My answer to these simpletons is not what they want to hear. I say at least it'll be glorious and I'll have a large column in the newspaper in the front section, not that measely two or three lines in the back.

Anyway I am writing in about some mods that I am working on. I "modified" the control linkages. I have this thing about cables. I hate them. I know that cables have been used on many aircraft and are safe but since I had a problem with my cable actuated hood release breaking, well, it's my plane I can do what I want anyway... so I decided to make side sticks and the only way I could see to hook them up to the ailerons and elevator was by push pull torque rods. I drew pictures, I cut out templates, I made prototypes, I bought tubing and rod end bearings and ballbearing bellcranks, made bushings, learned how to weld and fit, cut measured and got it to work very well indeed. Then I ordered the Diehl tri-gear setup. You guessed it, had to practically remake all the rods and tubes and bellcranks and fittings but when I finished that, they worked well too. Then I did my stubs and proceeded to freeze up almost all my bellcranks linkages and what have you with the foam and epoxy. The linkages works well now after the added hours of mental torture of designing and hacking away the epoxy. Moral or the story is, follow the plans people... it makes it easier and quicker although you won't have side sticks like me and the extra hundred hours of work in your building log book.

Warron Gray (447WG)
2701 Sunrise Lakes Dr. E.
Building 10, Apt. 112
Sunrise, FL 33322
305-749-6783

BUILDER REQUEST FOR HELP

Ted McClurg here! I am building two KR-2's. My project is on "hold" since I have to presently devote my full time as a caregiver for my invalid wife.

I live remote and have no association with any other KR builders. My connection is the Newsletter and Kitplanes.

I have a complete set of the Newsletters less a few copies and I've been through them endless times.

My immediate interest is in my instrumentation. I want a full gyro panel but no where can I find any reference to vacuum systems for the KR series in any of the Newsletters nor any mention of an engine driven vacuum pump or articles that bring this system to light.

It is respectfully requested that if any of our associates have installed vacuum pump systems and are willing to share some information, I would like to buy a set of plans, info, etc.

P.S. I am installing EA81 Subaru Engines with belt PSRU's. I can drive from either end.

Ted McClurg EA 394630
P. O. Box 202
Branscomb, CA 95417
707-984-6398

FOR SALE

Completed KR-2, never flown, groundlooped once. \$3,500 for parts, including Continental C-85 engine, full panel, nice fuselage, broken wing and spar. No landing gear. Contact:

James Jasper
P. O. Box 682892
Park City, UT 84068
801-647-5629

RICK HUMAN'S COVER ARTICLE (CONT'D)

- Widened the cockpit 2 inches (all mods pre KR-2S)
- Used an Dragonfly canopy (said to be the same as the Lancair)
- Turtle deck formed from 1/4" Clark foam to conform to canopy - one layer glass inside 2 outside.
- Canopy pivots open as stock Lancair
- Fixed tri-gear - Mains are early Rand Robinson fixed legs mounted on rear of main spar - Nose gear is a Long-Eze arrangement with Brock castoring nose wheel.
- Wings have one layer of glass on inside, one layer on outside from main spar aft, 2 layers from main spar forward overlapping at leading edge to give 4 layers on first 4 inches of leading edge. There is also an 18" wing tip extension on each wing.
- Vertical Stabilizer area increased by increasing angle of fin leading edge.
- Continental C-85 installed on swing out motor mount.
- All control surfaces to be mass balanced.
- Wing to center section fittings have been redesigned (my design) to allow the wing to fold - overall folded width about 8'-3" which will allow legal towing - will fit in a single car garage.
- One fuel tank -17 3/4 gallons.

I have about 2400 hours in the project and its any body's guess when I'll make that first flight. (I hesitate to say finished -I don't think these things are ever finished.) I am not in a position to answer any questions about my modifications as they all still have to be proven.

Our Chapter Designee has looked the project over and had two comments, (1) think about using heavier tubing in the control stick. (2) Think about using a steel elevator horn [he thinks that Gene Darst's KR-1 crash may have been caused by the failure of the Alum, horn, which sounds very similar to the report by Mike Kellums of Ralph Smith's accident in the Jan. '95 issue].

Thanks, and I appreciate your good work with the newsletter.



Rick Human

15803 Knoll Lake Dr.
Houston, Texas 77095

WANTED

Wheel fairings for retractable landing gear for KR-2. New or used acceptable, Call Prophits Pruning Service, leave message:

Norman E. Prophit
Box 262
Upper Lake, CA1 95485-0262
707-275-2473

WANTED

KR-1 fixed gear Rand Robinson type. Aluminum spring gear with or without brackets. Also axles fro 5.00 x 5 or 3.40 Auza wheels. Call:

Charles Zue
R.R. 1, Box 172
Vershire, VT 05079
802-685-3182 after 6 p.m. EST

FOR SALE

KR-2 complete, 23 hours total time. Being dismantled after a hard landing. All parts, engine, instruments, radio, GPS, etc. all available for 1/2 the purchase price. List available. Call:

Tom Killgore
517-786-4822 6-10 p.m. EST 7 days

FOR SALE

Great start on a great plane! KR 1.5 (widened to 24", stretched 21"). In "boat stage". Retract gear hung horizontal stabilizer and elevator complete. Outer wing spar material, plywood and wing fittings. \$500.00

Steve Fike
9602 NE 70th St.
Vancouver, WA 98662
360-254-8865 or leave message

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 116-217 JUNE-JULY 1995

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN



KR NEWSLETTER

ISSUE 219
AUGUST 1995



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide



BOBBY MUSE'S KR-2, N122B, MURFRESBORO, TN

Bobby's plane has won numerous awards for craftsmanship and performance. Awards include **"Best KR"** at this year's Toledo KR Gathering, Sun N' Fun and KR Oshkosh Gathering (and 1994). He also received an "Outstanding Craftsmanship" Award from the EAA at this years Oshkosh event. His plane is powered by a Revmaster 2100D, Posa Carb, Ed Sterba 52 x 52 prop. Performance at this year's Sun N' Fun Cafe 100 averaged 147.64 MPH. His plane also includes a removal 18.5 gallon header tank, Diehl tri gear, Loran and GPS. Canopy is a single piece Super KR-2 Canlopy from Applied Plastics in Dayton, Ohio that has been sectioned to fit the frames and gull wing door.

This is a response to Donald Reid's letter in the April/May 1995 issue (number 215-216) of the newsletter and to Earl's plea for help in that issue. Looking back at my original letter, it occurs to me that I really did not express my concerns very well. Incidentally, for anyone interested in looking up that letter (which Donald's letter responded to) it is in the August 1993 (number 195) issue, not the August 1994 (number 207) issue.

In 1993 my parents were living and working at a mission-school on the Whiteriver Apache reservation in Arizona. The school had a fairly new gymnasium (three years old) which they could not use because it was declared unsafe. The roof began sagging within a few months of its completion. It sagged fast enough that they had to measure the height of the baskets (which were suspended from the roof) before every game and adjust them at least once a month. Its frame was constructed of large wooden beams which were bolted together at the ends with metal plates with the same bolt pattern as the wing attach fittings on the KR (eight bolts arranged in two parallel lines). The design submitted for rebuilding the gymnasium used a staggered bolt pattern like the fitting I proposed in my previous letter.

I know that the primary loading on a spar cap is very different from the loading on a roof beam. I also know that the wood used in building construction is not as high quality as that used for aircraft construction. However, vibration and torsion will load the spar caps similarly to the primary load on a roof beam and even aircraft grade wood is not perfect. I am more concerned with the ability of the aircraft to hold up over time than I am with developing maximum strength. It seems to me that staggering the bolt pattern in the attachment fittings will improve the joints tolerance to vibration and loads oriented across the grain of the spar caps. The increased bolt spacing is really a side effect that I think wouldn't hurt anything (although I must admit it probably won't help anything except my nerves). What I really want to know is if anyone has any data indicating that my idea is completely wrong and will actually make matters worse.

I really enjoyed Donald's discussion of loading in the wing attach fittings, especially since I have been putting off digging up the information I needed to make the calculations myself. It also got me thinking about the proportion of the load carried by friction. That got me thinking about Howard Kaiser's method of mounting the wing attach fittings (issue number 167, April 1991). He used slightly oversized bolt holes filled with epoxy to distribute the load from the bolts to the wood and epoxied the fittings to the spar. I would really like to hear how that worked.

Joel Samuel Utz

2001 Kirksey Drive #B

Austin, Texas 78741-4839

(512) 385-0597

CONTROL CABLE TENSION

While helping Jeanette Rand man her outside display tent at Oshkosh '95 (along with Shane King who had his Subaru powered KR-2S project on display there, and Mike Stearns who along with Jason Parker had their KR-2S project at Oshkosh last year) there were many questions asked about construction, different engines, rigging etc.

Most of these could be answered by one or more of us, but one question that was asked quite frequently and couldn't be answered satisfactorily was one concerning the correct tension on the control cables and how to measure it without a tremendous outlay of cash for one of the available cable tensiometer⁵ that us A&P mechanic type use.

I'm pleased to announce that I stumbled across a neat little cable tensiometer that is very compact, light-weight and is very affordable. This unit is the CT-1 Economy cable tensiometer and is available from Aircraft Spruce (P/N 05-05800) for only \$31.15. It is straight forward in design and use and should present no problems in determining the tension of your cables as it reads the tension of both $\sqrt{32}$ ^f and V8" cables.

That solves half of the problem. The other part (the suggested tension of the cables) has not been so simple to come up with. Neither the KR plans nor the FAA's handbook: Acceptable Methods, Techniques, and Practices - AC 43.13-1A, chapter 4, have any explicit instructions for adjusting tensions, except to do it in accordance with the airframe manufactures recommendations.

In the absence of published instructions, I will offer the following guidelines which are based on a good cross section of certificated airplanes control system tensions.

cable size	3/32"	1/8"
Ailerons	25+5-5 Ibs	30+10-10 Ibs
Elevators	15+7-3 Ibs	20+10-5 Ibs
Rudder (if closed loop)	15+7-3 Ibs	20+10-5 Ibs
Flaps iif closed loop)	15+7-3 Ibs	20+10-5 Ibs

If anyone should be using any 1/16" cable for anything (different type trim system etc.) the normal tension for this size would be 10+5-2 Ibs.

One possible reason the ailerons on most aircraft are adjusted to a higher value is that the cables, bellcranks and opposite aileron all contribute to the counterbalancing effect and therefore may help to prevent flutter.

Even tho you use a tensiometer to adjust your cables, check for how the system feels, check for looseness or tightness of cables at both extremes of travel and check for drooping of cables or for interference between cables and any structure etc. Be sure to adjust your cables with the surfaces neutral and check both cables and average your readings. Most manufactures specify checking the ailerons on the tie together or balance cable.

Also bear in mind that temperature and humidity affect cable tension some, so you may want to check the system over several days or weeks as when initially adjusting. Also - re check your systems after the first 40 - 50 hours of use as the cables and pulleys etc. will tend to stretch slightly and "seat in" some. After that a periodic check should be all that is needed.

I hope this helps some of you by sharing what I've learned over the years of working on "spam cans".

Also the price of the above described tensiometer is well within the reach of most of us (the current price of the one I own is over \$465 and you can bet I'm not loaning it out to anyone).

John Sickafoose
642 Ray Ave N.W
New Philadelphia, Oh 44663

Ph (216)343-3964

RAND BRAKE PEDALS

Can't really say that this is "page two" in a Paul Harvey-style story about 684LM. Shoot, I'm into a whole new chapter with this thing. During early flight testing, if you'll recall, I'd been through the episode of wheel landings fast versus a much slower, yet blind, three-pointer...slower is gooder. Did the ol' whoop-dee-do on the runway with hangar, sky, trees...hangar, sky, trees; that is until I aligned and tracked the main gear so we're all trying to head in pretty much the same general direction.

Still, I'd find myself in a serious over control situation most every time I'd go romping down the runway, tail up or tail down. Must just be me and a lack of experience with little wheels in the back. Pretty exciting.

There's a nice, little Cessna on my home field that I use to fly EAA Young Eagles or friends that like flying...as long as the wings stay level. It's owned by a young man that's also a certified tailwheel instructor. I approached this guy, Dave, and asked if he'd give me some instruction and help correct some of my sins. We immediately went to work in a 180hp RV-6. After less than two hours, I'm able to run the Six down the runway while up on the main gear, wheel land the aircraft or set it down in a full stall landing. Even spent some time doing stalls, rolls, and loops. Great fun.

So the question is this; if the RV-6, a rocket with three times the horsepower of my KR, is responding correctly to my control inputs, how come the KR is so twitchy on the takeoff and landing rollout? Hey, Dave. Go fly my airplane.

Throttling back from a high speed taxi run, Dave proceeds to ground loop off the runway and into the grass. Hangar, sky, trees... Here we go again.

Much head scratching later, it's discovered that any rudder input, any more than a light touch, is also applying some brake on the same side. Those Cleavelands work good.

684's rudder bars are built to the plans specs. The brake pedal design, materials, and installation is also straight from the Rand Builders' Manual supplement for these parts. So how come I'm scaring myself?

After reviewing the plans, measuring my equipment, and determining that all was to specs, I snaked headfirst down under the instrument panel and watched as a volunteer shoved the rudder pedals back and forth. Sure 'nuf, a simple rudder input was also applying the corresponding brake cylinder because the brake pedal's pivot point on

the rudder bar was below where the ball of the pilot's foot was contacting the brake pedal. Simply stated, what was happening was the brake cylinder actuating rod was being depressed each time the rudder bar was moved.

You guys know that I'm always preaching, "Build to the plans. Don't modify nuthin'." So, I was only mildly aggravated since I'd come so close to a few dings in the aircraft. Plus I had to explain to my EAA buddies that Dave and I were just simply conducting Texas fire ant surveys for the airport manager.

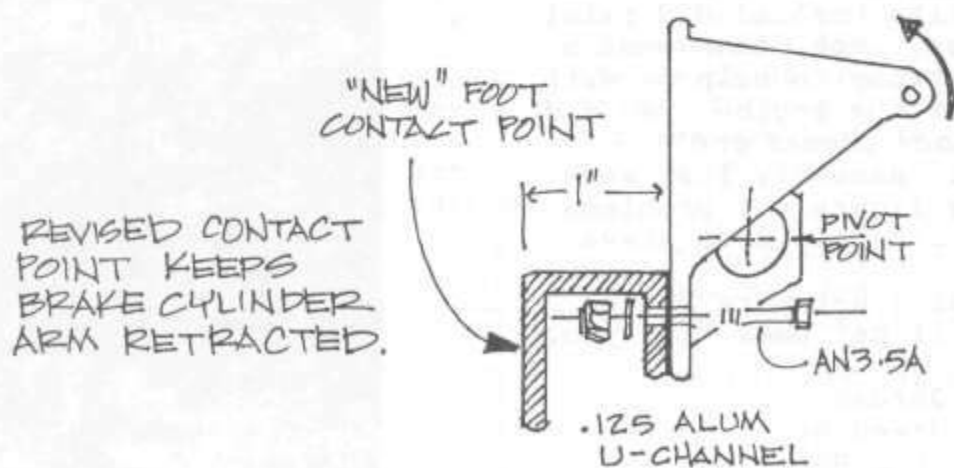
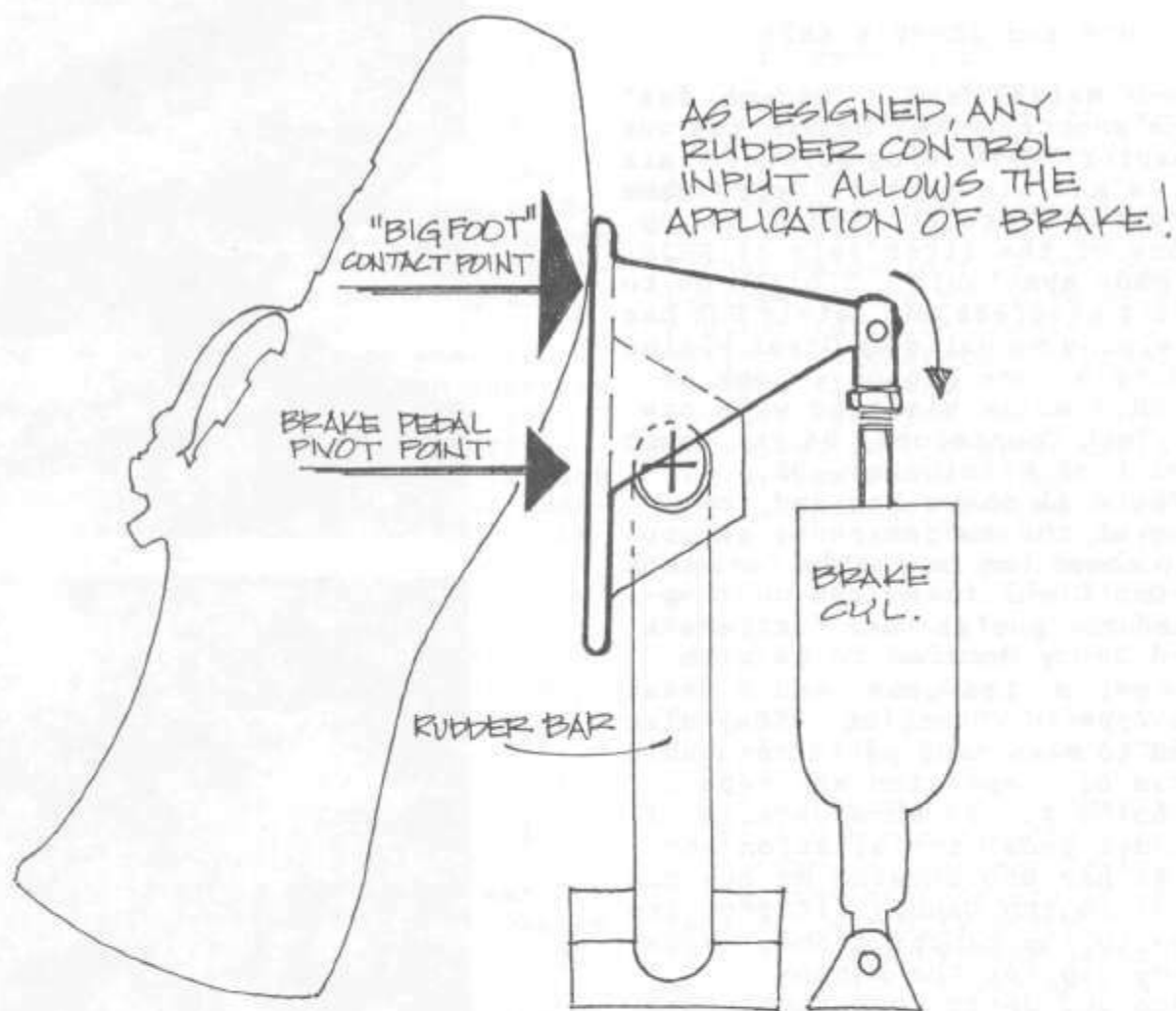
A sympathetic Volksplane builder let me measure his neat pedal/brake assembly and I was all set to cut and weld when he suggested I add a small, wooden spacer to the lower part of the brake pedal which might reposition my foot contact point and, consequently, the pedal pivot point. Hmm...looked possible on paper so I tried it. Eureka! Wood seemed a little "hearth-side" so a section of U-shaped .125 aluminum channel was shaped and bolted to the pedals. The modification moved the foot's contact point and, consequently, the rotation of the brake pedal around the rudder bar. Now, the brake rod is kept in a retracted position unless a conscious effort is made to apply any brake.

I spent last evening running up and down the Denton Muni runway just enjoying Lima Mike's newfound manners. The aircraft is still short coupled and requires your complete attention. However, if you're using or considering the Rand design rudder bars and pedals, look over the drawings of the modified pedal and then crawl into your project. May save you some "ant inspections".

As instructor Dave says, "Brakes on a tailwheel aircraft are good for only two things: safe ramp taxi maneuvering and engine run-ups."

SEE DIAGRAM ON PAGE 5

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871



BOB and JERRY's KR2S

Bob Wetzel and I became fast friends shortly after he visited our EAA Chapter 240 meeting several years ago. He and his partner Jerry came looking for a project and wound up with one of the first sets of KR2S plans made available. I often go to see their progress and lately Bob has been helping me build my Great Plains VW. Here's some photos I took of their KR2S while visiting with one of our Tech Counselors, 84 yr. young Tom Smith of Wilmington, DE.

Photo #1 shows Bob and Tom looking at the rudder pedal set-up. It also shows the removable fuel tank, the Dan Diehl fixed tri-gear option and the prefab rear turtledeck. Bob and Jerry decided to go with prefab parts, tri-gear, and a Great Plains Type IV VW engine. They also decided to make many parts removable for ease of inspection and repair.

Photos #2, #3 show details of the rudder pedal installation and photo #4 has Bob showing me how his forward hinging canopy fittings are mounted to the canopy frame. Note the nice jig for the canopy.

Bob and Jerry dove right into this project and really went to work. The quality is quite high and they have a beautiful fledgling on their hands.

The last photo shows what my Great Plains engine kit looked like 'right out of the box'. (I did paint the engine case). Bob comes over an hour every Saturday to help me with the assembly of the engine. We did all the clearance checks and started 'final¹ assembly last week. We can usually figure out problems that crop up with help from Steve Bennett.

As soon as I get more photos or progress I'll get back with you.

Ken Jordan
328 Green Ave.
Carney's Point, NJ
08069
Ph.# 609-299-0498



PHOTO #1

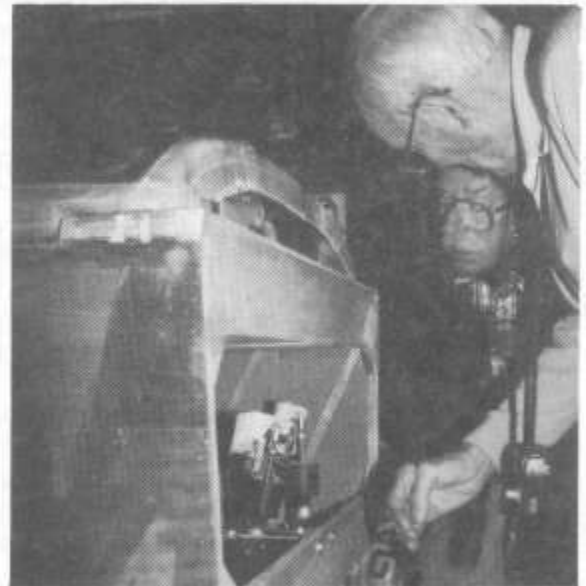


PHOTO #2

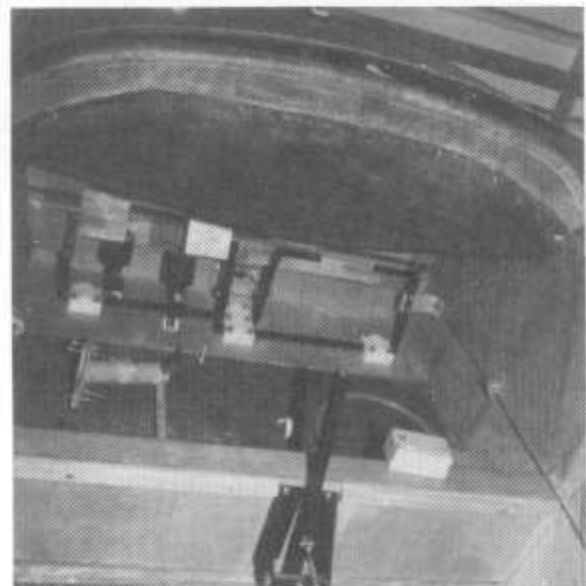


PHOTO #3

FOR SALE



PHOTO #4

KR-2 (1981) kit. All wood parts assembled. All woodworking done by professional cabinet maker. Preformed glass parts not included in kit. \$1,000 OBO. Contact:

Mike Weber
805-238-4603

KR-2 PARTS FOR SALE

Gear legs 2 ea. \$78.00 KR200-047
Gear retract hinge 3 ea. \$22.50 KR200-048
Gear retract hinge 3 ea. \$31.50 KR200-049

Wing tips 2 ea. \$68.00 KR200-010
Canopy, green tint 1 ea. \$80.00 KR200-015
Canopy frame 1 ea. \$88.00 KR200-012
Turtle deck 1 ea. \$100.00 KR200-008
Forward deck 1 ea. \$50.00 KR200-016

All prices are plus shipping UPS. Part numbers are from Wicks catalog. Call:

Paul
603-432-9817

FOR SALE

KR-2S Plans #271 all drawings and parts list. Also newsletters from Dec. 1993 till present with remainder of subscription in March 1996. \$220.00

Hani N. Assabgui
30-08 37th St.
Astoria, NY 11103-3809
718-545-4736



PHOTO #5

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$20.00 PER YEAR- U.S., \$25.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN INDIVIDUAL COPIES \$2.00 EACH.

1995 KR GATHERING

The 1995 KR Gathering will be held in Columbia, TN. The dates of the 1995 KR Gathering are September 22, 23 & 24. Since the Friday night cookout was such a success last year, planned activities will include Friday night and Saturday with the awards dinner on Saturday night, so make plans to be there. No reservations are needed for the KR activities.

The host hotel is the RAMADA INN, Columbia, TN. For hotel reservations call (615)388-2720. Room rate is \$34.95 (single or double), if reserved by 9/16. Tell the hotel that you are part of the KR GATHERING.

Contact(if needed):

Jim Hill
(205)882-2054

Bobby Muse
(615)399-9853

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 219 AUGUST 1995

FIRST CLASS U.S. POSTAGE PAID PERMIT NO. 334 LAKEVILLE.MN
--





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



JIM HILL'S N58DR, HUNTSVILLE, ALABAMA
(Photographed at the 1995 Midwest Gathering,
Toledo, Ohio by James Gochnauer)

Jim's KR is powered by a Great Plains 2180cc VW with an Ultra Garb. Prop is a Tennessee Prop 52 x 44. The canopy is a modified Dragonfly design. Diehl fixed gear. Performance figures are 1000-1200 FPM climb, 140 MPH cruise, 167 MPH max.

Jim said he really appreciates converting from his original retract gear to Dan Diehl's fixed gear. Not only from a performance standpoint but also because of a few "wheels up" landings. Jim Hill can be reached at : 205-882-2054.

WING ATTACHMENT FITTING

After re-reading my discussion of the wing attachment fitting, I realize that I did not answer Joel Utz's original question, which concerned the layout of the fitting itself.

The holes that are drilled in the attachment fitting do more than just remove extra weight. The size and placement performs a specific function in the design of the fitting. The load on the fitting must be transmitted to the spar cap through the bolts. As the distance from the applied load increases (in this case, the 3/8 inch wing attachment bolt) less load is available to be transmitted to the wood. As each pair of 3/16 inch bolts is reached, load is transmitted to the wood and does not continue along the metal fitting.

In order to transmit the applied load to the wood, the wing attachment fitting must undergo an elongation (strain) that is proportional to the load (stress) that is applied. The stress/strain relationship of the spar cap and metal fittings are very different. They will stretch different amounts under an applied load. I am not a structural engineer, but I believe that if the wing attachment fitting was a solid bar of metal, the bolts would tend to crush the spar wood sequentially instead of simultaneously. This would result in a significantly lower overall load factor in the spar. In other words, the fitting would rip out of the wood at a much lower applied load.

For example, assume an 8000 pound load is applied at the 3/8 inch bolt. With symmetrical loading of the eight spar cap bolts, 1000 pounds must be carried by each in bearing on the spar. At the first pair of bolts from the end of the spar, 2000 pounds will be carried by the wood and the remaining 6000 pounds will continue along the fitting. The second pair in line will transfer another 2000 pounds to the wood, leaving 4000 pounds, and so on. If the spar cap bolts transfer load asymetrically, the most heavily loaded area of the spar cap would fail first. The load no longer carried at the point of failure would then be picked up by the next bolt/spar cap combination and the failure would cascade along the fitting length. This failure mechanism is similar to what would happen in a control cable that had been kinked. In that case, a few strands of the cable would carry all of the applied load until they failed, which would transfer the load to a few more strands, and so on until the cable failed.

As designed, the fitting will carry 12,656 pounds between the 3/8 inch main bolt and the first pair of 3/16 inch bolts [(1.5 in - 0.375 in) X 0.125 in X 90,000 lb/in²]. Between the first and second pair of 3/16 inch bolts, the fitting will carry 11,250 pounds f (1.5 in - .5 in) X .125 in X 90,000 lb/in²]. Between the second and third pair, the fitting will carry 8,438 pounds, and between the third and fourth pair, the fitting will carry 7,031 pounds.

CONT'D PAGE 3

According to all the reference material that I have seen, there is a minimum required bolt to bolt and/or bolt to edge spacing. Any additional space provided does not increase the load carrying capability of the member. It does not hurt the strength of the member in any way, but it does not add anything.

The attached graphs are from an aircraft maintenance handbook that was published in the early 1950's. It is not from ANC-18, Wooden Aircraft Design, which is probably the "bible" of this type of work, but it is easier to use. The results are also slightly more conservative than those given in ANC-18. As can be seen from the graphs, the distance between the center of a 3/16 in bolt to the end of the spar must be at least 0.850 inches. The KR is designed to have 0.875 inches. The center to center spacing along the fitting must be at least 0.944 inches and the KR design is 1.5 inches. In addition, there must be at least one and a half bolt diameters between the edge of the spar and the center of the bolt. In the standard KR design, the eight 3/16 inch bolts through the 2 3/8 inch thick spar will carry approximately 1,150 pounds each for a total of 9,200 pounds.

In regard to the idea of bedding the bolts in an oversized hole that has been filled with epoxy, I have the following comments - Don't do it without performing experimentation. The bolts through the wooden spar carry the applied load in bearing on the wood. The wood has a known crush strength and all proper design calculations use a minimum that is dependent upon the wood specie. Any epoxy that is used to fill an oversized hole must develop at least that minimum before undergoing plastic deformation or the resulting combination will not be as strong as originally designed. This sounds like an attempt to correct sloppy work with a bad idea. The only quality way to do this work is to initially drill the holes undersized and then ream to fit.

In closing, I propose a slight change to the KR designed attachment fittings that would increase the bearing strength by more than 40 percent. The 3/16 inch bolts closest to the end of the spar should remain as is. The remaining six could be increased to 1/4 inch. All minimum spacing is maintained and the maximum available bearing strength of the wood would increase from approximately 9,200 pounds to 13,220 pounds. This is different than the design that I have used in my own project due to the size and weight involved. The modification should work fine but I leave all verification to anyone interested in using it. As with any other modification, you must be prepared to accept not only the time involved, but also the possible consequences.

Donald Reid
15256 Hopeful Church Road
Bumpass, Va. 23024
804 883-6828

MINIMUM ALLOWABLE DISTANCES BETWEEN STANDARD STEEL AND ALUMINUM ALLOY AIRCRAFT BOLTS IN SPRUCE, PARALLEL TO GRAIN AND MARGINS AT ENDS OF SPRUCE TENSION MEMBERS. FOR BIRCH AND MAPLE MULTIPLY THESE DISTANCES BY 0.75 AND 0.70 RESPECTIVELY.

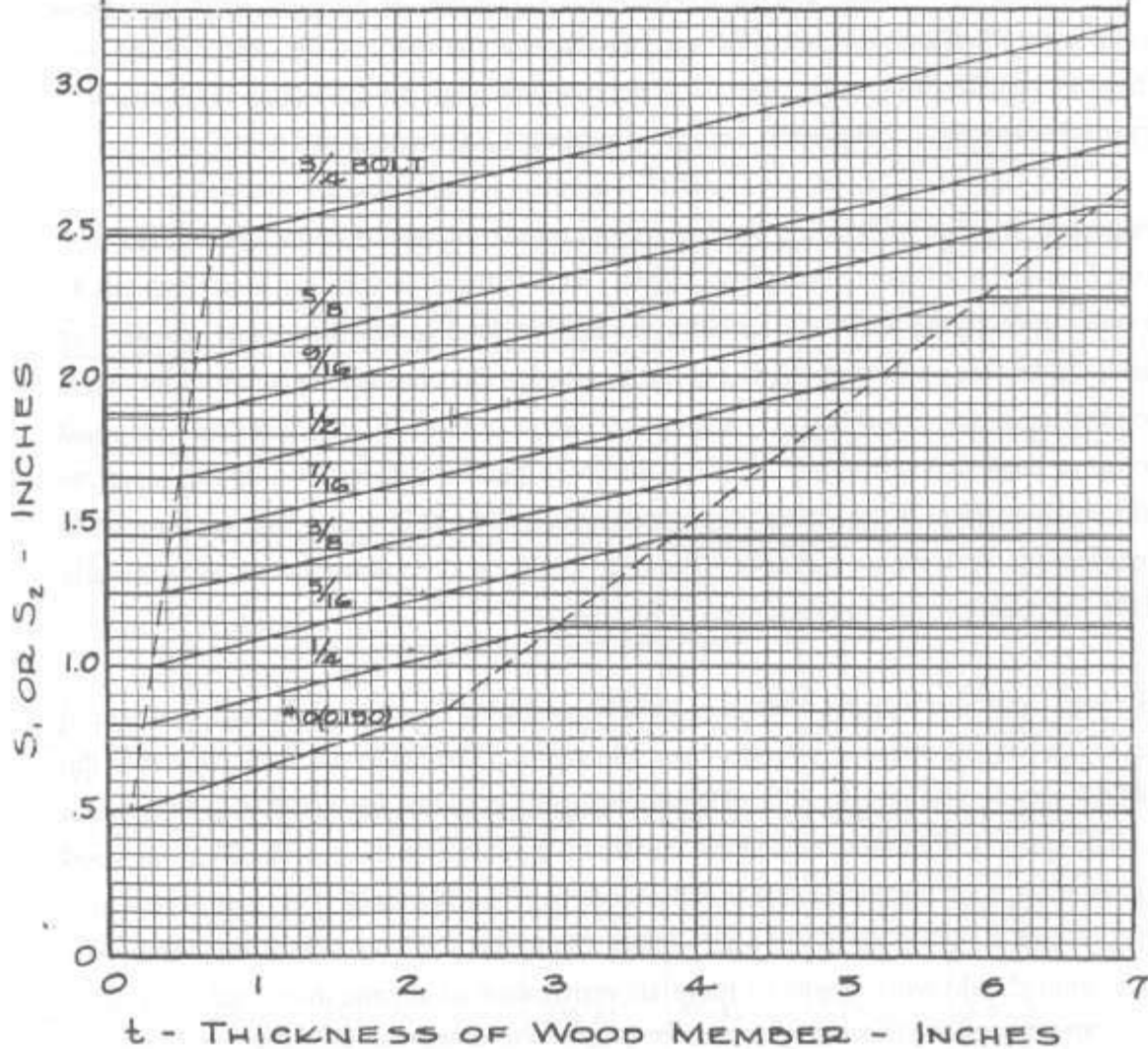
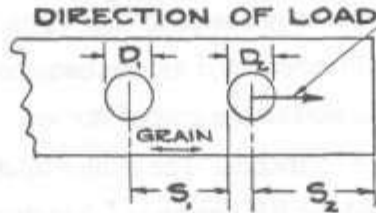


FIG. 2-4. ALLOWABLE DISTANCES BETWEEN BOLTS IN SPRUCE AND ALLOWABLE

ULTIMATE CONCENTRIC BEARING LOAD PARALLEL

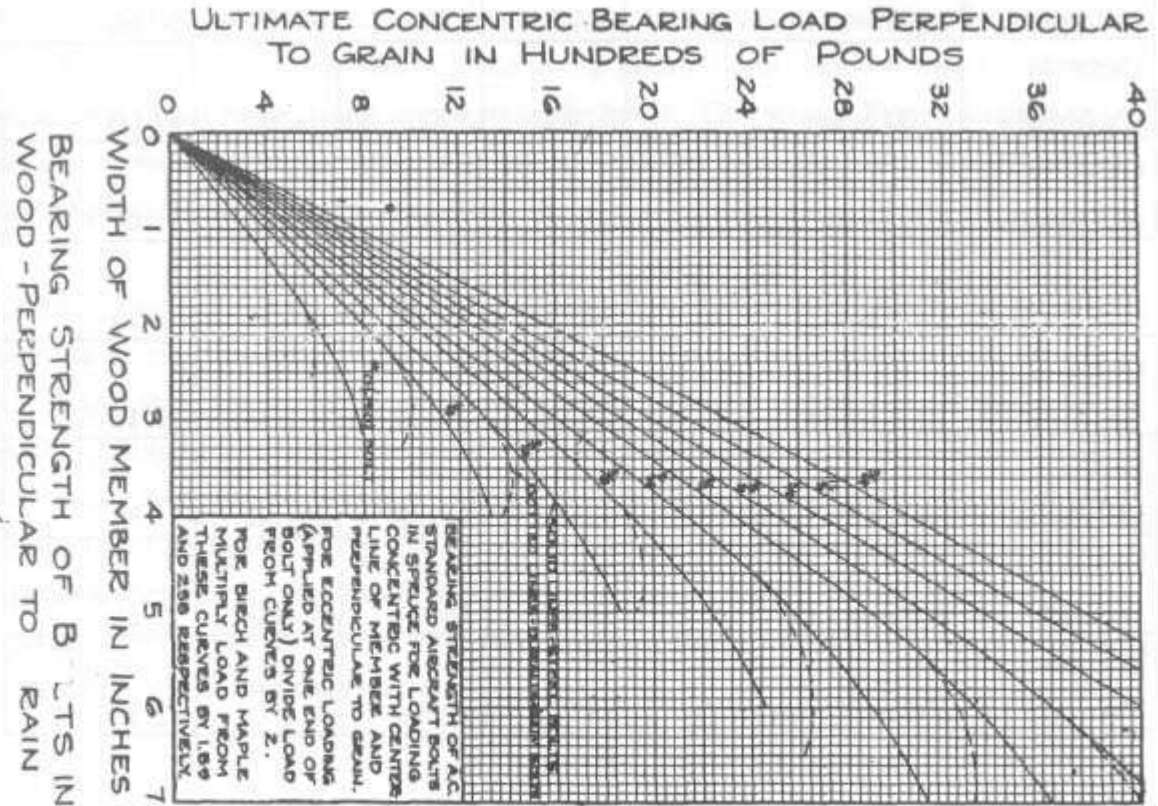
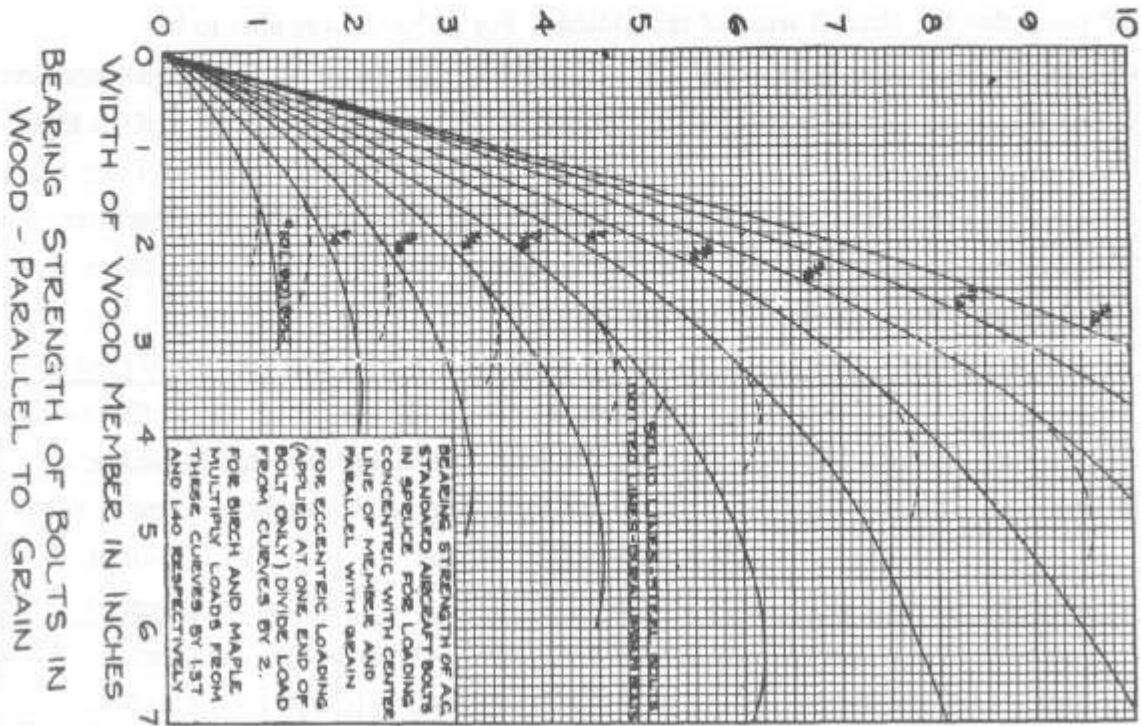


FIG 2-3 BEARING STRENGTH OF BOLTS IN WOOD

ENGINE COMPARISONS

I recently bought an O-200 powered Vari-Eze that had been damaged in a ground handling accident. The main spar, together with other miscellaneous components, was damaged to the point that the aircraft was not rebuildable. For \$6500, I was able to buy a low time engine (154 hours after certified rebuild), all required VFR instruments, a brand new Terra transponder, and an entire plane full of assorted hardware, bolts, seat belts, and the like.

As a part of this deal, I got over ten years of the Rutan Aircraft Factory newsletter. The table below was published in the July 1976 edition of the Canard Pusher, along with a discussion of engine selection and installation.

Engine	1 Time available till next overhaul (regular use = 300 hr/yr)	2 Outright cost for engine	3 Value of engine after runout	4 Cost to owner (2-3)	5 Engine cost per hour of flying
A65/A75 Ohr SMOH	1200 hours	\$1300	\$400	\$900	\$0.75
A65/A75 half runout	600 hours	\$800	\$400	\$400	\$0.66
C85/C90 Ohr SMOH	1200 hours	\$1900	\$700	\$1200	\$1.00
C85/C90 half runout	600 hours	\$1300	\$700	\$600	\$1.00
New O-200	1800 hours	\$4700	\$1600	\$3100	\$1.72
O-200 Ohr SMOH	1600 hours	\$3000	\$1200	\$1800	\$1.13
O-200 half runout	800 hours	\$2300	\$1200	\$1100	\$1.38
Top of the line VW	800 hours (?)	\$2600	\$800	\$1800	\$2.25
Low cost VW	100 to 600 hours (?)	\$1300	\$200	\$1100	\$2.20

CONT'D PAGE 7

What is clear from this table, other than the fact that aircraft engines have gotten a lot more expensive since 1976, is that auto engines are not as good a deal as they might at first appear.

A recent article in the EAA publication, The Experimenter, describes a Subaru project that would be comparable to an O-200. The total price on that conversion, including initial purchase, all support equipment, and reduction drive, was \$4000. A run out O-200 with all accessories will cost \$2000 - 3000 and still have some reliable service time. In my own case, I have an engine that should provide years of flying before any major maintenance is required that cost the equivalent of about \$5000.

My project won't have a "new" engine, that could be rebuilt for the price of a single O-200 piston and cylinder, but it will have an engine that is specifically designed for aircraft use. The technology may be sixty years old, but it is an engine that is designed to run at high load for long periods of time.

An aircraft in cruise is running at fifty to sixty five percent of its rated load. Takeoff and climb power is near one hundred percent load for long periods of time. An auto engine is designed to run at a cruise condition of approximately ten to twenty percent load with only brief periods of high power in passing situations.

The other aspect that people consider in choosing an auto engine conversion is that of weight. When all the parts (including coolant) are added up, the typical automobile engine will only save fifteen to twenty pounds over the comparable aircraft engine. This difference can be made up by eliminating electric start.

Donald Reid
15256 Hopeful Church Road
Bumpass, Va 23024
804 883-6828

FOR SALE

Plans built KR-2 that is 90% complete. Aircraft is on the gear (retracks) with wing stubs complete, wings complete except for ailerons, horizontal & vertical stabilizers installed & complete, elevator & rudder installed & complete, turtle deck installed & complete, fuel tank & forward deck complete & ready for installation. I have many materials needed for completion. I am asking only enough to partially cover the cost of materials \$2,000. Construction is excellent, please call:

Ed Crenshaw
1463 Leestan Ct.
Orange Park, FL 32073
904-264-2685

FOR SALE

KR-1 project; boat stage on standard retract; some controls installed; fin, horiz. stab, and outer spars completed; most controls and seat installed; some materials to complete plus canopy; "0" time 1700cc VW, Monnett conversion, \$1600 with engine, \$600.00 without engine; Northwest Illinois

Dion 815-626-8209 or
Ed Janssen 414-261-4717, evenings

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 220 SEPTEMBER 1995

HELP!

I'm looking for help with the installation of my MATCO brakes. I have been unable to find a description or illustration as to how to properly mount them to the axle, what spacers might or might not be needed, etc., etc.

Larry Reid (see sale ad for address/#)

FOR SALE

ICOM A200 Radio. Has never been used and still in box. \$925.00, shipping included.

Larry Reid
11006 W. 11th St. Ct.
Wichita, Kansas 67212
316-729-9166

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$20.00 PER YEAR- U.S., \$25.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN INDIVIDUAL COPIES \$2.00 EACH.

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN



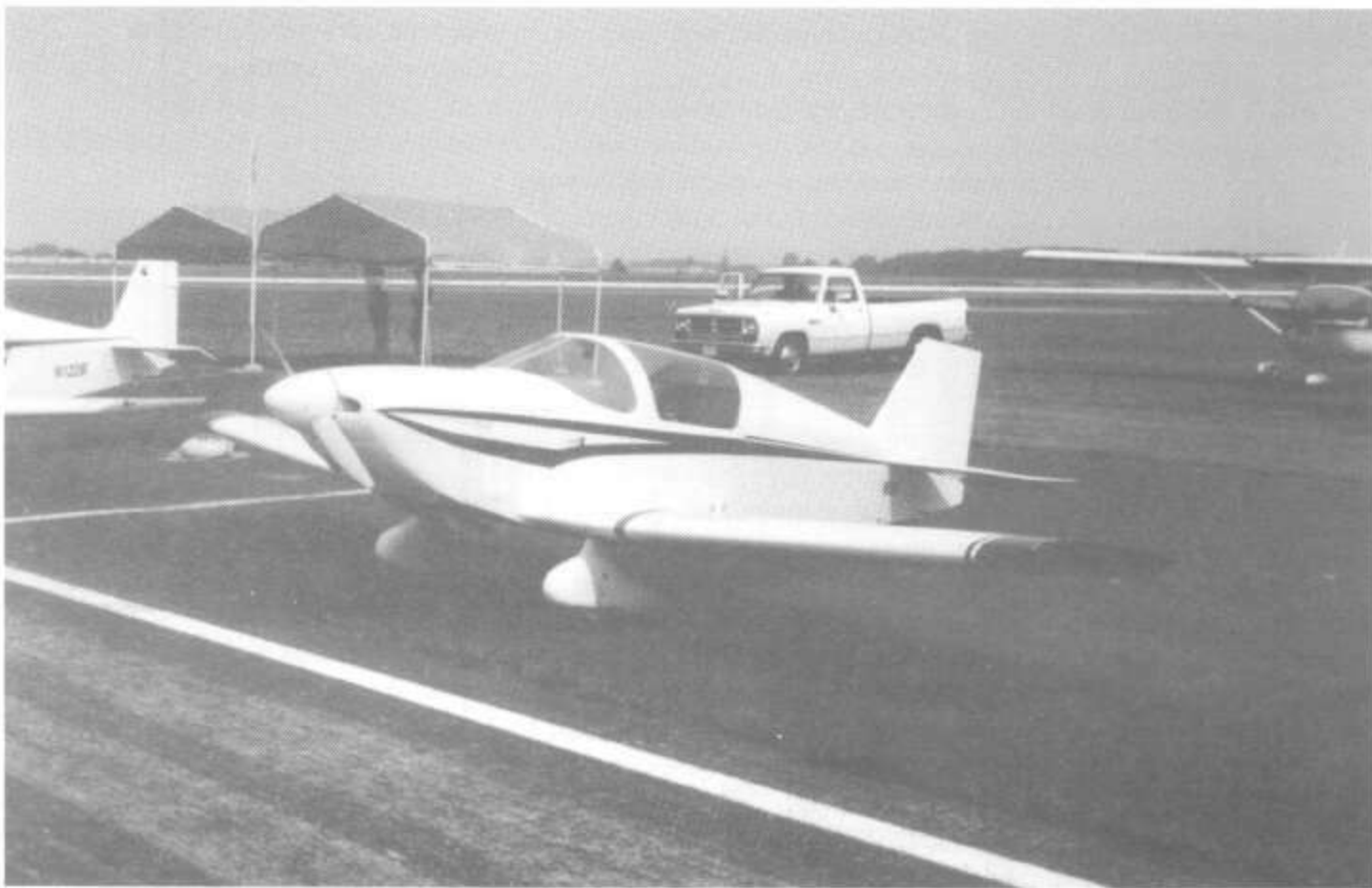
KR NEWSLETTER

ISSUE 221
OCTOBER 1995



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



RANDY GROVE'S N6GM, BELLEFONTE, PA

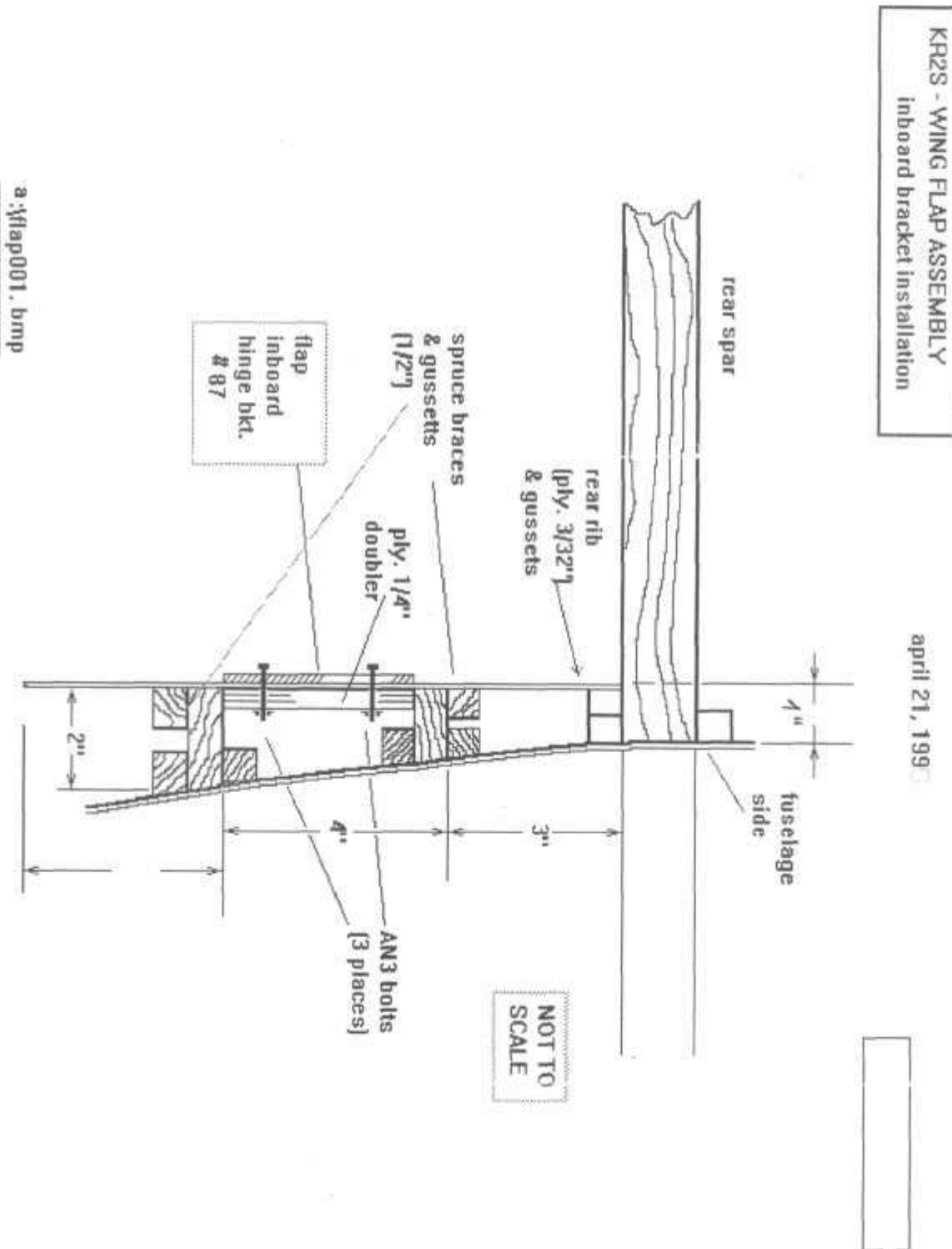
Randy's KR-2 is powered by a 1994cc Barker engine. Barker produced engines in the late 70's and subsequently went out of business. Randy uses a 52 x 48 Sterba Prop, Zenith carb and has a home-brew fixed gear. Randy can be reached at: 814-355-7343

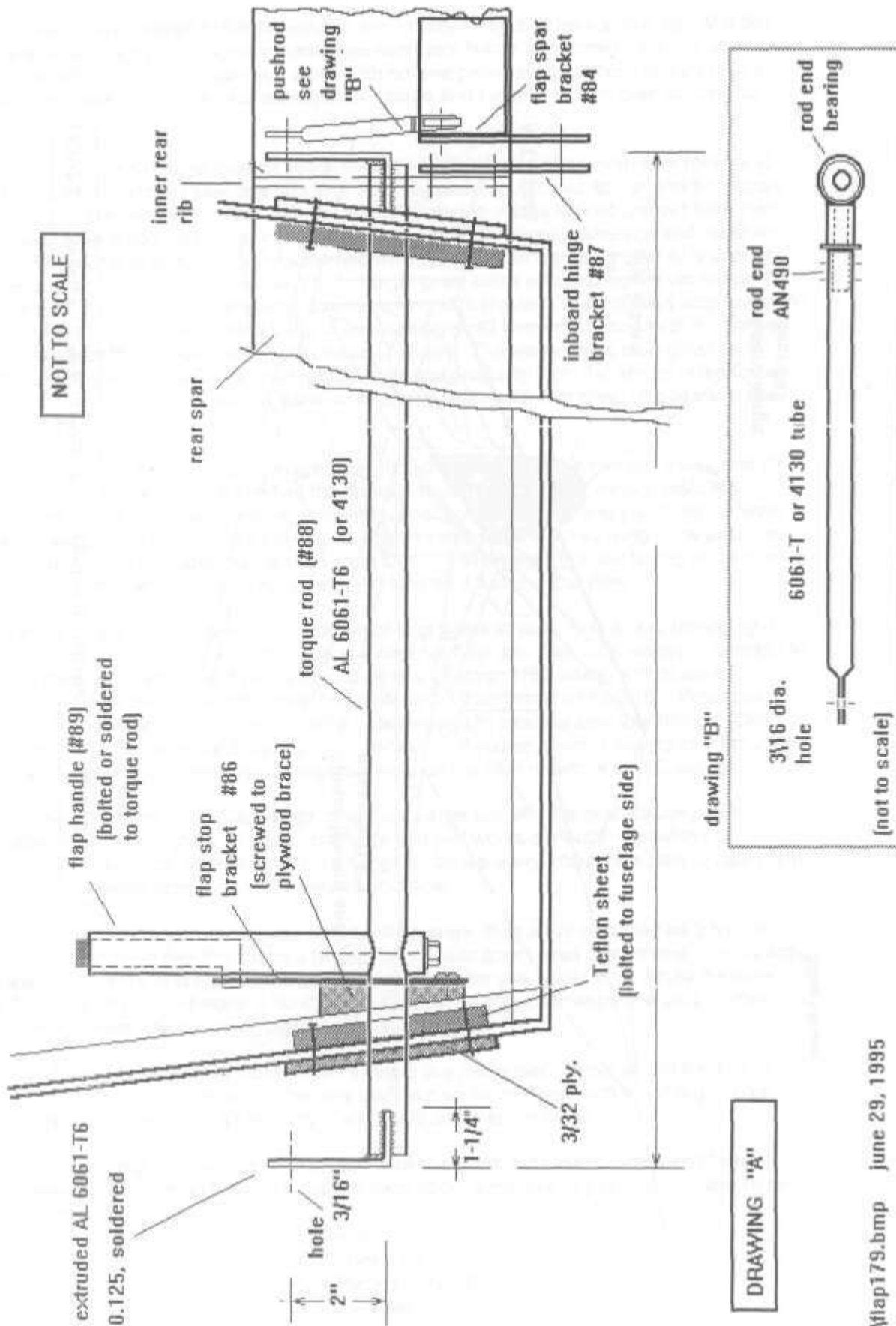
ALESSANDRO PECORARA FROM TORINO, ITALY

My KR-2S will feature flaps: I think that the instructions (bolting the inboard hinge bracket to the fuselage sides), need some refinements, as a good wing trailing edge fillet needs a gap of some 2" between flap and fuselage size.

The following is a sketch of a possible way to install the bracket (that should be light and strong) **but I have no way of making structural calculations to proof its strength... so I need somebody's help.**

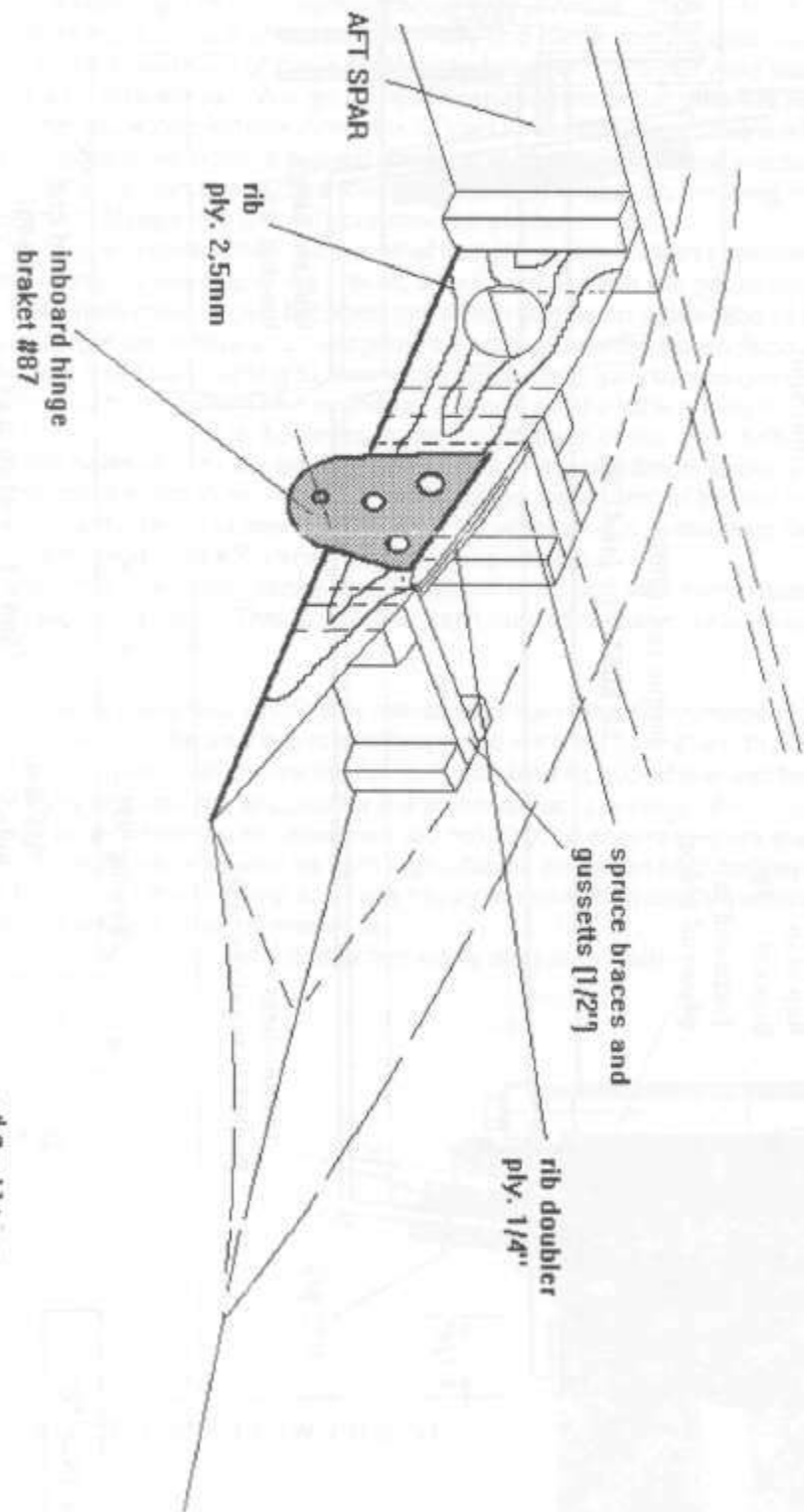
ALESSANDROS SKETCHES REFERENCING THE ABOVE, ON PAGES 2, 3 AND 4.





flap179.bmp June 29, 1995

KR-2S - WING FLAPS ASSEMBLY - Hinge bkt installation 29 June 199



a:\Bsp-bkt.c

Greetings Fellow Wood and Plastic Fabricators:

I recently subscribed to KR Newsletter and I really enjoy it. About a year ago (9-8-94) my Emeraude with a legacy engine experienced alternator failure and I crashed in the woods near Remer, MM. Obviously, I survived albeit with several physical conditions I lacked before.. However, my plane was totaled so I salvaged all I could and I vowed to start over as soon as I could.

I've liked the KR in general for years. I read all articles available, even sent for an info pack. However, everytime I saw one up close it looked malproportioned to me, like an aircraft with pituitary problems. To my eye, from spinner to aft wings, things looked fine but from there back it looked like a polliwog. In any case, I decided to design my own fuselage and mate an extended RAF 48 wing to it. I partially patterned the fuselage after my Emeraude only shorter. The fuselage is made of "aero core", strips of straight grain balsa with mahogany veneer on either side. It's built like a canoe-upside down -starting with regular longerons laid atop an open topped 2 x 6 table. One has already cut and installed plywood formers starting with the firewall and proceeding to the tailpost cut to your choice of shape. The aero core is then glued to the longeron and screwed to formers and layer by layer you gradually form the shape of the lower fuselage. When this is done, you fill, sand, and cover outside with two plies of glass and the inside with one.

I finished the entire lower fuselage through that stage in about a month. It weighed 78 lbs at that point. Since then I've finished the firewall, built back of motor mount, installed "Whitman" style main gear and brakes, installed rudder pedals, brakes and plumbing, tailwheel, both center spars, seats, stick, flap control, all control cables and finished wing roots which on my plane extend approximately two feet on each side. I just finished the last fairing and am now beginning my outer wing panel. I have been working on it four months now.

I've stumbled on to a few items that might help some of you. First a spar drilling jig--I had one made like the KR manual shows and it cost me \$50. and was fairly sloppy. I decided to make one from a C clamp and it works fine. Just buy a foot of 4130 tubing with close to whatever inner diameter you want, (I built two, one for 3/16 and another for 5/16). Weld this across a C clamp, then cut out center of tube wide enough to straddle spar and fittings. Don't make the mistake I did and weld tube too high in clamp. If you do, it won't extend very far onto the spar and may not align with your fittings, so weld tubing near mouth of a 3" C clamp.

Now, some tool tips. Black and Decker just came out with the best stapler made. Costs about \$20. but it's great. It takes less force and just works perfectly. Speaking of staplers, when you put on your spar web, I'd suggest staples every inch. It's a pain to take them out later, but its better than a bad glue joint on your spar.

I'm using 1/8" ply on my plane since it will be larger than a KR so it may be a bit stiffer than 3/32. For shaping filler I've found a farriers file is quite good, even a worn one. Check with someone in your area who shoes horses - he'll probably give you an old one. I tried the new round Stanley surform - not worth a hoot. Stick with half round wood rasps and clean when needed on your wire wheel - much better.

And last - these new random orbital sanders are just super. I have an old Sears and there is absolutely NO comparison. The new ones cut so much faster with few if any marks. I believe with one of these and a belt sander you could do an entire plane.

I'm an older guy forced into retirement since the crash but I love building and flying. I have a phone in my shop so if anyone has question about aero core or just wants to talk I'd be pleased to chat.

Art Smart
HC05 Box14-A
Park Rapids, MN 56470
218-732-5295

P.S. I've kept a video record of my construction for the FAA and my son if anyone is interested.

PHOTO SUBMITTED WITH THIS ARTICLE ON BOTTOM OF PAGE 6.

This letter is in response to Joel Utz's letter in issue 219 (Aug 95). Joe's concern about spar cap failure at the bolt holes paralleled mine. I had a structural engineer employee of mine run calcs on the strength of this interface based on a GWR of 1050#. These calculations were sound as far as the strengths of the various wood and metal components, but were questionable due to my limited knowledge of the in-flight air loadings on the outer wing panel. (I have the extended span, Deihl wings.) We ran several sceneries based on different loading distributions and I felt a little more comfortable when the G load limits of the joint calc'd in the 5 to 7 range. It should be noted that the point of highest stress is at the wing/fuselage juncture. This load limit calc'd at about 3.7G worst case (spar cap compression failure) so the wing root will probably fail before the attach fittings in a properly constructed airplane.

The "proper construction" part is what had me worried when I decided to epoxy bond the wing attach fittings to the spars. As I recall, I could not achieve the necessary alignment to get a perfect 3/16" hole cross drilled between the attach fittings on either side of the spar. Every hole was off target just a little and I imagined all sorts of horrible loadings on the bolts during flight. I thought that I had nothing to lose and everything to gain by epoxymg the whole affair.

After 325 hours, much of it in choppy Arizona air, the attachment fittings are still firmly bonded to the spars. There is, however, some degradation of the main bolted joint (the 3/8" bolt). The bolt holes in both the inboard and outboard attach fittings, upper and lower on both wings, show minor elongation. This is allowing some movement of the outer wing panel. I am not sure if this is the result of one gust encounter or whether it is cumulative "trauma". I'm curious if there are other high-time KR's showing this aging pattern.

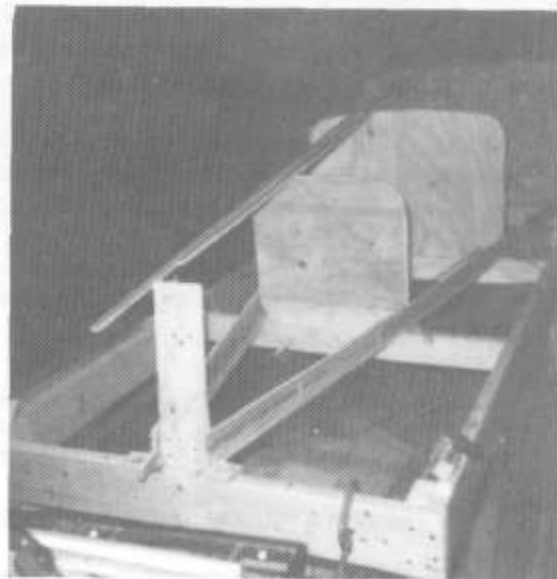
I plan on reaming the fittings to the next standard bolt size and installing a single long bolt with a spacer between. This is another "can't hurt" idea that maintains attach fitting alignment under load.

It's been 6 years since N39HK's maiden flight and the honeymoon is not yet over. I don't fly as often as I would like as there is another, more important love affair, that needs my attention (family). It is still the kick-in-the-pants, fun to fly airplane I'd hoped it would be and I continue to encourage folks who call me to consider it a prime project candidate if it meets their needs. Performance on a conservatively designed (60 hp) 2100cc engine is more than adequate to allow mild, +G aerobatics as well as both high altitude and short field runway visits. I plan on keeping it for a long time to come and I am happy to answer anyone's questions on its construction, operation, and maintenance.

Keep at it,guys...it's worth every penny and every drop of sweat!!

Howard Kaiser N39HK
1339E. Carmen St
Tempe, AZ 85283
602-839-6387
74267,3454 ©CIS

ART SMART'S PROJECT (ARTICLE ON PAGE 5)



Your Attention Please: Under-the-Bottom Stalls and Elevator Bell Cranks

Dear Earl:

I'd like to tell our pilots about a flying characteristic of aircraft partly discussed in the second paragraph, page 53 of the September 1995 issue of *KITPLANES* magazine. A topic of the article described the effects of high and low wing positions on the lateral stability of aircraft. A simplified description of the effect of low wing position is to tend to roll to the left in a large sideslip due to wind from the left (and vice versa). High-wing aircraft tend to roll in the opposite direction given the same situation. If we deviate from proper aircraft handling, the rolling tendencies of both types of aircraft can present a fatal flight safety hazard.

I recently received a video tape from the AOPA entitled, "Proficient Flying," with Barry Schiff. A part of the tape showed what is termed an "under-the-bottom stall," which is a major cause of fatalities in small general aviation aircraft. On the video, a stunt pilot in a high-wing aircraft demonstrated an under-the-bottom stall. To enable recovery, the stunt pilot climbed to a few thousand feet AGL before simulating the unexpected rolling stall. The camera sequence went like this:

1) On imaginary left base, the stunt pilot overshoots the centerline much too far to the right. (In an actual landing, the plane might also be below proper glide slope, and the pilot might chance a landing anyway.)

2) The stunt pilot puts in a large amount of left rudder to get back to the imaginary runway centerline. He cross controls with the ailerons to balance aerodynamic forces and approaches just above stall speed.

3) The large skidding sideslip angle induced by the pilot stalls the right side of the high-wing. **The plane abruptly rolls over**, nose down to the right. As described above, low-wing planes in the same scenario would likely roll over nose down to the left. At low altitude, recovery in either type of plane would be unlikely.

The AOPA video tape demonstrated a hazard of improper aircraft control and electing not to go around when substantially overshooting the runway on base leg. Manuals that describe proper side slipping or forward slipping state the techniques are for reducing altitude without increasing airspeed and for dealing with cross winds on final. In a wind from the left, a proper slip would be left wing down and right rudder as needed (exactly opposite from what could get us into an under-the-bottom stall!). If we ignore proper procedure and stomp the rudder into the wind to get back to the runway at low speed, an under-the-bottom stall can result.

Although the stall described above can occur in an approach to landing, why couldn't the same thing happen in a slow-speed takeoff? It **can** happen, particularly if power is chopped for some reason, effectively putting the plane in an approach-to-landing situation. If the pilot then puts full rudder into the wind, an under-the-bottom stall could result. However, normal takeoff propeller blast can help keep air flow attached over low wings.

Given that we are all very interested to know potential causes of accidents, and that a few builders diagnose those causes, it may be of some use to go a little farther with the under-the-bottom stall crash scenario:

If a high-wing plane does an under-the-bottom stall on final when it is slipping due to a wind from the left, it will likely crash on the runway or to the right of the runway. A low-wing aircraft in the same situation could roll left and crash to the left of the runway, on the runway, or to the right. It would appear to any witness of a crash resulting from an under-the-bottom stall that the plane just flipped upside down for no reason.

The last thing is this: When a plane crashes in an inverted stall, a relatively low impact would easily generate a 20-g load factor. That means if a pilot or passenger hits the control stick in a crash, the person will instantly impart thousands of pounds of load on the elevator control cable and bell crank. If the cables are properly swaged (and they better be!), even the best bell crank will break or pull out of its attachment in a crash. Thus, any panic to redesign a **well-proven bell crank** based purely on some guy's **assumption** that a cable must have pulled through a KR bell crank in flight instead of in a crash would appear unjustified to say the least.

Thank you for your kind attention,

Don Blankenship
Aerospace Engineer

(513)255-2451 days, 859-8581 eves
615 Wilson Park Drive
Dayton, Ohio 45449-1651

FOR SALE

2180cc VW (0 time) Monnett conversion,
less magneto. Set up for distributor.
Zenith carburetor... asking \$3,900/OBO

John Nowicki
708-293-4043

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 -- EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

HELP!

Has anyone installed a push-pull rod
control system in a KR-2 Call after 7:00
p.m.

Clarence Fangman
R.R. 2, Box 3
Dyersville, IA 50600
319-875-8596

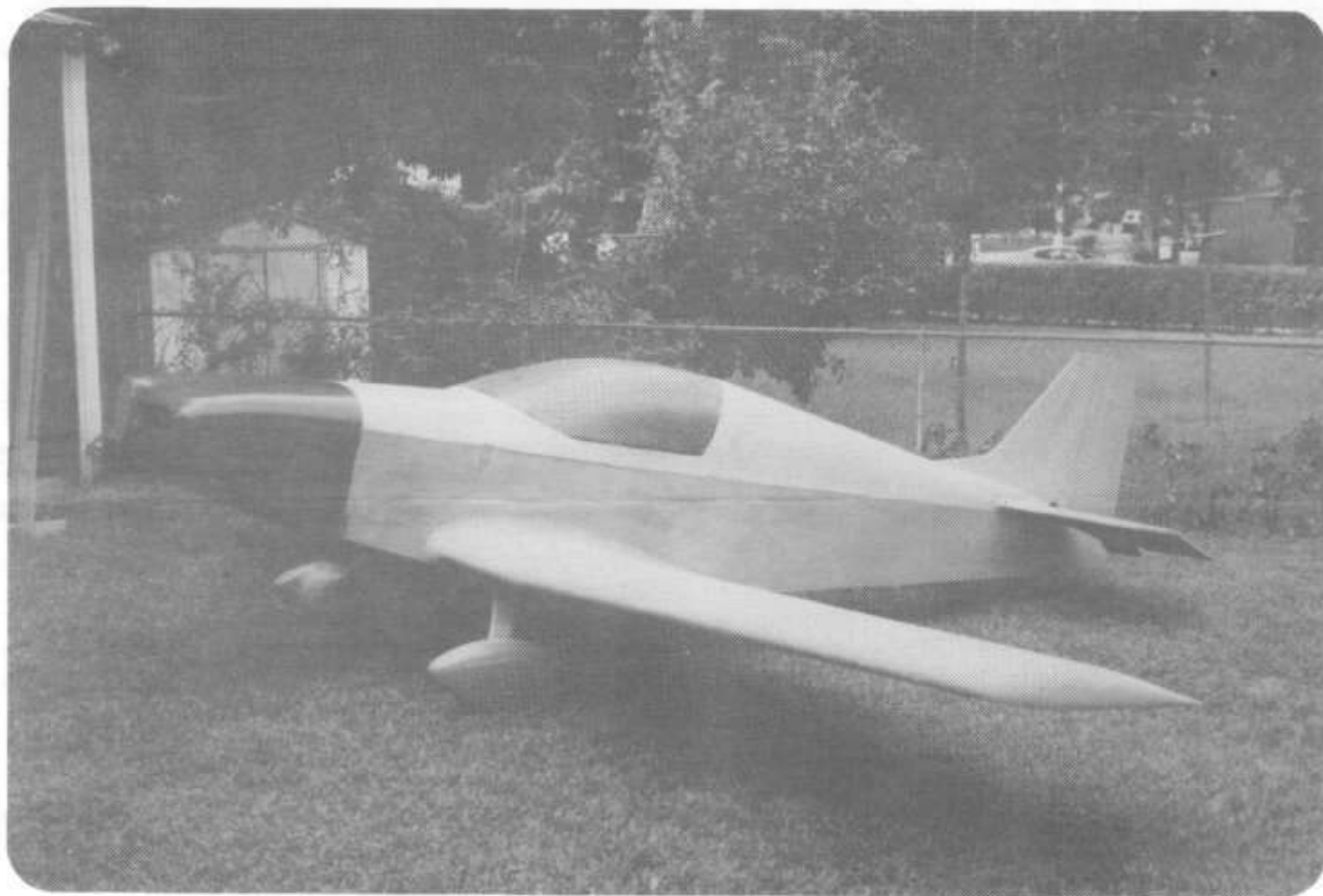
KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 221 OCTOBER 1995

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



DAVE BLUCHER'S KR-2S, ORLANDO FLORIDA

Here's a photo of my KR-2S. At this point, airframe only, it weighs 338 pounds. I ordered the plans at lakeland Sun 'N Fun in April, 1993. The first wood was cut in June, 1993. I retired in January, 1994 and since then I've been averaging about four hours per day on it. Total time to-date, is 1110 hours.

(Cont'd page 7)

For all of us who have been told that the KR is not able to accomodate tall people, 'Don's article should be of interest.

DONALD REID'S UPDATE ON HIS KR-2XL

This is a project update on a modified KR that I plan on registering as a KR2XL. The fuselage has been stretched 11 inches over the KR2S plans, I added an additional 5 inches in front of the main spar and 6 inches behind the rear spar. The fuselage is 3 inches wider and 1 inch deeper than the 2S. Wing span will be 26 feet with an area of 100 square feet. The empennage span and area have been increased slightly.

The projected empty weight is 750-800 pounds, with a designed gross of 1400. To carry that much load, several areas needed to be strengthened. The center section main spar is solid and the outer main spars have wider and deeper spar caps. The top longeron doubler is slightly longer with a third longeron added below it. This is also a doubler on the bottom longeron that extends to behind the baggage area.

The main fuel tanks are in the wings, with 15 gallons on each side. An electric fuel pump will transfer from there to a 3 gallon header tank that will constantly overflow back to the wing tanks. I added a plywood rib at the inboard end of the outer wing panels. This should result in a more accurate profile and a cleaner line at the joint. The wing bottom was glassed first to make tank installation easier. The stub wing top surface will be glassed after routing the fuel lines and installing the flap actuator linkage.

The control surfaces are mass balanced with lead weight. It does not show up in the photos but I continued the air foil from the root to the tip on the rudder and elevator instead of transitioning to the flat profile shown in the plans. There is an auxiliary rib made from 6mm birch at the ends of the elevator and rudder with a 2 inch foam extension. After glassing the surfaces, the foam was removed from the leading edge area and this cavity was filled with lead shot mixed with epoxy.

The majority of the changes I made were required because of my size, 6'9" tall and 240 pounds. To allow little people to fly my plane, I had to come up with moveable seats and rudder pedals. The pedals can be adjusted 1-2 inches and the seats 6 inches. I couldn't find any light weight seats that would fit in the available space, so I made my own. They consist of a 0.25 inches thick foam core covered with two plies of glass inside and out. A strip of 3 inch wide unidirectional tape runs along the edges, inside and out, for extra stiffness. The seat tracks are 0.75 X 0.058 tubing with 0.875 X 0.058 slides. The slides lock in place with a pair of clevis bolts that are reached via an access panel under the floor. Each seat and track weighs about seven pounds.

The main spar wing attachment fittings are fabricated from three layers of 0.063 X 1.5 steel. The layers are tapered in width and graduated in length. The strap fittings are bolted to the spar with 1/2 inch bolts. It would have been more elegant to use smaller bolts with large diameter metal bushings in the spar, but that involves additional steps in the fabrication process. The wing removal bolts are also 1/2 inch, with a compression spacer between the front and rear straps. These could have been 7/16 inch but since I already had all those other 1/2 inch bolts, why not put in a few more.

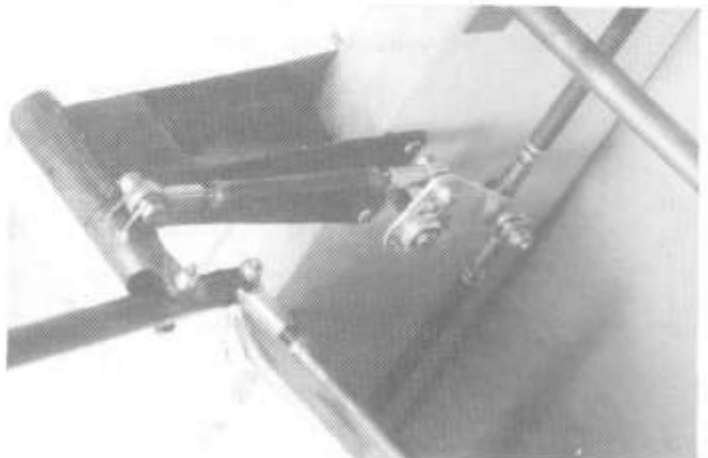
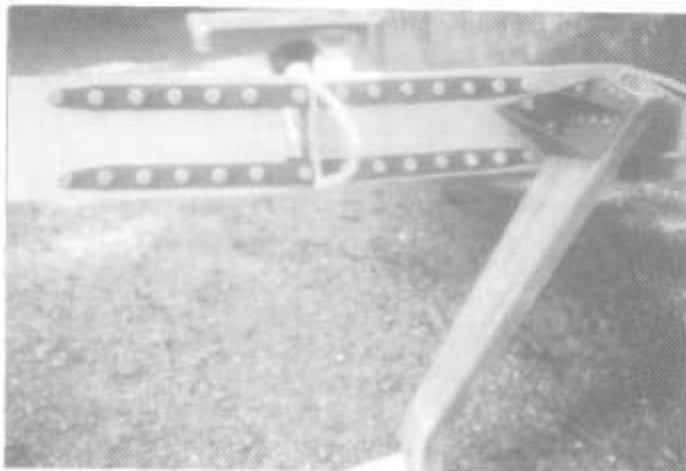
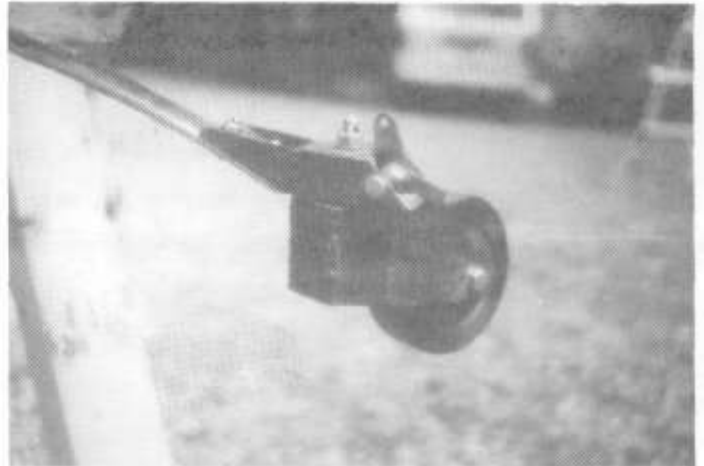
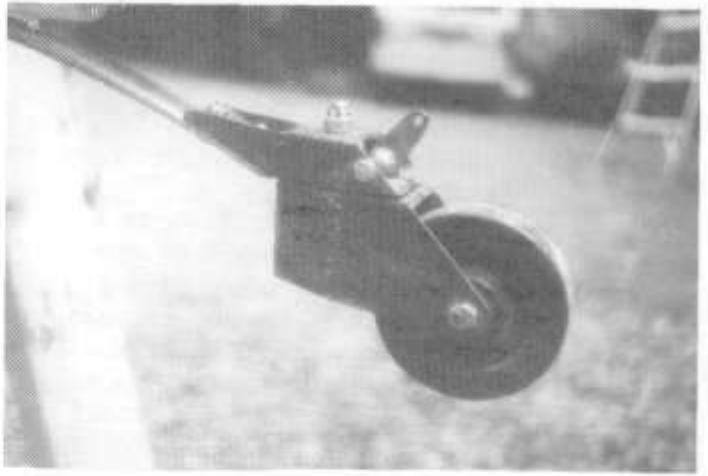
The landing gear is designed for a 5G static load. It is unidirectional glass layed up in a mold. The legs are 1.5 inch thick and 6 inch wide. They are tall enough to give a 9 inch ground clearance with a 72 inch prop.

The tail wheel is a Haigh style locking, full swivel unit that I designed myself. The locking lever is held in a slot by a small spring. A slack cable will run from the locking lever to the elevator cable. The wheel will only unlock when the stick is held in the full nose down position.

CONT'D PAGE 3

A preliminary weight and balance shows that the 750 pound empty weight is possible if I don't get carried away with extras. The engine will be a stripped down 0-200 with a B & C alternator, no starter, small battery, day VFR instruments and a wood prop. The worst case after CG (two of me, full wing tanks, empty header tank and some baggage) will be used to determine the engine mount length. Total construction time has been 1600 hours since starting in March of '93.

Donald Reid
15256 Hopeful Church Road
Bumpass, VA 23024
804-883-6828



FROM STUART ROBINSON...

Dear Earl, It has been a long time since I have written you but I have been reading every word from your fine Newsletter.

Ken Rand and I decided early on in this venture that we would not put a straight jacket on our builders and insist that the plans be followed to the letter as so many other designers have done. In hindsight I am pleased and I'm sure Ken would have been very pleased at the many different ways a person can build the same airplane. Your Newsletter has given the builders so many options that it must be hard for some of them to know where to begin.

Ken always loved all the bells and whistles and we always eventually had a very full instrument panels, large engines, adjustable props and turbochargers. But I still have soft spot for the occasional builder who writes in and tells about his little "Plane Jane" KR-1 or 2 that he built in his living room, it flies just fine, doesn't weigh too much and his wife still loves him. That is the heart of what we had in mind.

There is nothing wrong with lots of stuff, beautiful paint jobs and big trophies at fly-ins but just once I would like to see a trophy for the "Lightest KR-2" or the "Most Tolerant Wife".
Sincerely,

Stu Robinson
22352 Longeway Rd.
Sonora, CA 95370

"LIVE AND LEARN OR IS IT LEARN AND LIVE"

This incident happened to me a number of years ago in my first KR-2. One day I was out by myself and I would firewall the throttle, climb up very steeply and just before the stall, kick in left rudder and head back down in the direction from which I had come. This was great fun for 3 or 4 times. Next I wondered if, at the top, I could reverse my direction as before but hold that altitude. I tried that just one time. I can't tell you what the KR did but all of a sudden there was a deafening noise, the control stick was oscillating forwards and backwards like a fast sewing machine needle and I was heading straight down for "the farm". I was probably at about 3000' and I remember thinking, "I can't survive this". I put both hands on the stick but I could not overcome the oscillations no matter how hard I pulled. Finally, I got enough wits about me to retard the throttle. I was then able to pull out of the dive. People have asked me, "How fast did you get to in the dive" and "How close were you to the ground when you finally leveled out"? I can't answer either question... I was too shook to notice.

From the noise, I was sure that the tail feathers had departed the aircraft or were about to. I very gingerly headed back to the airport for a very careful landing. After a period of time and when I thought maybe my legs would support me, I got out to assess the damage... there was none. No doubt I had gotten into a full power stall which resulted in elevator flutter. The loud noise was probably all the control and seat belt cables slapping the sides and bottom of the fuselage.

The original builder of that KR had installed four elevator hinges instead of only three as called for in the plans. This fact probably saved my life. (Our present KR-2 has balanced elevators.)

The first and foremost lesson I learned is that if you are not a qualified aerobatic pilot, don't try to act like one. (The KR-2 is not really designed for aerobatics anyway.) Second, if you do get into trouble, reducing the power will usually help the situation. Best regards,

Max Calkin
14095 Denver Rd. W.
Omaha, AR 72662
501-426-5307

HELPFUL TIPS FROM PARK RAPIDS, MINNESOTA

Greetings again from "crash " Smart here in, northern Minnesota My KR derivative is coming nicely I started on the bottom of the wings since I had it inverted to finish the wing roots anyway. Took me a while to reason out the diehedral etc. upside down but it wasn't too tough, i've tried a bunch of different adhesives to attach the "planks" of one inch polyurethane and I've found one that seems to work real well for me. Tried hot glue...fast but won't sand and leaves holes if you try to remove a chunk after drying. Epoxy, at least mine doesn't sand well against the foam and 2 part expanding foam [like great stuff] attaches well but doesn't sand. I came up with something that some of you may want to try It has worked great for me. The idea began as I looked at the cups and cups of polyurethane grit lying about on my floor I reasoned that if this could be mixed with an adhesive it might sand easier and would be of the same material. I made a slurry of this dust and aliphatic resin glue [titebond or Elmer's], slopped it on the planks, toothpicked them in place and dried. To my pleasant surprise, it sands beautifully, no dips or high points from my straight edge grinding over too soft or too hard glue alongside the tender foam. Beware of a couple points tho ..straight aliphatic resin won't work {dries to a crusty hard edge}, and don't get it too thick or it won't spread nor will it adhere to the foam edges well. So experiment around with some scraps first to get your consistency established.

I wanted to mention a couple other items that might help some of you I sent for some polyester filler to {famous west coast company}> Its advertised as being much lighter than "regular" fillers. 7.5 lbs/ gal. as opposed to 12 lbs/gal. The ad shows bondo right above supposedly weighing 12 lbs / gal. so its clear what they're referring to. So I sent for the Dynalite...21 30 per gal + reg. shipping + hazardous material surcharge. So...it arrives and I place it on my workbench right next to the remains of a gal. of Bondo. Here's the kicker..they are made by the same company, from exactly the same resin, the hardener is identical....and the weight? the dynalite does indeed weigh 7.5 lbs. but the Bondo weighs not 12 lbs per gallon but 7.75 lbs Now, neither can was filled to the top but they appeared to have been at a similar level. The dynalite behaves exactly like the bondo, same color same consistency, same drying time. Why we are faced with this advertising disparity I don't know, but as far as I'm concerned, for half the price and a product available locally, I'll take Bondo. The other point is this...since my plane crash injuries, my eyesight is less acute and I find I can't scarf plywood for my spar webs. What I've done instead is bond a strip of ply over the seam, overlapping 3-4" on either side. To my mind, this much surface bonding the ply together should be superior to a scarf joint. I'd like to hear from any of you who wish to comment. Just heard from the FAA and I have my medical back so as soon as my bi-annual is done, I'll be legal again One other tip....for any of you guys who haven't drilled your spars yet, Harbor freight has a set of extra long, brad point wood bits for ten bucks. You'll pay more than that for one usually. Sizes from a quarter to a half inch {I think}

So long for now from frozen Northern Minnesota.

Arthur G. Smart

HCD5Box14-A

Park Rapids, Mn 56470

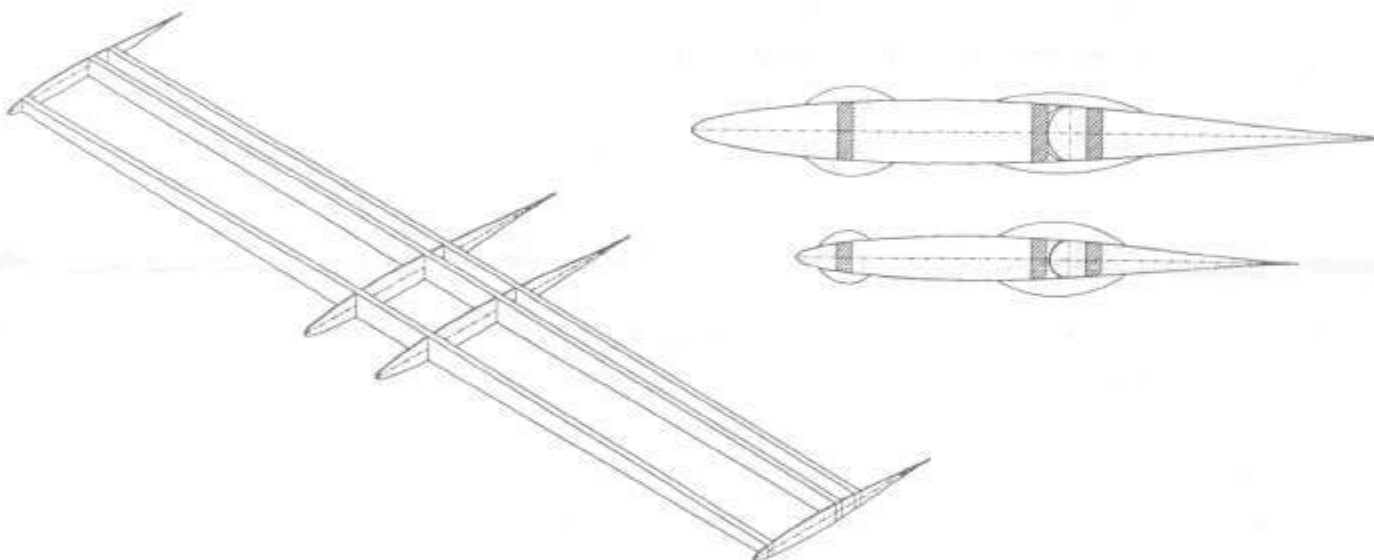
Earl,

I've just completed construction on my KR-2S's horizontal tail and thought I'd share what I learned in the process. Although I changed some of the basic characteristics of the stabilizer, the construction and alignment methods remain the same.

In an effort to tame some of the pitch sensitivity, I made my horizontal stabilizer 6 inches longer on each side, and adjusted the elevator area to remain about the same as the plans call for. I also added two extra hinges (for a total of five) to effectively cut the hinge loading and wear in half. I'm told that the Australian feds are requiring similar modifications for the same reasons. For drag reduction purposes, I chose a NACA 63010 symmetrical airfoil for the root and the tip. That 5/8" square tip called out in the plans is certainly quick to build, but probably isn't the hot setup for aerodynamics. But then we're only talking about a small percentage of total drag incurred... The 10 percent airfoil should also offer more control during a stall than the 8 percent that it replaces. Not that there's anything wrong with the way a KR-2 stalls, if you can get one to stall. Crazy? Hey, that's why they call it Experimental!

My first horizontal stabilizer was built the recommended way, using the long 3/16" rod to align the hinges, which were then marked, drilled, and installed. Unfortunately, once the rod is removed, the elevator removed, and you are able to get to the hinges to drill the spars for the AN-3 bolts, things move around sufficiently that your alignment evaporates. I supposed that the trick would be to lightly glue the hinges in place (just in case you have to replace them some day) while the rod is holding alignment, and later drill the holes using the hinge halves as your jig.

My second horizontal stabilizer was considerably nicer but has taken about 40 hours so far. Yes, it will be a while before this bird flies at this rate. The new airfoils were plotted out full size with the spars (same 7" spacing as the plans) located on the plots. Then these plots were glued to 3/32" plywood which were cut out on the bandsaw. The "humps" around each spar were provided to allow the spar area to be cut away, so that the rib could also double as an alignment fixture during construction. Also, notice that the elevator and horizontal stabilizer are constructed simultaneously as one continuous piece, maintaining perfect alignment with each other.



The tapered spars were created on the tablesaw with the same tapering jig that the newsletter printed a few years back. The angle on the blade was gradually altered during tapering, so that the spars required no sanding to match the airfoil profile. This took an awful lot of thinking (mostly in mirror-mode) and ate up a lot of time, but was worth it in the long run.

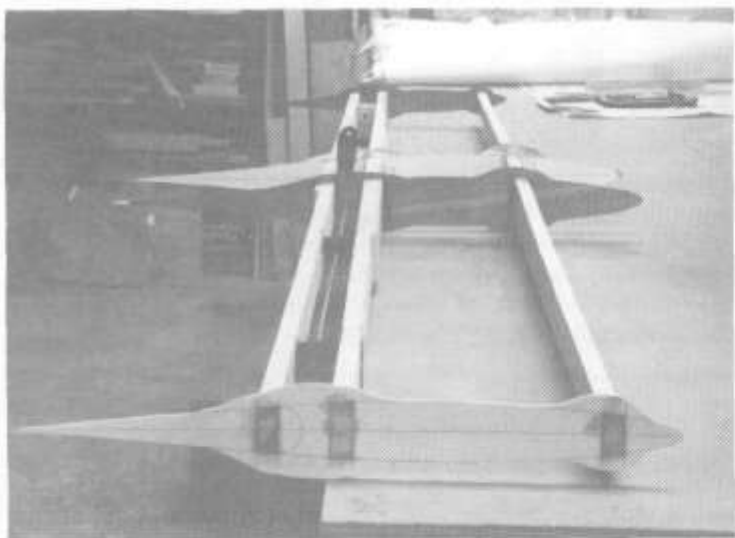
Once the spars were complete, the spar cutout locations in the rib/jigs were removed with a jigsaw. The spars were inserted into the ribs and properly located: the roots at 4" from the centerline, and the tips at the ends. With all the spars aligned and leveled (using a level, a waterlevel, and a straightedge) the hinges were again aligned using the rod and were clamped and epoxied in place between the two spars. All other joints between ribs and spars were also epoxied in place, and gussets added.

After curing, the humps were sanded off down to the airfoil outlines plotted on the ribs. 3" urethane foam (necessitated by my 10% airfoil) was then epoxied between the spars, and shaped by block-sanding between the ribs with an aluminum channel with 50 grit sandpaper glued to it. The large self adhesive sheets sold at Home Depot type stores for floor sanders works great for this job. The glass was applied per the plans, and the resulting surfaces are impressive. Elevator gap seals were created by sanding the urethane foam with PVC pipe covered with sand paper.

Most modifications have their compromises, and mine were no exception. Because my tips are airfoils, they are much thicker, and require deeper spars. That means they are heavier, but also stronger. But as we all know, the design doesn't need to be "beefed up" anyway. The extra depth also required 3" thick foam between the ribs, but I simply glued some 1" to some 2" to make it, and ensured that the glue joint would not require sanding. Looks good so far. I'll let you know how it works!

Mark Langford, 296 Taylor Denton Lane, Harvest, AL 35749

205-851-9901



(Cont'd from cover)

I have incorporated flaps, Diehl gear, elevator trim and have made the header tank removable.

I've ordered a NSI 98 HP TBI Subaru engine with dry sump oil system, dual ignition modules (single plug) and special shock mounting. I was just notified that it will be delivered at the end of November. They have given me the engine serial number so I'll complete and mail off for an N number etc.

I hope to fly it to Sun 'N Fun in April '96.
 Dave Blucher
 616 Viscaya Ave.
 Orlando, FI 32839
 407-855-8071

DO YOU HAVE AN OPINION ON HOW TO MAKE THIS FIRST FLIGHT AS SAFE AS POSSIBLE???

Our local city county airport runway is supposedly 50 feet wide. That might be true if you measure across from runway light to runway light, but these lights are at least ten feet off the pavement and out into the grass. I know I would feel like there would be more pavement if it were a two lane country road. The length is 3400 feet and that is measured to the very end of any form of asphalt. South there is a steady incline, but north its pure terror. When you rotate going north there is at least one full mile of nothing but a deep ravine. There are cedar trees big enough for logging down in that ravine. There is no doubt those trees would devour my little craft and of course I would be in it.

I hope you can understand my hesitation at making the first flight. By the time I would be up to enough speed to make a departure in my KR I'm committed to a go situation. There isn't enough runway left to back off and re-land the craft. I have make several trips up and down the runway. My KR seems to be operating fine. I've gotten it up to about seventy-five before I shut down. That one time I got it up to seventy-five I went off the end of the runway before I got it stopped.

There has got to be a way to determine if my craft has enough thrust to continue flying after rotation. How can I measure the effectiveness of my prop to ensure there is enough to make it around the pattern the first time? I've used a feed bag scale, you know the kind you can hang stuff on and weigh it, and it showed thirty-two pounds of pull at full throttle. My problem with that measurement is, what do I compare it to?

Since I rent a hangar my KR will always have a hangar to be stored in. With that thought in mind I made the winds attached. I know of no way to transport it to a different airport that would be longer.

Some other changes I have made are: metal formed front leading edge fuel tanks, Stretched the length, fixed gear, A double trailing edge flaps on both inboard wings, and an electric in-flight adjustable prop.

I would appreciate any opinions as to making this first flight as safe as possible with calculated educated knowledge rather than just a prayer and a full throttle.

Bob Easland
 Rt #3 Box 53C
 Gatesville, Tx 76528

work phone 817-628-8448
 Home Phone 817-865-2145

FOR SALE

Diehl accessory case with bushings \$ 90.00

KR Style dual port intake system
set-up for Zenith carb \$100.00

Tom Killgore
3395 M-32
Atlanta, MI 49709
517-786-4822

FOR SALE

KR-2 Tricycle retractable gear, cruise
165 MPH, gull wing canopy looks like ""V
Glasair, 500 TTAF, 1 SMOH, wing tanks,
full panel, Flybuddy, COMM, transponder,
full night lights, disk brakes. Easy to
fly. Award winning plane. \$11,900

Ralph Nuanez
805-834-3966

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ATI. AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 222 NOVEMBER 1995

FIRSTCLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN

500
MONTE: MILLER
1900 PARKSIDE DR.
DENTON. TX 76201



KR NEWSLETTER

ISSUE 223
DECEMBER, 1995



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



1995 KR GATHERING FLIGHT LINE

There was a good turnout of spectators while 14 primo examples of KR-1's and KR-2's were shown and flown. Raider Aviation, the host at Maury Co. Airport, did an outstanding job providing services and "Southern Hospitality". They were voted the Appreciation Award at the Saturday eve banquet at the Ramada Inn. Marty Roberts, Jim Faughn, Troy Pettaway and others gave lots of rides to prospective and current builders and the public. I'd encourage anyone interested in KR aircraft to attend the Gathering next year at Pine Bluff, AR. It'll be hard to match the reception given us in Tennessee but I'm sure it'll be fun and informative no matter the locale. Ken Jordan, 328 Green Ave., Carney's Pt, NY 08069

LOOK FOR MORE INFORMATION/PHOTOS ABOUT THE 1995 GATHERING IN UPCOMING NEWSLETTER!!

Anyone mixing epoxy for aircraft should be aware of the importance of correct mix ratios but few know what correct is. An Aircraft Spruce catalog mentioned + 5% (they probably meant $\pm 5\%$) mix ratio error with little drop off in physicals for one epoxy system. The preferred device for measuring is a ratio pump. It is convenient and there is little chance of error but it is expensive. At the other end of the scale (no pun intended) are distance ratio beam balances. They are not commercially available but books and manuals usually illustrate them, saying they are inaccurate and please buy a ratio pump. They are the only devices using separate resin and hardener cups.

I started considering ways to improve the accuracy and convenience of these balances and almost immediately thought of a one cup method of applying the distance ratio principle. I have never seen this method published but it is so simple that it must have been thought of by someone. The scheme is illustrated in the schematic and explained in the text. I used numbers from my design. The second cup is only to demonstrate tare, hardener is added directly to the resin cup. This eliminates the error involved in balancing hardener into a second cup and then pouring it into resin cup. The variable weight of hardener remaining thickly coating the inside of the cup is a bane of the two cup system. It prevents the accuracy needed to consistently develop epoxy properties. The two cup systems illustrated are also inconvenient.

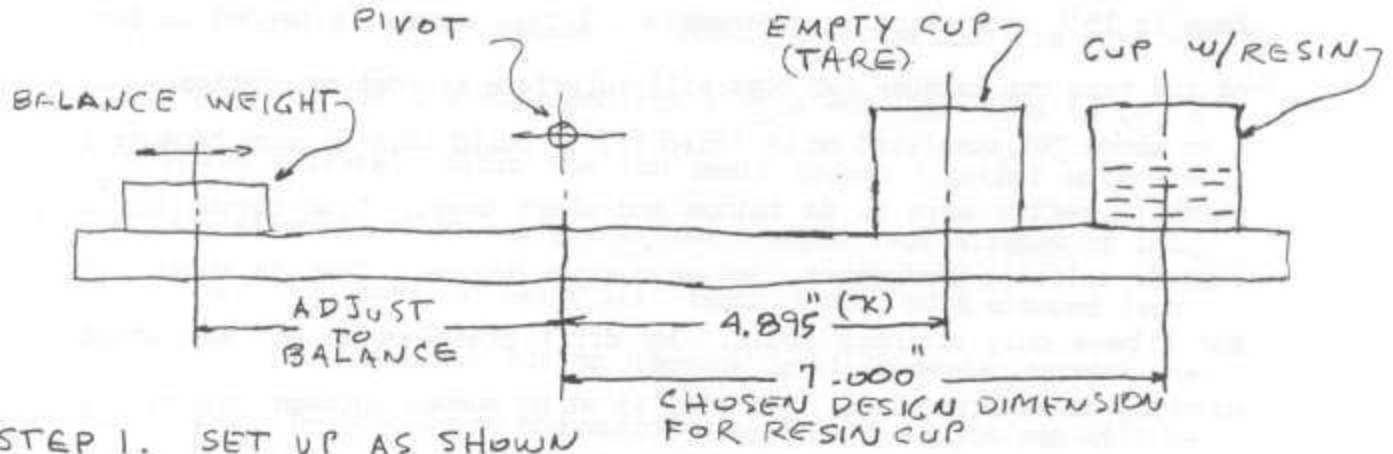
I chose 7.000" for the resin cup dimension as a compromise between accuracy and size. I hope to position the cup within $\pm 1/32$ " of both correct positions. The worst case for dimensional error is the 100 to 100 ratio when $X = 3.500$ ". The error would be $\pm .031/3.5$ and $\pm .031/7.0$ for the resin position. The additive error would be 1.3%, all right for an unlikely situation. As for size my 8 oz. cup is 3 3/4"

dia. so the right side of my beam will be 9" long and the left side 5" for ample balance weight movement. With 1/2" overlap at each end the base is 15" long which is reasonable. A tare weight is needed instead of the tare cup because two cups will interfere at most mix ratios.

I am about 70% completed on my third try to build this balance because I think of better ways to do things and start over. I am trying for a rugged, reliable instrument, not a stopgap device. Cost is under \$10 and I have only ordinary tools. My drill press is an old \$29 stand mounting an electric drill. My shop is at my summer cottage, now closed up until spring. Here are details of the balance as I built it so far, how I intend to continue, some test results and some comments on features of this balance beam.

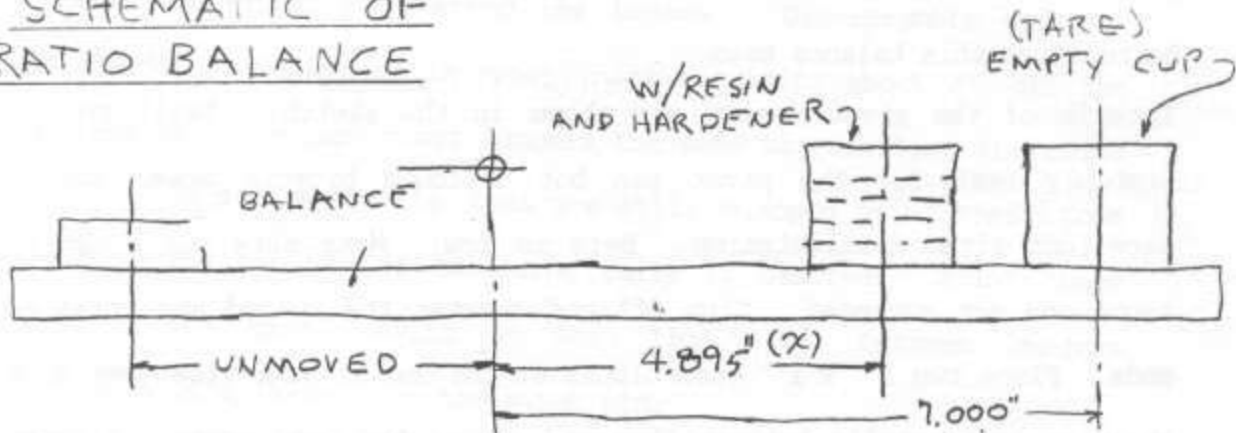
Details of the pivot design are shown in the sketch. Drill rod is probably best for the pivot pin but I found bicycle wheel spokes excellent after straightening. Here is how. Make sure the spoke is round and not corroded. Clip off and chamfer the swaged and threaded ends. Place two 1" x 1" wood blocks at the end of your vice jaws with the wire horizontally between them and across the wood grain. Tighten the vice leaving about 1" of wire protruding to grab in your drill chuck. With the drill running cock it off about 10 degrees and pull the wire steadily out of the wood blocks at this angle. This puts a rotating bend in the wire that averages out to zero as you pull the wire out. You are trying not to fatigue the wire so don't use too much angle and don't pull too slowly. It is not a critical technique and it will probably work on your first attempt. Clip off and chamfer the ends and you will have a length of straight , hard drawn wire. Polish it by spinning it in your drill against fine emery paper using no axial strokes that might leave friction causing scratches. The wire is 5/64" (.078) dia. This is a good size for rugged, low friction pivot for this balance. It is near the lower limits of what I can drill in the metal pivots. I am not big on sharpening small drills. CONT'D PAGE 4

BALANCE SET FOR RATIO OF 100 RESIN TO
43 HARDENER (SAFE-T-POXY II)



STEP 1. SET UP AS SHOWN

SCHEMATIC OF RATIO BALANCE



STEP 2. SWITCH CUPS AND ADD HARDENER TO RE-BALANCE.
MIX AND USE.

THE X DIMENSION (4.895") IS FOUND FROM THE FIXED 7.000"
AND THE RATIO OF RESIN TO HARDENER AS FOLLOWS.

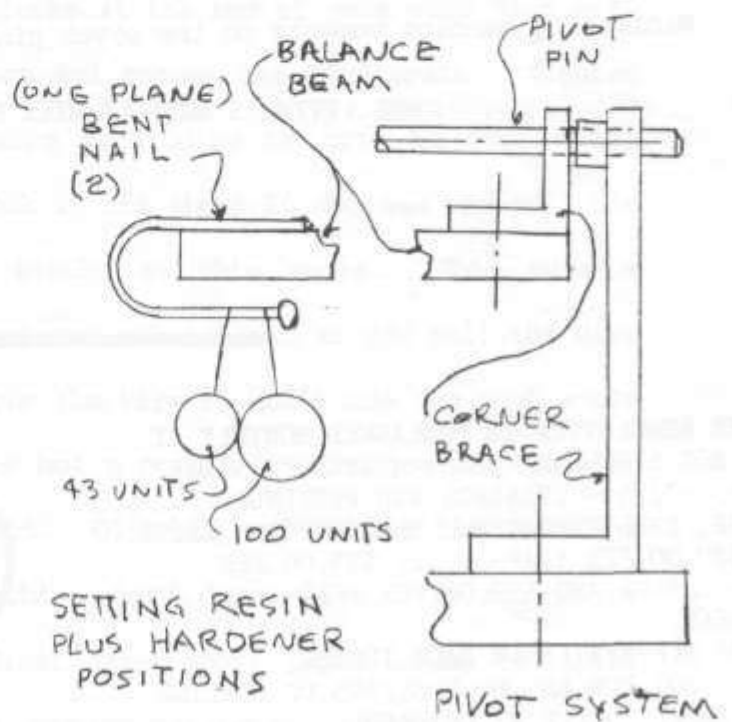
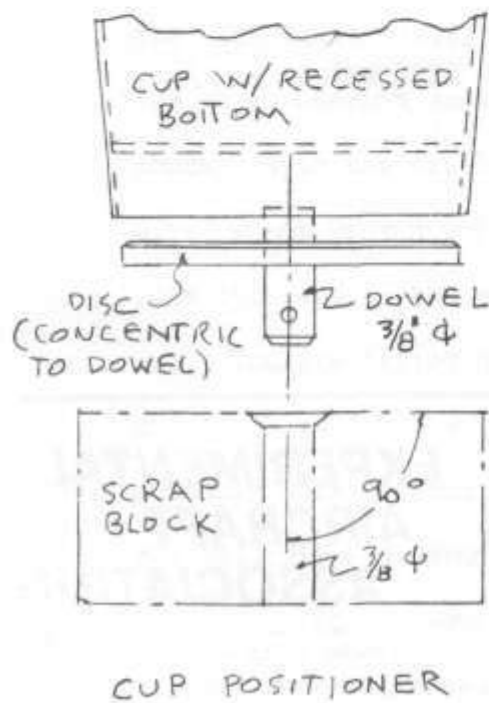
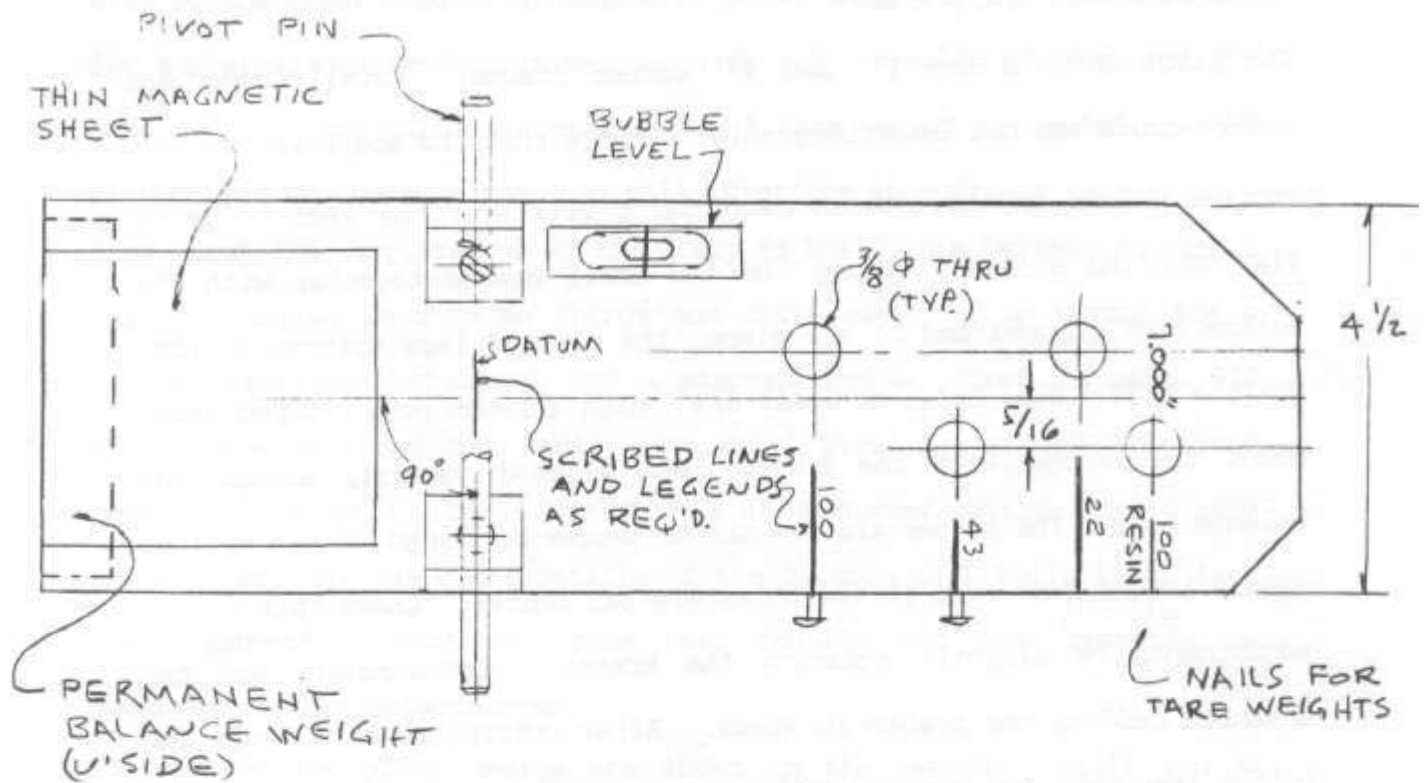
RIGHT SIDE STEP 1 = RIGHT SIDE STEP 2 SINCE LEFT SIDE IS KEPT
CONSTANT. MOMENTS ABOUT THE PIVOT ARE:

$$\begin{aligned} X(\text{CUP}) + 7(\text{CUP} + 100) &= X(\text{CUP} + 100 + 43) + 7(\text{CUP}) \\ 700 &= X(100 + 43) \\ X &= 4.895" \end{aligned}$$

IN SOLVING THE EQUATION ALL THE CUP WEIGHT TERMS CANCEL
SHOWING THAT SWITCHING THE CUPS SOLVES THE TARE WEIGHT PROBLEM.

THE X DIMENSION FOR OTHER EPOXY MIX CAN BE FOUND
IN THE SAME MANNER. GENERALLY -

$$X = (\text{FIXED RESIN DIMENSION}) \times \frac{\text{RESIN WEIGHT}}{\text{RESIN} + \text{HARDENER WEIGHT}}$$



CONT'D PAGE 6

The pivot hangers are 1" and 4" corner braces. Usually they are pretty crude and not interchangeable. Insure that the angle is near 90 degrees, clean up the c'sinks and run a file over the legs to get a flat mounting surface. Clamp the two small braces together with the bottom legs aligned and in one plane, the clamped legs aligned or not. Drill a 5/64" dia. hole, at least 3/4" high through both clamped legs. Mount the braces with the bottom legs aligned squarely across the balance beam. The braces are now mirror images so the pivot pin will be square to the beam even if the holes are off center. Check this making adjustments by slightly rotating the braces. Dis-assemble and re-assemble bedding the braces in epoxy. After cutting about 2" off the bottom legs make the base pivot hangers the same way drilling the holes near 3 7/8" high. While the legs are still clamped grind their tops flat and square for use as balancing rails if desired. Mount these hangers on the base leaving no rr.or.? than 1/8" between hangers minimizing bending moments on the pivot pin.

MEL LEVINE'S ARTICLE WILL BE CONTINUED NEXT MONTH

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, IAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARI TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER
YEAR- CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK LSSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD OSHKOSH WI 54903 MB6
PHONE 414/426-4800

HELLO NEWSLETTER

Hello again from northern Minnesota. Art Smart...the old crash survivor, checking in again with a few more building tips before we head south for the winter. I'm sure many of you fellows know these things but I'm also sure there are lots of novices like me who need all the help we can get..so these tips are for fellow beginners and anyone else who can use them.

I use cheap paint brushes to apply my resin. At first I tried cleaning them with acetone or MEK. Maybe due to poor technique but when I attempted to re-use them, they were always stiff. I now use 2" chip brushes from Harbor Freight and toss 'em when I'm thru. Cost 35 cents for the 2" and 2 bits for the 1" ...alot cheaper than around here anyway.

Have you tried vinyl gloves rather than latex cause they're cheaper? I did and they are very inferior to latex. The vinyl fingertips rip so easily, even on 1st wearing, and even if they don't do that, they usually self destruct when you take 'em off. Latex are a bit more expensive but many times tougher...can be re-worn 2-3 times. They're easily worth the extra money.

A good re-useable device for mixing polyester filler (aerolite, bondo) is an old car window. The dry filler peels right off leaving a nice clean surface for the next batch. And speaking of polyester fillers...I've used them for years with no problem. Used no gloves or a mask until recently. When I built my Emeraude however I had to use a fancy painting mask because the polyester__adhesives (actually the solvents, MEK acetone etc.) made me sick Well, now the polyester filler fumes are doing the same thing so I've had to resume using the mask and it has again..worked. Some of us are slow learners, impatient or some combination of undesirable character traits that leads to foolish decisions. But for those of you not suffering from the "curse of Aries"...buy a good mask and use it when you work with this material before you get "issy".

I'll bet alot of you guys have found that generic bits "walk" with the grain of the wood frustrating your attempts to produce a hole where you want it. Try either forstner or brad tip bits. (your dad's brace and bit "bits" were brad point) These types really help to create straight holes where you want them. If you don't mind imports, Harbor has them for a reasonable price.

I'll be away from my plane for 4 months beginning the first of Dec. as we'll be in Gulf Shores Ala. for the winter. I'd love to meet and/or talk to any builders in the Mobile Pensacola area or even further away. Otherwise, I'll be suffering severe builders withdrawal.

Happy building to you all).

ART SMART
HCO 5, BOX 14A
PARK RAPIDS, MN 56470
334-948-7405

HAPPY NEW YEAR



*Wishing you
a healthy and
prosperous New Year,*

Earl & Judy

FOR SALE

(2)two 1800 CC Subrau EA81 Engines
(1)one stock as it was removed form
vechile, (1)one disassembled, inspected,
and reassembled with modifications for
use in my KR2. No set price, Best offer.

(2)two new Cleveland Master Cylinders
with Reservoir #CWB-35 \$70.00 each or
trade even for (2)two Matco Master
Cylinders #MC-MC4. Please call after
6:00 PM weekdays or any time weekends,
or leave a message and I will call back.

Keith A. Young
35 Ramblewood
Princeton, Texas 75407
214-736-3193

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 223 DECEMBER 1995

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN



KR NEWSLETTER

ISSUE 224

JANUARY - FEBRUARY
1996



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



BILL KRAPF'S KR-2 FOR SALE, FALL RIVER MILLS, CA

Bill's KR-2 with 60 hours total time is "For Sale". It has a Revmaster 2100 engine, retractable gear, strobe position lights, ASI, oil P/T, EGT/CHT, vacuum, electric trim, tachometer, carb temp, clock, altimeter, voltmeter, wet compass. Flies great at 170 MPH. Have \$14,000 invested will take \$8,000. Call or write Bill at: 43523 Highway 299 E., P. O. Box 760, Fall River Mills, CA, 916-336-6547.

I now had a balance beam, a base, a pivot system and a rubber band fastened bubble level so I did some preliminary testing. The permanent balance weights were not installed. The first problem was that the balanced beam would not return to balance when displaced although the action was smooth and friction free. That was due to oversize .089" dia. (No. 43 drill) holes in the beam pivots. A manual had recommended large holes for low friction but they also allowed the C.G. to shift slightly. It would not be noticed using the usual nail against a mark as a level indicator but the parallax free bubble showed it. I center punched around the holes to shrink them and re-drilled to 5/64" dia. I then opened the base pivot holes and chamfered away half the metal thickness. These are now the pivoting bearings and the beam returns to level. I then did some fast sensitivity testing in the midst of closing my house for the winter. I found that I was able to get a bubble indication by moving 1/8 oz. about 1". Relating this to mix ratio error it is .024 oz. at 4.895" where hardener is added per the schematic example. For a 5 oz. epoxy batch 1.5 oz. of hardener is required so the detected error is 1.6% which I think is pretty good. I also realized that the beam I had made of 1/2" plywood was too heavy. With balance weights and epoxy it would be about 38 oz. and this is a lot for a sensitive element working on about 6 oz. maximum. I will make a thinner beam and mounting the permanent balance weights will also help. They are low and being at the end of the beam are lighter than equivalent adjustable weights.

CONT'D PAGE 3

I intend to use the cup positioning system shown by the beam plan and the cup positioner sketch. I think they are self-explanatory except for the upper dowel extension. That is to check that the C.G. is on the dowel axis. It is much less important than concentricity of disk and dowel but it is easy to check on balance rails and when satisfied cut it off. The tare weight is the weight of the cup positioner and a wetted cup. Here the wetted cup is made by wetting a cup about 1/3 of the way up with resin, letting it sit for a few minutes and wiping it out. It may be an un-necessary step. If you use two cup sizes you will need two cup positioners. It is good practice to keep tare weight low but I would make the smaller cup positioner heavy enough so the cup and positioner pairs were equal in weight and could use the same tare weight. If not paint to color code them.

The beam plan shows the four cup positioner holes and tare nails for three mix ratios. The holes are off-set because close ratio holes may interfere. To locate the holes first find the axis of the pivot pin on the beam using a small square and scribe this datum. Carefully measure out to the 7.000" position, scribe that line, center punch for the hole and put the tare nail in squarely. Measure and lightly pencil in lines for your other holes. A coat of white paint at the start will make this and other operations easier. Now make up two equal weight bent nails and two nail bundles totaling about 6 oz. as shown in the sketch. Hang one bent nail and the 100 nail bundle on the 7.000" tare nail. The second bent nail is placed on the 4.895" line as shown. Balance the beam. Leaving the bent nail at 7.000" hang both nail bundles on the second nail and keeping it square to the beam shift it to balance the beam. This is the correct position to add hardener for the 43 to 100

mix ratio. Scribe, center punch and put in a tare nail. If it is not on the penciled line find out why. This is the method one would use to check a dimensioned position so it makes good sense to locate the position this way. Locate the other positions this way and progressively drill all the holes making sure the drills do not walk. You could probably have a dozen mix ratios if you wanted that many.

For one cup size and four or five mix ratios you can cut shallow circular locating groove directly into the beam. The few groove intersections will not be a problem and a cup positioner is not required. Make sure the grooves do not tilt the cup.

The adjustable balance weights are speaker magnets. They are low and powerful. Several will probably be needed including a small one for fine balance. The beam magnetic material should not retain magnetism, at least not much. Transformer laminations or steel strapping material might be good. Put some on the base to store magnets. Be sure the magnets and magnetic materials do not torque the beam.

Finishing steps are mounting enough permanent weights to balance the empty beam. Bed them in epoxy. Paint the beam gloss white and print the legends with a permanent, fine line marker. Make limit stops from wood dowel stock epoxied into holes in the base and epoxy the bubble level conveniently on the beam. Tether the tare weight against loss to one of the holes in a base hanger and drill a hole centered near one end of the base. Use it to hang the unit on a wall when not in use. Capture the cup positioner to the beam with a toothpick through the dowel hole.

CONT'D PAGE 5

I think the accuracy of this SUPER EPOXY MIXING BALANCE will be more than adequate. It will also be convenient to use and versatile. It is "open". You can see where you are in the simple operations and whether or not you have considered tare. You are unlikely to accidentally move a balance weight and no calculations are involved as with digital scales and the like. That is important in avoiding mistakes when you need a batch of epoxy fast and your mind is really on your project. I will not get back to this project until spring but I would be glad to hear from anyone interested in it. SASE please.

Here are *a* few Pa's to my article.

*Get ratio data from the manufacturer's containers. catalogs and manuals may be outdated or in error.

*The bubble level is a line level, about \$1 at discount stores.

*Good permanent balance weights are mending plates in the same hardware section as the corner braces.

*The speaker magnet adjustable weights are very strong. Consider thin metal strips or other means to reduce forces of adjusting.

In case anyone tries to contact me I will be away for two weeks in mid-February. I hope this article contributes to the safety of your project.

Mel Levine

201 E. 79 St. Apt. 6D

New York, NY 10021

(212) 288-9155

Building the Experiential Aircraft

By Richard A. McCall. EAA 505347, AOPA
009205843

Having sold my Piper Warrior!! just prior to leaving Germany in November 1994, I was anxious to replace it with another plane, what with purchasing a new home, furniture, etc., the money just wasn't there for another commercial production.

I wanted a faster plane than the 130-140 knots I got from the Piper. I had replaced the engine, upgraded the avionics and installed a new interior after taking the plane to Germany, so I felt that I was ready for something more and had been eyeing the sleek homebuilts. However, I didn't want to get-in-over-my-head.

I began to look around local airports in Northwest Dallas and Fort Worth as I began my new job. Both my flight physical and bi-annual flight review were coming due. So I took off to locate the airfield nearest to Trophy Club and my new home. This turned out to be Roanoke's Northwest Airport, just around the corner from Trophy Club. Trophy Club is not far from DFW and a lot of airline pilots live in the little town, so I had a lot of flying company to talk to. A neighbor pilot (American Eagle) accompanied me on several outings looking for homebuilts and to an air show at Alliance Airport during the summer of 1995.

At Alliance I joined the EAA and met Jerry Stallings who has an excellent airplane that he was displaying. Jerry gave me a picture of his plane and I got to look it over. THIS WAS THE PLANE FOR ME ... It was love at first sight!

Then, I saw the price tag ... and questioned whether or not I could handle all that glass work. Back to the drawing board I went.

Choosing a more realistic approach this time, I ordered the AeroCrafter Source Book and a subscription to Kitplanes. As I waited, I sat down and listed what I wanted in an airplane. It had to be an inexpensive kit. One that I could assemble without having to buy expensive tools, carry two passengers, produce 200 MPH, tie a good cross country plane, and capable of being IFR. (I had worked on my IFR in Germany and hadn't taken the check ride, but I still wanted the IFR certification).

When the AeroCrafter finally arrived, I was delighted-to-no-end and dove into it with glee! First, I dog eared every page listing a two-seat aircraft and found how difficult it was going to be to choose. Then reduced it to those two-seaters capable of 200 MPH. I talked to builders whenever possible. Prices eliminated a lot of plane kits, while the availability of sub-kits singled out others. The list was narrowing considerably. Some of those composites really looked good though!

As my list of prospective kits narrowed, I began to think of my own abilities, experience and what I felt comfortable attempting. I had no experience with composites, a little experience in metal and a little more in wood. By choosing a kit that could be purchased in sub-kits, I could stop without losing too much investment if I did get in too deep. My choices narrowed further to Van's Aircraft RV-6A and Rand Robinson's KR2S.

Van's Aircraft RV-6

I spotted several RV-6AS at a local field being built by two brothers. One was completed and the other in various stages. The RV-6A required approximately \$1600 worth of sheet metal tools for construction and uses a Lycoming I 50 HP engine. I had already spent \$10,000 replacing the Piper's

CONT'D PAGE 7

lycoming 160 HP engine, so I knew how expensive certified engines could be. I put that one on the back burner!

Rand Robinson's KR2S

Next I contacted Rand Robinson asking for information and ordered their information packet and video. Although I couldn't tell much from the information or video about the difficulty involved in building the plane, it appeared to be easier than working with aluminium and the cost of tools was much less. I asked for several builders names in the local area.

The KR2S is new and there weren't any being built in the local area, but several names of KR2 builders were given to me. The folks at Rand Robinson were extremely nice and seemed like the kind of people I would like doing business with. One of the names given was Monty Miller, the current President of the Denton EAA Chapter. Monty was only too happy to talk about his KR2 and I kept him on the phone for about two hours discussing the pros and cons of the KR2.

Research

I had spotted several catalogs during my visits with experiential aircraft builders. Wicks Catalog was one of them. So I catalogs from Wicks, Alexander's and several other catalogs. I visited Avery Enterprises, obtaining their tool catalog and subscribed to Kitplanes.

Next came the engine considerations. I contacted Great Plains to find out what I could get a complete VW 2180 for and the answer was around \$5,500 assembled, much less than the Lycoming engine. Monty had said he had a VW 1835 in his KR2. This was even less than the VW 2180 and less horsepower.

The cost of instruments and avionics is relatively constant in cost, regardless of the aircraft being built. The avionics could be added later on without having

to buy a lot of expensive equipment right away.

Decision Time!

After delaying the inevitable for as long as I could (not relishing the idea of telling my wife) and trying to think of all the different aspects of building an experiential aircraft, I finally reached the go or no go decision point! Had I preflighted this operation well enough? Was there anything else I could do to ensure success?

Yes there was! I called EAA Headquarters and ordered all the books on building aircraft I could find in their catalog. (The catalog came with the EAA membership packet).

The book on VW engines was out of stock, but I did receive the EAA Aircraft Building Techniques in Wood, Tony Bingelis on Engines, Firewall Forward, The Sportplane Builder, and Sportplane Construction Techniques. I spent many hours going over these books. Later on, the VW Engines book and video arrived.

Monty's conversation and all the accumulated material helped immensely! Those plaguing questions that I had at the beginning were beginning to unfold their answers. Little questions like how could I make a fiberglass cowling or wing spars? What about aligning the fuselage? Weight and balance? The cost of the tools? My own perceived abilities (or inabilities)?

Considering all of this, I took a deep breath and made the decision ... it would be the Rand Robinson's wood design! I was so nervous and excited that I got the price wrong when I ordered the plans and later had to send an additional ten dollars. They didn't seem to mind and mailed the plans anyway!

CONT'D PAGE 8

Part II

The Rand Robinson KR2S First Time Builder

The KR2S Plans

By Richard A. McCall, EAA 505347, AOPA
009205843

It is amazing how things can look so bright one minute and be doomed in another minute. As I leafed through the bright blue KR2S Instruction binder containing the greatest Greek alphabet the world had ever seen, that's exactly what happened.' The instruction manual was for a KR2 and included supplements for the KR2S and an application for the KR2 Newsletter and a list of builders, which I ordered.

While waiting for the kits to arrive, I started with the easy stuff, like assembling the following tools:

- Table or Radial Arm Saw
- Saber Saw
- Wood Plane
- Drill, 1/4" w/bits & disc sander
- Belt Sander
- Carpenter's Square
- Protractor/Square Set
- Hacksaw
- Files
- Screwdrivers
- Wrench Set
- Staple Gun
- Plumb Bob
- Steel Tape Measure
- Circle Saw 2"
- Hammer
- Pliers
- Bench Vise
- C-Clamps
- Long Pipe Clamps
- Brushes
- Squeegees
- Mixing Cups
- Exopy Glue

Now if your a veteran builder, I am sure that the plans and Instruction book would have made perfect sense immediately. Being a first time builder, I had to reread the book while studying the plans many times. Finally, I used my computer to build a "trial" KR2S. Then everything began to make sense for me. I ordered the Spruce Kit, Birch Plywood Kit and Epoxy.

Page 7 of the instruction manual called for making a well braced 16' table level in all directions. Remember the subscription to Kitplanes? Well the October 1995 issue had a nice article by Fred Gaboury on Building a Work Table. I used this article and began building the table. It looks easier than it really is because my garage floor is not level and this was the source of some frustration. After cutting:

- (2) 2x6x14 siderails
- (2) 2x4x48" cross members
- (5) 2x4x35.5" legs
- (12) 2x4x32" diagonal braces
- (4) 2x4x29" end diagonals

then shimming both the legs and the two 4'x8' pieces of 3/4" plywood tops, I finally had a level table top to work with. I added my own touch to the table design by including cross braces a foot up from the floor on each set of legs. This I used to store the various pieces of spruce wood included in the Spuce Kit, which until now had occupied some of the floor space in the garage.

The source of my lumber came from new houses still being built in Trophy Club. I'm sure the folks at Highland Homes thought I had a screw loose when I said I wanted some of their discarded lumber to build an aircraft work table in my *garage*, but they agreed to let me have the lumber. With the lumber obtained, I was able to build an additonal five foot work bench in an alcove just off the left section of the garage.

**RICHARD A. MCCALL
JO PALO DURO COURT
TROPHY CLUB, TEXAS 76262**

IT'S ABOUT TIME!!!

The first flight in 10 1/2 years for N44729.

On February 1994, the lonely, broken-down little home-built airplane that had gone through 4 owners since it was built was sold to yet another. With a total of five flight hours, the airplane was in sad shape with damage from a landing mishap, damage from being trailered down the Alcan Highway from Alaska to Seattle and back. 9 years of hangar damage (holes, scratches, dents, and chips) and, lastly, serious damage caused by callous mechanics (the fuel tank had been cut out of the front deck with a large electric saw with resulting damage to the longerons and destruction of the front deck.)

For the last year and a half, this "project" airplane has undergone much repair and many modifications including:

- repaired longerons
- modification of the fuel system
- modification of the fuel tank
- removal of the conventional landing gear and replacement with a tri-cycle gear
- fabrication of a new exhaust system
- installation of a pitot-static system
- installation of new landing and navigational lights
- re-routing of the aileron cables
- patching of many holes in the belly
- installation of hydraulic brakes, transponder, and altitude encoder
- overhauling of the magneto
- installation of cabin heat

The airplane sat upside-down and wingless in the daylight basement for so long that it seemed like a piece of furniture.

On the 10th of November, 1995, the airplane made its first flight in 10 1/2 years. It was flown out of Fairbanks International Airport at 0°F for 45 minutes. It flew **very** well - light controls and very responsive. With a top speed of 200 MPH and a cruise speed of 150 MPH. it will be a great airplane to fly back and forth to the Lower 48.

A big thanks to those who helped so much: Frank Ross, a retired Delta Air Lines mechanic; Vicki Domke, mechanic for Tamarack Air; Bill Lentsch, owner of Tamarack Air; Hugh Keith, Fairbanks FSDO (fantastic support); and my very patient and ever supportive wife, Jeanne.

Jack Schnurr
11645 Vasi Way
North Pole, Alaska 99705

P. S. I have six flights on the airplane now and I have moved it to get it ready to paint.

12 Nov. 95

Dear Krazy KR Addicts,

A note from a couple of Friends of a KR-2 Addict who is too busy sanding and fussing to write and also too modest to brag at all:

N44729 is back in the air!. Jack Schnurr purchased the lonely little airplane from her fourth owner a couple of years ago. With a total of five Sight hours the airplane was in sad shape with damage from a landing mishap, damage from being crated and carted up and down the Alcan Hwy from Alaska to Seattle and back and finally damage caused by callous mechanics.

Jack flew the single-seat VW-powered rocket last weekend. Finally!! He says that it didn't seem to want to get off of the ground and he was worried that the wings may have frosted up a little so he tweaked back on the stick a tiny bit more. The airplane leaped off of the runway! Immediately he pushed the nose down and started a small series of climbing oscillations. Fortunately Jack is a very experienced pilot and used to flying high-spirited airplanes. He says that his KR-2 is as pitch-sensitive as an F-4.

Anyway, his first flight was orbiting the airport checking speeds, a stall approach and control responses. The electric aileron trim works well (probably a necessity due to the extended wings), the cabin heat (a Jack modification) kept the temperature somewhere near freezing (OAT was 1 above) and the bubble didn't frost over. The landing roll was about 300* with the aid of his hydraulic brake modification. Jack landed near the end of the 12,000' runway and had to taxi a long, long way to get back to the hanger. Guess he didn't want to miss the airport.

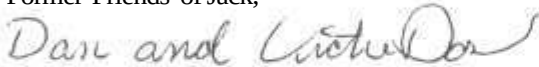
Jack and his wife Jearmie have spent the past year working on that airplane. Most people invite their friends over for dinner, movies or social gatherings. Not Jack. We were treated to fiberglassing, sanding, filing, and the hard labor of turning the airplane over and moving it in and out of the basement under Jack's constant scrutinizing supervision. Thank goodness that is all in the past now!!

The biggest modification that Jack and his wife Jeannie did was to install tricycle gear. Of course that necessitated modifying the exhaust, aileron control cables, cutting big holes in the belly and so many other things that Jack's friends have long ago lost count. Other modifications include long-range wing tanks for a total of 56 gallons of fuel, single-seal configuration with the control stick on the right side of the pilot and a removable top deck. Jack and Jeannie had the airplane upside down and wingless in their daylight basement for so long it seemed like furniture. For months Jack has smelled like fiberglass resin.

Jack's next flight will have to wait until the temperature gets above zero. He also has a hard time taxiing through the snow, even though the taxiways are plowed. Fortunately the runways at Fairbanks International (Interior Alaska) are cleared down to the asphalt.

Well, now Jack has to pretty up the airplane. He attended a couple of KR fly-ins and will not fly his somewhat mangy-looking (but AIRWORTHY) airplane to a gathering until it is fit to at least park halfway up the row of KR's. All he has to do is paint, wait a minute...there's no such thing as "all he has to do..." Uh oh, this sounds like more work for Jack's friends...

Former Friends of Jack,



Dan and Vickie Domke

Address: moved, unknown, unreachable, not at any address

20 Dec 1995

Dear Krazy KR Addicts,

Hey guys, listen up! If you and your darn airplane newsletter would just go away I would have a lot more peace around my hanger Not to mention a little less danger. "Danger?" you might ask...read on.

Remember I wrote to you when Jack Schnurr finally flew N44729? Well, he made four flights and ended up with a slight nose seal oil leak, probably from the breather freezing up in our arctic weather. He made an extra hole in the breather hose but on the next run-up, while adjusting the carburetor, the small leak became a pretty big leak. "No problem," Jack said. "We (???) will just change the seal. It can't be too hard...Right?"

Well, that's a mighty big statement from someone at the brink of losing all his old friends. I figured that Jack would just give up for the year and store the airplane in his garage for the winter. But No...

How hard is it to change a prop seal⁹ Jack's first dilemma was merely getting the hub off of the Volkswagen engine crankshaft Just pull, right?

Steve Bennet of Great Plains Aircraft, a V W engine Guru, was a great help by explaining how the hub and crankshaft are put together He says that there are two combinations of hubs and crankshafts. The first combination is a 3 degree tapered shaft with a matching hub and a keyway. The other kind is an interference fit shaft and hub—which would probably be destroyed during disassembly.

So Jack pulled. And pulled Jack eventually made steel reinforcements for the back of the hub where the rented steering wheel puller gripped the hub and pulled some more He soaked the whole assembly overnight with Tri-Flow and continued pulling the next day

Jack eventually found a local EAA'er who had replaced his prop seal "Didn't have any trouble popping the hub off.." Not very encouraging. So then WE pulled, and WE heated. (How in the world does Jack keep getting his friends involved in these little nightmares?) At this point we were no longer concerned about bending the hub flanges because we knew we could get another hub from Great Plains Aircraft. If we could just get the old one off..

We graduated from a 1000 degree heat gun to the oxy-acetylene torch. And pulled, and heated and pulled.

And gave up

We stared at that #\$\$%#& hub The rented puller was as tight as it could go, the glow of heat on the hub was starting to fade. We were finished

I think that engine has a sense of humor. Bang! At that moment the hub sprang off of the crankshaft and clanged onto the hanger floor Good thing that neither one of us was standing in the line of fire or we would have been branded by the hot propeller hub!

Working on Jack's airplane could be dangerous

Well, the rest of the story is pretty mundane Jack ordered a new hub and Steve Bennet shipped it the same day Only one heart-stopping moment when Jack started to pry the seal off of the front of the case and a huge, gory crack appeared halfway around the nose seal. Jack didn't realize that the old seal was Bondo'ed onto the case halves until after his heart rate subsided and vision returned. The Bondo job was exceptionally smooth and painted to match the case so we thought the case had cracked Whew!

The new seal is stuck on the crankcase with JB Weld which according to a Kansas fanner is supposed to be " ..even better than baling wire!" Says so on the package.

The run-up and leak check went fine Jack hopes to fly tomorrow if the temperature gets up to zero. Last week we had 40 below so zero is a heat wave Keep Jack and his little muffler heat exchanger in mind the next time you fly your KR-2 around the patch Maybe Jack will fly his KR-2 to nice warm Sun'NFun and you can personally check out the Arctic Special.

In the meantime. Jack is thinking about writing an article on nose seal problems...

Best regards, stay warm and watch the trajectory of those red-hot hubs,

Dan and Vickie Domke

IT'S CHILLY UP HIGH, DON'T FORGET YOUR SCARF

Water runs downhill. Electricity seeks the path of least resistance. Applied stress will express itself in an area of weakness.

There. You now have the sum total retained knowledge of a first year engineering student and with a substantial savings in tuition. Remember this information, especially the stress stuff.

A letter was published in the November '95 *KR Newsletter* from a builder who suggested utilizing a plywood patch as a substitute for scarf joints in the KR's wing spar shear webs. The builder wrote that he felt a plywood strip with a 3/4 inch overlap on each side of a butt joint "should be superior to a scarf joint" as called for in the plans. Wrong on a couple of points. If the spar is constructed in the manner suggested, the potential for an inflight failure of the main wing spar has been built into the aircraft.

Besides adequate tools and time, every builder should have in their shop: 1) a copy of FAA 43.13 *Acceptable Methods, Techniques, and Practices in A/C Inspection, Repair & Alterations*; 2) the EAA reprint of CAM 18 (the predecessor to 43.13); and, 3) all three EAA Bingelis aircraft construction manuals. There are many other helpful texts available as well but the above should be considered mandatory.

Within these books, you'll learn that a properly constructed scarf joint with a 10:1 ratio (or greater) is the absolute best way to join plywood. No other technique can be considered "superior". If a butt joint is used, a full depth plywood doubler of the same thickness and with a width of at least TWENTY times the ply's thickness must be used. Any less and the flight induced loads will be forced to make too great a change in direction through the doubler, thereby creating a potential failure mode.

The KR airframe is designed to transmit and distribute flight loads throughout the airframe structure. The main spar is a key

element within the design. Check the plans and notice all the diagonal, vertical, and triangular blocking leading away from the spar/fuselage junction. Each piece helps distribute stress, directing these loads throughout the aircraft where they may be more easily absorbed. The spar's plywood shear web is an important load distribution pathway. Any alterations to the spar construction that weakens the structure will, in turn, result in a reduction in the stress absorbing capabilities of the entire airframe.

A worst case scenario would be the failure of an inadequate butt joint in the main spar shear web just prior to a failure of the shear web/spar cap bond and, ultimately, a sudden inflight collapse of the wing.

Not everyone involved in constructing experimental aircraft can be an aeronautical engineer. That's not even necessary. What is important is the need to follow acceptable building practices and recognize that there is a wealth of technical information and knowledgeable people available who can assist a builder in examining any proposed change or modification. If the *KR Newsletter* article was not enough, the postman just delivered the December '95 *Sport Aviation* and there's an article in it regarding the importance of scarf joints and substitutions—both good and bad, I know everyone's a member of EAA and will have access to the information presented in the article.

Build safe and build smart. Let's not stack the odds against us before we even get to the airport.

Monte Miller, N684LM
1900 Parkside Drive
Denton, Texas 76201
817.566.5871

UIARRON GRAY (447WG)
'701 SUNRISE LAKES DR. EAST
BLDG.10 APT 112
SUNRISE FL, 33322
305 722-1350 BUS ,
305 749-6783 HOME

IT WAS A PLEASURE SEEING ALL THOSE KR BUILDERS AND FLYERS IN TENNESSEE. I AM ESPECIALLY THANKFUL TO MARTIN ROBERTS FOR THE RIDE HE GAVE MY HONEY . I TRIED TO BRIBE HIM WITH A SET OF KR STERLING SILVER WINGS I MAKE, BUT HE LIKES TO GIVE RIDES FREELY . I HAD PLANNED TO GIVE THEM TO HIM ANYWAY, MY HONEY SURE ENJOYED THE FLIGHT PARTICULARLY THAT LOW PASS AT THE SPEED OF LIGHT . BY THE WAY JEANETTE WILL BE HANDLING THE PINS SO IF YOU WANT A PAIR GIVE HER A BUZZ .

I WAS GLAD TO BE OF SOME SMALL HELP TO THE OTHER KR-2S BUILDERS CONCERNING THE CANOPY SETUP AND BASIC MEASUREMENTS TO GET THE STRUTS TO WORK. THE INFO I USED TO GET MY CANOPY WORKING WAS COPIED FROM THE SYSTEM THAT LANCAIR USES. I USED THE ORIGINAL HINGE DESIGN AND BRACKETS AS DESIGNED BUT MODIFIED THE DIMENSIONS SO THAT THE HINGES WOULD CLEAR THE BOOT COWL. MY TANK AND BOOTCOWL ARE ONE WHOLE UNIT THAT CAN BE REMOVED TO WORK ON THE AREA UNDER THE TANK SUCH AS THE ENGINE MOUNTS. IF YOU GLASS THE TANK IN, YOU CAN'T WORK ON THE MOUNTS, MY FRONT STRUT MOUNTING POINT IS EPOXIED AND GLASSED IN PLACE. THE ALUMINUM BRACKET IS BOLTED IN PLACE AND REMOVABLE.

A LOT OF PEOPLE WERE INTERESTED IN MY PUSHROD SETUP. THE GUYS AROUND MY HANGAR WERE AMAZED AT HOW SMOOTH THE SYSTEM WORKED. IF YOU WANT MORE DETAILED INFO ON HOW TO MAKE THESE WORK, DROP ME A LINE OR GIVE ME A BUZZ ON THE PHONE AND I'LL SEE WHAT I CAN DO FOR YOU.

I WOULD ALSO LIKE TO SAY THAT THE GLASS WORK THAT JEANETTE SUPPLIES FOR THE STRETCH VERSION, IS FANTASTIC, WELL MADE, AND IT FITS!

ONE OTHER THING, ! PLAN ON FLYING MY KR-2S TO SUN AND FUN THIS YEAR AND THE WAY IT LOOKS TO MY BUDDIES THINK I'VE GOT A GOOD CHANCE, JUST HOPE IT WILL ALSO BE PAINTED. I WORK ON IT SEVEN DAYS A WEEK, THAT'S BECAUSE I HAVE MY CUSTOMERS WELL TRAINED AND LEAVE WORK USUALLY BY 3 O'CLOCK. HOPEFULLY STEVE, BOB, AND I WILL ALL HAVE OUR SUBURU'S THERE. TOGETHER. SEE YOU.

OPEN LETTER TO MAX CALKIN

Max... I read with great interest, your letter describing your elevator flutter adventure....and I must compliment you on your honesty. Some fellows would never admit such an event especially since it was self created, (but aren't they all?) In so doing, I feel you've rendered a service to all pilots....**Thanks alot!**

We've all heard of flutter and. of fatalities resulting from it...but I've never seen a first person account describing flutter in which a recovery was made. In fact, articles I've read state that recovery is impossible once flutter ensues since the involved surfaces almost instantly self destruct rendering the plane uncontrollable.

You're kind to credit the original builder of that KR with your recovery (due to the extra elev. hinge.) and no doubt it was a large factor. However, I think we must all doff our hats to Ken Rand and Stu Robinson for creating such a simple, honest and strong-craft. And of equal importance...they gave us a design almost anyone could afford.

So...a big thanks to you Max...but also a round of applause for the "leaders of the band" Ken Rand (I know he's smiling somewher.) and Stu Robinson. All of us...the mildly deranged the wildly deranged plane builders...with dreams larger than our wallets... would be cloud dancers with necks craned skyward at the sound of each passing instrument of flight.... we all salute you...and thank you again for your gesture of affection toward your fellow airmen by drawing the map leading toward this cute-homely,honest, uncomplicated but strong little craft that has given so many the "gift of flight".

Yours truly....

Art Smart
1023 W. Beach Blvd. #5
Gulf Shores, A1A.36542
334 948 7405

P.S. We'll be back home in northern Mn. around April 1st, and anxious to resume my project. Hope to be chatting with any of you builders interested in aero-core or anything to do with buiding. Phone in Mn. is 218 732 5295.

FOR SALE

KR-1 Project: Boat stage on standard retract, wheels and brakes; some controls installed, seat, fin, horiz. stab., and outer spars completed, most controls and seat installed, some materials to complete plus canopy, "0" time 1700cc VW, Monnett conversion. \$1600 with engine, \$600 without - OB0; Northwest Illinois. Call:

Dion
815-626-8209 or
Ed
414-261-4717 evenings

FOR SALE

KR-2 Fuselage on tri gear all controls in, wings and tail surfaces completed. Includes fuel tank, canopy and brand new Revmaster engine. Excellent workmanship. \$3,800. Contact:

Charlie Watson
5928 Horrocks Sr.
Philadelphia, PA 19149
215-535-8746

FOR SALE

KR-2 90% Complete, 2180 custom aircraft engine. 8 years spare time work free. \$8,500 OB0. Call:

Bob laTour
3148 Bailey Rd.
St. Cloud, FI 34772
407-957-4339

WANTED

Back issues of newsletters, KR construction/fly-in/forum/demo videos, KR-2 or KR2S plan set, project, raw materials, or components. Please send details, price and contact to:

Bill Shambrook
4 Oxford Drive
Lincolnshire, IL 60069
847-845-8406



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITTMAN AIRFIELD OSHHOSH WI b490J J086
PHOA/I 414/426 4800

FOR SALE

Two KR-2's in construction. Both units as a package where is, as is \$8,500.

Unit One: Standard construction \$3,000.00

Unit Two: "Stretched" 19" spars readied for Diehl wings \$5,500. Call or send for equipment list.

Unit One: W/o engines and accessories \$2,400.

Unit Two: W/o engines/PSRU plus accessories \$4,000.

Ted McClurg

P.O. Box 202

Branscomb, CA 95417

707-984-6398

PT 6:30 a.m.- 10:30 p.m daily

THE KR NEWSLETTER IS PUBLISHED MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.

EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER YEAR-
CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES

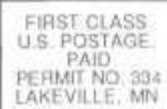
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

KR NEWSLETTER

P.O. BOX 579

LAKEVILLE, MN 55044

ISSUE NO. 224-225 JANUARY-FEBRUARY 1996



KR NEWSLETTER

ISSUE 226 - 227

MARCH - APRIL

1996



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide



DAVE SHIREY'S KR-2, N55DS, STERLING HEIGHTS, MICHIGAN

David's KR-2 has won numerous awards since its completion in 1985 including the "Best Custom Built Aircraft" in the non-certified engine category at the Midwest Regional Fly-in (MERFI). Among his plane's ingenious design features is a canopy that can swing open from either side or be removed. The plane is powered by a Type IV, prop is a Sterba 52 x 54, carb is a Zenith.

LEVELING OF TOP LONGERONS AND STRAIGHTENING OF FIREWALL

While building my K.R. thru the boat stage I noticed that the top longerons were not level from the firewall aft to the tail post and also that the firewall was not perpendicular like the plans show. As careful as I was at building the K.R., somehow I figured I had goofed along the way. So corrections were in order. First I added more sitka to the top logerons and then planed and sanded to make them level. Don't worry about adding a little more weight, I said to myself, It wont be much ! To compensate for the firewall tilt, I added spacers on the top motor mount bolts to set the engine back in line.

For the past several years I have heard that others have had the same discrepencies and wondered why.

After long study and expermenting with twisted panels, the following is what is taking place, refering to Drawing 111, we see that the flat planes as indicated in Fig. 1 will be tangent for entire surfaces of "A-B" and "C-D". This also holds true for Fig 11. In Fig 111 due to the compound curves this no longer holds true. The top plane will be in contact at points "A" and "B" but point "E" will be below the surface. The bottom plane will now make contact at point "F" and points "C" and "D" will lie abpve the plane. This is what is happening to the sides of the K.R. fuselage when laid out per plans.

Now the light bulb starts to brighten, and new thoughts start to arrive. Why not use descriptive geometry & make isometric drawings, hence drawing 1. From the drawing the inclined vertical stringers become longer than what the plans call for. Trigonometry was used for the length of the four members shown.

Also if the fuselage was built using the four stations as bulkheads as shown on drawing 1, then the fuselage would comeout to true form.

Next, referring to drawing 11, calculations show that the fuselage has shrunk close to two inches on the top longerons from the rear spar aft. The shrinkage forward of the rear spar was negligible.

The lower longerons calculated out to be 1.596 inches shorter or a difference of .4094 of an inch, (firewall tilt).

But due to the dip on the top longerons as per drawing 111, the firewall now appears to tilt by .250 of an inch per the new thrust axis.

By deriving an equation for the curvature of the longerons & the use of calcalas the exact dimenions & deviations along the entire length of the longerons could be ascertained, but since my calcalas is rusty, I will not make the attempt while trigometry will suffice.

To achieve a fuselage very close to drawing the K.R. plans have been altered as per drawing IV using all of the foregoing data.

This paper was not written to alarm anyone, because hundreds of K.R.'s have been built per K.R. plans & these birds all fly. Thanks to Ken.

I hope that the readers of this article will understand what has happened & I would like to hear any rebuttable on this paper,

Sam Sayer
6621 Foxmoor Dr.
Zephyrhills, Fl 33541-0620
Phone: (813) 782-3302

Retired Chief Engineer
24 years experience
with 5 Aero-space companies.
A delightful education.

CONT'D PAGE 4

The following article is a reprint from the Spring, 1995 EAA TECHNICAL COUNSELOR NEWS.

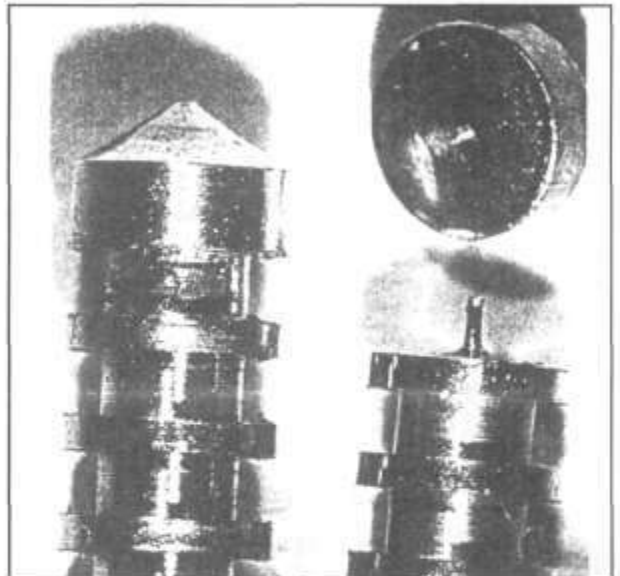
ROTAX SERVICE INFORMATION

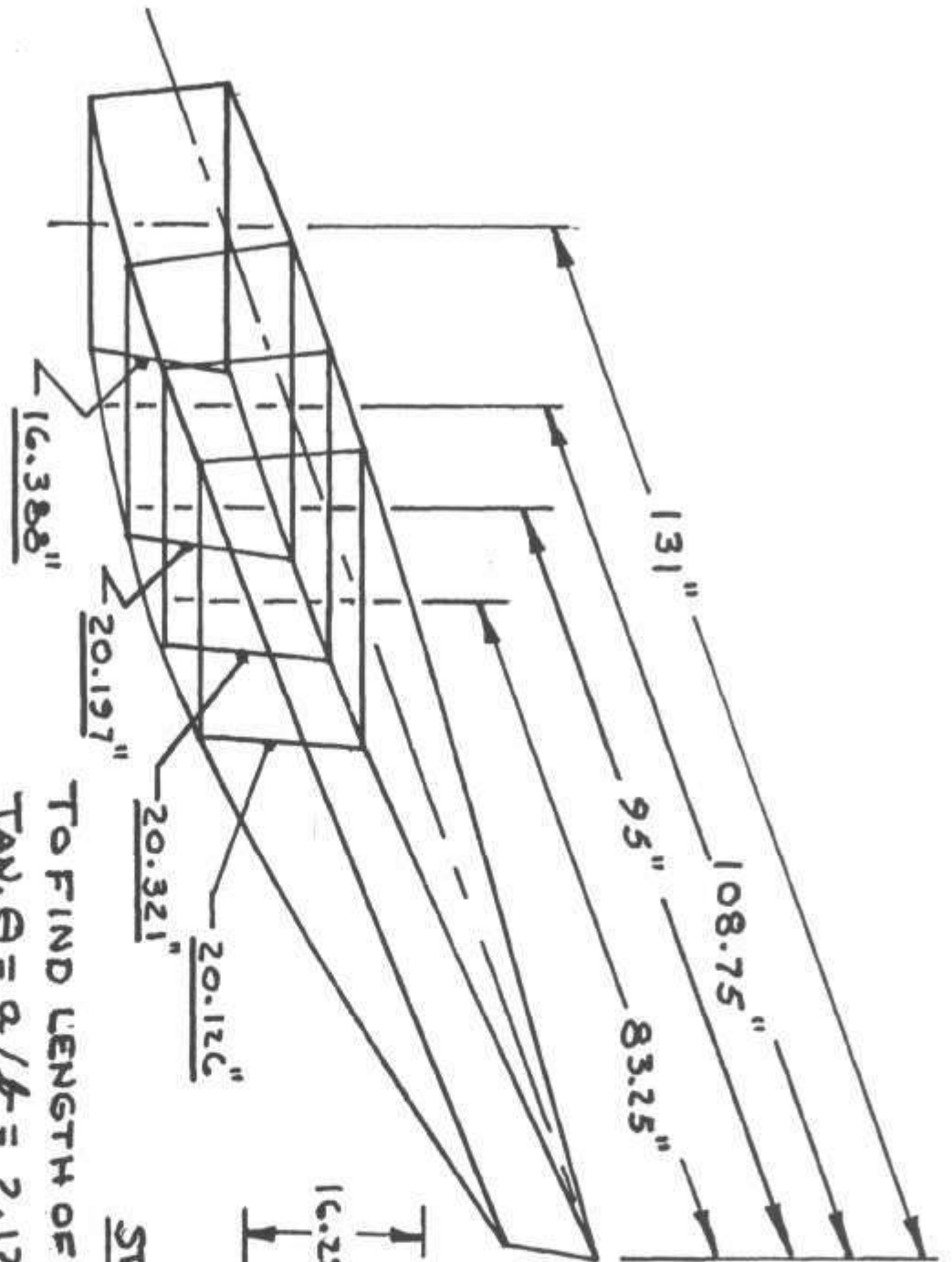
Thanks to Popular Flying, Oct/November '94

This is a reminder to all owners of Rotax powered aircraft to make sure they are receiving Rotax Service Bulletins and Service Information on a regular basis.

Investigations by the Air Accident Investigation Branch at Farnborough have concluded that a July 1994 crash of a Kolb Twinstar Mk 3 in Suffolk, which killed both occupants, resulted from an unsuccessful forced landing carried out after the installed Rotax 503 engine suffered a loss of power.

It was found by AAIB that the needle in the rear carburetor was worn through at the retaining circlip and had dropped into the carburetor jet, restricting the flow of fuel into the rear cylinder. This problem is covered by a 1991 Rotax Service Information leaflet 8UL 91-E and is included in the Rotax maintenance plan 3UL 91-E, both of which recommend a 50 hour inspection of the needle and its replacement every 150 hours.





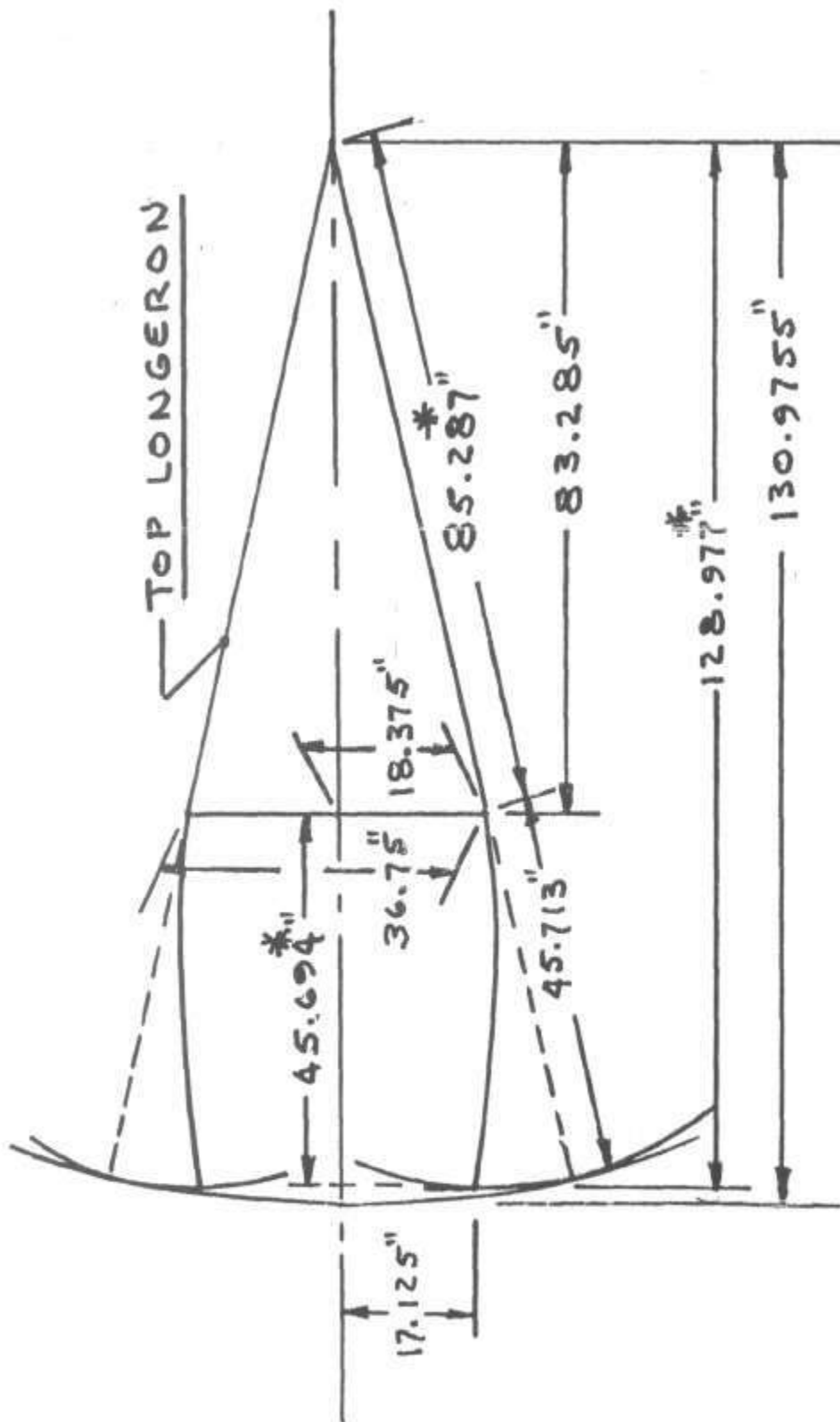
TO FIND LENGTH OF "C" & OTHERS.
 $\text{TAN. } \theta = a/b = 2.125/16.25 = .13076923$
 $\theta = 7.45025 \text{ DEGREES.}$
 $"C" = a / \sin \theta = 2.125 / .129665 = \underline{16.388}$

STATION - FIREWALL



DRAWING

SAM SAYER 12-95



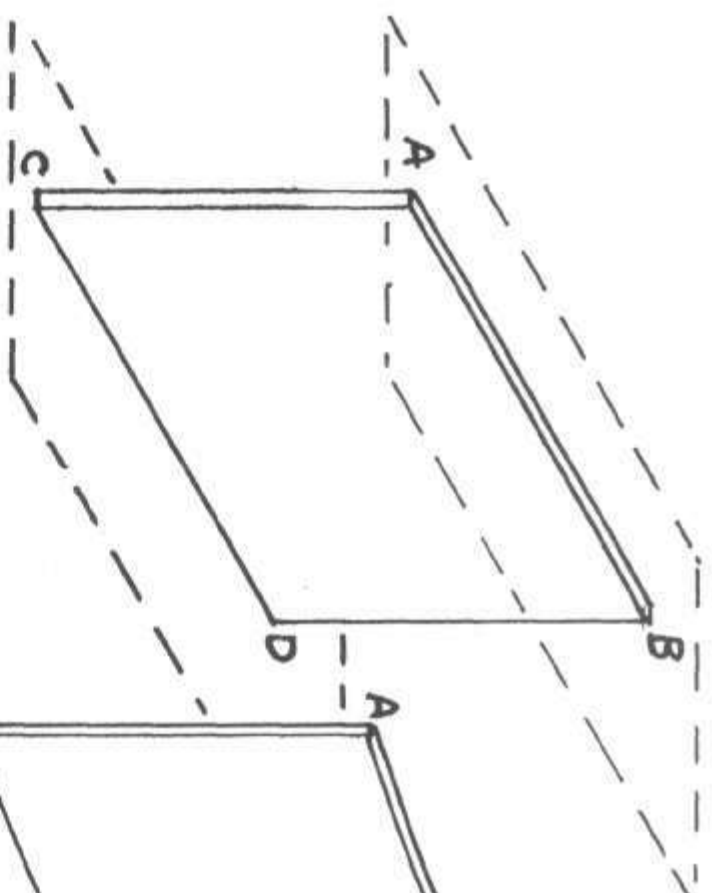
LAYOUT OF TOP LONGERONS.

* CALCULATED DIMS.

NOT : FUSELAGE BECOMES SHORTENED BY 2".

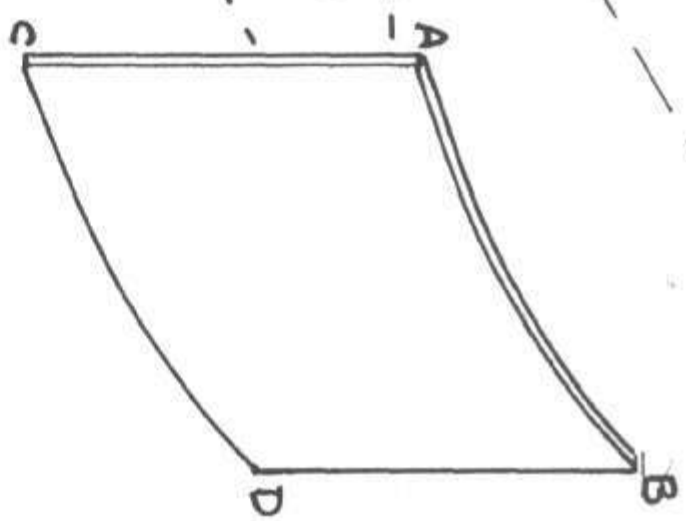
DRAWING II

JAM SAYER 12-95



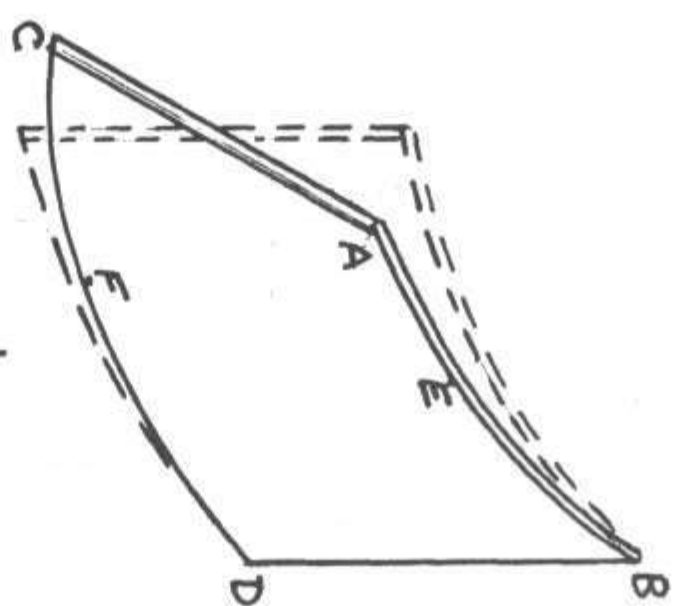
FLAT SHEET

FIG. I



CURVED SHEET

FIG II



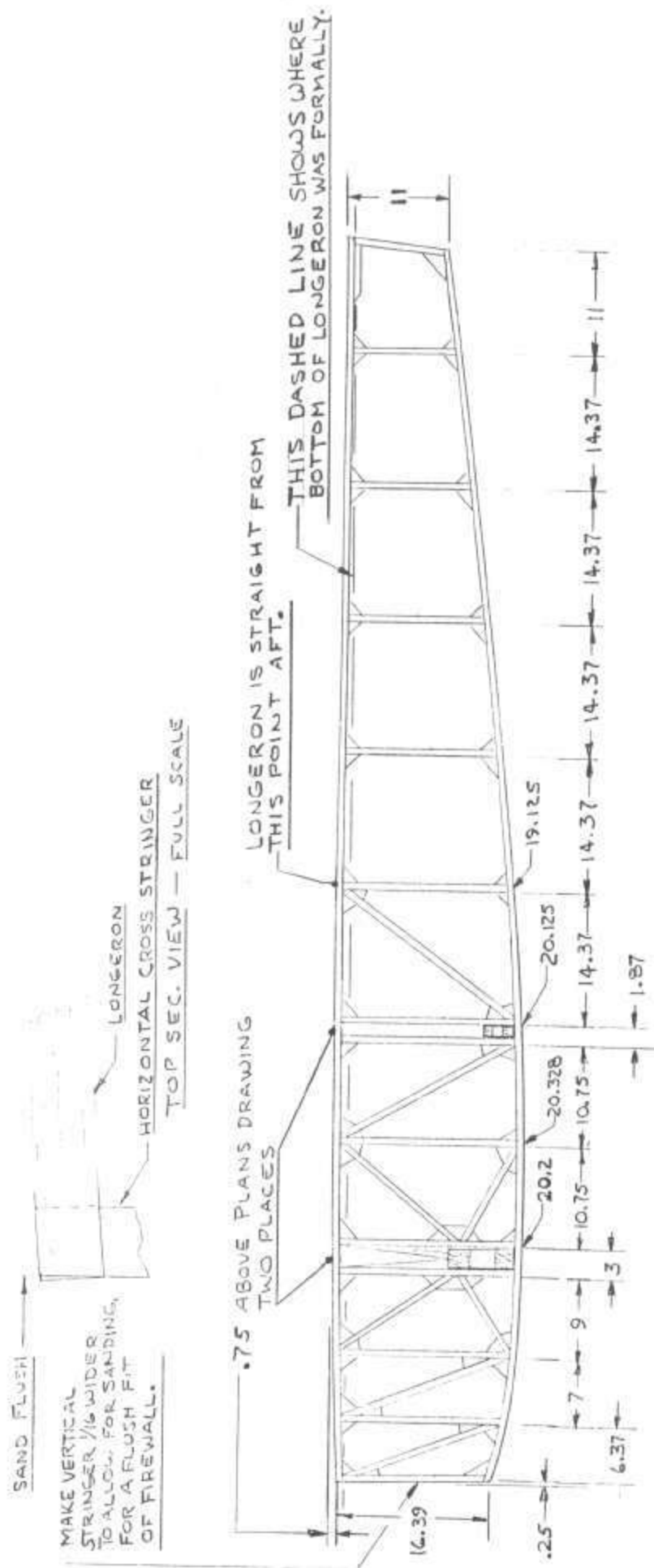
CURVED & TWISTED

FIG III

NOTE: K.R. FUSELAGE SIDES ARE
CURVED & TWISTED AT ASSEMBLY.

THE DASHED LINES IN FIG I
INDICATE PARALLEL & HORIZONTAL
PLANES.
DRAWING

SAM SAYER 12-95



ALTERED K.R. PLANS TO SUIT DRAWING I

DRAWING IV

SAM SAYER 12-95

RICHARD A. MCCALL
W PALO DURO COURT
TROPHY CLUB, TEXAS 76262
(817) 430-3345

Part III

**Getting Started
(First Time Builder)**

The KR2S Plans (Drwg #1)

By Richard A. McCall, EAA 505347, AOPA
009205843

Here we go (shutter)! Opening the KR2 manual to page 11,1 enthusiastically read the instructions for the "Fuselage Sides". The first sentence referred me to drawing number 1 (on the large sheet), stating the entire fuselage would be constructed from this sheet. Now, where did that large sheet get to? Oh, oh, here it is. Reading the fine print (located in the lower right hand corner block, I discovered it is for the KR2! But I ordered the KR2S plans!?! Leafing through the remaining sets of drawing, I found drawings A and B, marked KR2S. Ah, what a relief. There for a moment, I was terrified.

I began by stapling drawing no. 1 to the garage wall, followed closely by drawings A and B (my wife didn't appreciate my having stapled them in my office and promptly made me remove them with some choice words).

As I read the instructions on page 11,1 did the required task. The first task was to mark off a straight line, the common reference point. This I did with the authoritative snap of a chalk line, after having diligently measured both ends of the table for the center and nailing a nail on the far end of the table!

Next, I marked off the positions of the vertical members. After completing the markings, I double checked the measurements. Uh oh, they were off. I began erasing lines and remeasuring. This I did several times, until I realized that the problem was in the thickness of the carpenter's pencil lead I was using (it certainly wasn't my fault) . The second

time I erased the lines (all of them), I thought that there had to be a better way of getting rid of those lines. Besides, my "drawing board" was becoming very messy. So I reached for my handy disk sander and drill. That did the trick. Then I called my wife and had her check each line as I drew it (wives do have a vital function now and then).

Having drawn out the desired lines in a satisfactory manner, I was *ready* for the next task of measuring the lengths of each vertical member. The first vertical member was measured at 16.26", which I promptly marked off. There were only three measurements on the plans to go by.

As I reached for the 5/8"x5/8" wood, I discovered that the KR2S spruce wood kit came in all sorts of various sizes. Suddenly aware that I might make a mistake and cut up the wrong piece of wood, I decided to separate all of the spruce by airplane section that it went to, such as center forward spar materials, horizontal stabilizer and elevator, etc.

First I located the KR2S Spruce Kit list of materials located in the rear of the manual. Using this, I pulled out all of the 5/8x5/8" spruce, put them together and separated the piece of 5/8"x5/8"x14" belonging to the horizontal stabilizer. I labeled the remaining pieces of 5/8x5/8x165' (various lengths) as kit 1 for the fuselage and left it on the unused section of table top.

Kit 2 consisting of the center forward spars and verticals were assembled, taped, marked, and replaced under the table. I did the same for kit 3, the center rear pieces; kit 4, the center rear spars and verticals; kit 5, the outer rear spars and verticals; kit 6, the horizontal stabilizer and elevator spars, ribs and tips along with the 5/8"x5/8"x14" spruce previously set aside; and kit 7, the vertical stabilizer and rudder spars and ribs.

The remaining pieces were identified and marked, then put back under the

CONT'D PAGE 9

winged doors and center post are desirable to provide the correct distance for the head area, preventing the necessity to have to turn sideways or bend one's head because of the curvature of the glass.

In building the fuselage, I did not taper the bottom of the sides inwards, as called for in the plans, but made them the same lengths on Lester's advice. That way, I do not have to fly with my body curved along the sides of the fuselage when carrying a passenger and the fact that the taper has not effect on aerodynamics or looks when the plane is finished.

CONT'D PAGE 10

The following article is a reprint from the Spring, 1995 EAA TECHNICAL COUNSELOR NEWS.

PISTON SPEED

Thanks to Charles Fink and the Puget Sound Rvators

Should Auto Engines Be Used In Aircraft? (Abbreviated Content)

Last month we found out the only way to produce a given amount of horse power (HP) was to burn a set volume of fuel mixed with air. This can be done with a large engine turning slowly or a small engine turning much faster.

Now let's talk longevity. The highest wear parts in most engines are the cylinder and piston assemblies. They are subjected to the high temperatures of combustion and surfaces rubbing each other. There is no rolling action as with most bearings.

Back to our example, Lycoming vs. Olds. The Lycoming engine has a stroke of 3.875 in. This means every time the engine turns one revolution each piston moves 3.875 in. down and 3.875 in. up for a total distance traveled = 7.75 in. If we carry this out over the 2,000 hour life of the engine we see each piston traveling 2,511,000,000 in. inside its cylinder (7.75 in. x 2,700 RPM x 60 min./hr. x 2,000 hr.). That's 39,631 miles! That is a long way to rub an aluminum piston with a steel cylinder. What about the Olds? It will put out the same HP as the Lycoming at 6,200. It has a stroke of 3.35 in. Will it last the 2,000 hours? Let's see: 6.7 in. (total travel for 1 revolution) x 6,200

RPM x 60 Min./hr. x 2,000 hr. = 4,984,800,000. I don't think the Olds can do it. That is almost twice the distance the Lycoming piston travels, 1.99 to be exact. The piston and cylinder are roughly the same alloy so they should wear approximately the same.

This tells us even though the Olds will develop as much HP as the Lycoming it will wear out much quicker. How much quicker? Lycoming considers their engines to be in need of overhaul when the pistons have traveled 39,631 miles inside the cylinder. If we apply this to the Olds then it will last about 1,000 hours. Note this is only a rough approximation. Many factors affect the life of an engine.

Now we get into some heavy engineering except I am going to gloss over it because it is beyond me. Structural integrity has as much to do with engine longevity as wear and it is directly linked to reliability. So if you want an engine that will be reliable and long lived then it must be strong enough to withstand the loads and stresses it receives while running. The Lycoming is designed to operate at 75% of its rated power for 2,000 hours. Automotive engines are designed to operate at 25 to 30% of their rated power. Run either engine at a power setting higher than the design and both the reliability and longevity will be reduced. This may be acceptable for the auto engine given the cost difference between the two.

KR BUILDER'S

1. Join local EAA chapter and indicate desires. Talk to people and find out who is/has built your type airplane.
2. Borrow or order appropriate research and study books for aircraft building.

AeroCrafter Homebuilt Aircraft
 EAA Aircraft Building Techniques - Wood
 EAA Experimenter "How To" Magazine
 Sportplane Construction Techniques by Tony Bingelis
 The Sportplane Builder by Tony Bingelis
 Firewall Forward by Tony Bingelis
 Engines by Tony Bingelis
 Aircraft Sheet Metal
 Aircraft Bonded Structure
 KR2 Plans.
 Wicks Aircraft Supply Catalog
 Aircraft Spruce Catalog
 . KR2 Videos
 VW Engine Assbly & Install Video
 Order KR2 Spruce Wood K
 Order KR Newsletter

LEDGER

NOTES:

... Call EAA 1-800-322-2412. Cost is \$35.00 annually.

... EAA members love to help.

... \$25 from BAI Publ. (707) 747-1509
 ... \$18.95 from EAA (listed above).
 ... \$28.00 from EAA.
 ... \$21.95 from EAA.
 ... \$21.95 from EAA.
 ... \$21.95 from EAA.
 ... \$21.95 from EAA.
 ... \$21.95 from EAA.
 ... \$11.50 from Jeppesen Training Products, # EA-SM
 ... \$8.95 from Jeppesen, # EA-NMR
 ... Rand Robinson (714) 898-3811
 ... Wicks Aircraft 1-800-221-9425
 ... Aircraft Spruce 1-800-824-1930
 ... Wicks Catalog, page 134
 ... 1-800-348-9933
 ... Rand Robinson (714) 898-3811
 ... P.O. Box 579, Lakeville, MN 55044; 612-435-7275

KR BUILDER'S

LEDGER

By R. A. McCall

TASK:	
NO.	STEPS
1	
2	
3	
4	
7	
8	
9	
10	
11	

NOTES:

START: _____ FINISH: _____ TTL HRS: _____

COMMENTS/MEASUREMENTS/CHANGES MADE:

REMINDER: TAKE AT LEAST THREE PHOTOS OF THIS PROJECT.

Part IV

Why Modify? (First Time Builder)

The Dream Machine

By Richard A. McCall, EAA 505347, AOPA
009205843

By this time, I had formed an opinion of what my dream machine would be like and what I wanted it to be capable of doing. This machine, in my mind, had to have the sleek looks of a Glasair, a canopy that allowed two people to sit up straight without getting whiplash, be as fast as the Beech Queen Air (or almost), be made of wood and composite, enough weight and control surfaces to be smooth in mild turbulence (700 - 800 lbs. empty), an engine that had long range reliability, the ability to carry two adults weighing 200 lbs plus comfortably, the ability to carry some baggage (50 -100 lbs), a sound structure and fast wing, a tricycle landing gear, IFR capability, a low landing speed, and docile handling and spin characteristics.

The KR2 and KR2S, while an extremely good basic airplanes, could not achieve all of this and was reported to be trail heavy and squirrely to handle, needed more horsepower to be a true two seater for normal people, and needed to be longer to help smooth it out.

On the other hand. Ken Rand's design and methods had been used in many other designs, such as WAR plane replicas. So it was highly possible to use the basic structure and modify it for the desired results.

In order to achieve my goals, I needed an airplane with a gross weight of around 1400-1600 lbs. To get there, I would have to make many modifications. This would definitely not be a 600 lb. empty 980 lb gross weight plane.

The first thing to do was to decide which power plant to use. There had many good reports on the Subaru engine and its longevity. So I decided to find out about it and the availability of the engine. Lester had an EA-81 Subaru installed in his plane and it looked very good. With his help I investigated this engine.

The Subaru EA-81, 80 horsepower, 1.8 liter displacement engine produces 90 bhp @ 6000 rpm with a single carb and 98 bhp with a dual carb. It uses 5 gph with an NSI 65" x 47" agricultural propeller, a PSRU of 1.69 and a VW Rabbit radiator and weighs 127 lbs. dry; 248 lbs loaded].

The Subaru EA-82, 100-130 horsepower, 1.8 liter displacement engine produces 100 bhp a carb system and 130 bhp with fuel injection. It uses 5 gph with an NSI 65" x 47" agricultural propeller and a VW Rabbit radiator and weighs 263 lbs. loaded j.

The Legacy 2210 CC 16 valve produces 130 bhp @ 5600 rpm with a loaded weight of 300 lbs. It uses two VW Rabbit radiators and a 54" three or four bladed Warp Drive propeller].

Local prices around Dallas are running \$450 for an EA-81 or EA-82, without the brain box which is an additional \$75.

Foot Note: (1) (Information extracted from Article by Dennis Shattuck, Kitplanes, Feb 96. NSI Propulsion Systems INC. is located at 19132 59th Dr., Arlington, WA 98223).

DOES ANYONE OUT THERE IN KR LAND HAVE THE ANSWER?

A friend of mine has been having problems with over heating on a Subaru EA-81 installation. His engine ran at 180-190 degrees for several days, then immediately went to 226 DF at all power settings, except at very low RPMs. The water pump and indications of a blown head gasket are being checked for the possible cause. The radiator is mounted near the bottom of the cowling next to the firewall and additional venting of air flow has had no success.

Since I have an EA-82 and plan on installing it in my KR2S XL, I am very interested in the specifics of radiator installation from anyone who has an operational EA-81 or EA-82. Please write to me at 10 Palo Duro Court, Trophy Club, Texas 76262 and include photos if you can.

Needing Help,

Richard McCall



**EXPERIMENTAL
AIRCRAFT
ASSOCIATION**

WITTMAN AIRFIELD USHKO SH WI 54903 J086

REQUEST FOR INFORMATION

Does anyone know how to contact Neil Bingham? We show him as out of the country. Please contact:

Mark Langford
296 Taylor Denton Lane
Harvest, AL 35749
205-851-9902

KR Gathering

May 25th & 26th
Metcalfe Airport TDZ
Toledo, Ohio

The 5th Annual Midwest KR Gathering will be held

May 25th & 26th at
Metcalfe Airport TPZ
Toledo, Ohio

Normally, the **KR Gathering** is in June. However,, due to the EAA Chapter 502 hosting the "**ALUMINUM OVERCAST**", we have moved the **KR** events to coincide with this great crowd-pleaser.

This B-17 Bomber has been completely restored by the EAA and is presently touring **EAA Fly-Ins** nationwide.

Early KR arrivals will gather at 6—pm, May 24th, for a cookout plus a spontaneous, planned, impromptu, and spirited exchange of information and general B.S. Session.

A cook-in will be scheduled for the same time if the weather is prohibitive.

Transportation is available to the Comfort Inn South, or you may camp at **Metcalfe Airport**.

The Annual Awards Banquet will be held at the Hotel on May 25th with cocktails at 6- pm.

Thanks to attendees:

Bob Muse Jr., Martin Roberts, Jim Hill, Bob Hawk, Dave Shirey, & Randy Grove for making this event last year the biggest & best ever. **We're shooting for even bigger & belter this year.**

Ron Smolinski
419 882 8478

1-800-228-5150
Comfort Inn South
2426 Oregon Rd. / Northwood, OH. 43619
(419)666-2600
Fax (419) 666-0076

FOR SALE

KR-2 approximately 40% built. Fuselage on conventional gear, wings covered, premoulded cowl, canopy, tank and turtledeck. VW engine mount. Most hardware to finish. No engine or instruments. Everything in an enclosed trailer for you to hook up and pull home and get started- everything for only \$2,200!

Jim Smrt
560 Arbul St.
Felton, CA 95018
408-438-3666 days
408-335-1182 Sundays

FOR SALE

I have been asked by Bonnie Robertson to sell a KR-2 kit and Vari Eze Manufacturers Manual. These items belonged to her deceased husband Robbi Robertson. Robbi was a long time EAA member.

The sides of the fuselage are started. Workmanship looks good.

1. There appears to be a spruce kit for a KR-2. I have not done a complete inventory and all has been stored in a dry location, wrapped in plastic and is in a clean condition.

2. There is also Vari Eze Manufacturer's manuals Sections 1, IIA, V, unused serial no.

3. Several drawings, newsletters, instructions, most everything you would need to get started building a KR-2. Also some aluminum materials.

Lyle Muir
2503 W.C.R. 47
Hudson, CO 80642

FOR SALE

ENGINE CONVERSION SPECIAL: VW 1835 Firewall forward except mount. Ellison TBI and much more. Runs great! Call for details and photos. \$3,500 plus shipping.

Monte McClean
319 Plymouth Ave.
Ft. Walton Beach, FL 32547
904-862-4834

THE KR NEWSLETTER IS PUBLISHED BI-MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 - EVENINGS AND WEEKENDS.
EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER YEAR-
CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH.

FROM THE EDITOR.....

As you have probably noticed, the Newsletter has been published monthly and bi-monthly within the past year. We have weighed both options and have realized that it is more cost effective to publish on a bi-monthly basis. Costs for printing and postage keep going up and we want to keep our rates from increasing. You will still be receiving the same amount of information because the Newsletter has 16 pages instead of 8 pages. We hope you understand and continue to support the Newsletter! It's your contributions that make it such a great Newsletter!

Thanks for all your help!



FOR SALE

Partially completed KR's and misc. equipment. Over \$11,000 invested, will sell all or parts at a fraction of original cost. For details and a equipment list, contact:

Ted McClurg EAA 394630
P. O. Box 202
Branscomb, CA 95417
707-984-6398

VIDEO FOR SALE

While attending the 1995 KR Gathering in Columbia, Tennessee, I was able to record a lot of good video (VHS) of the the KR's that were there. The cost for a 1995 KR Gathering copy is \$20.00. US to cover postage and handling.

C. 1. Gardiner
42 Billings St.
Whitby, Ontario
CANADA LIN 9B9

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 226-227 MARCH-APRIL 1996

FOR SALE

Engine parts for 1600 VW conversion to turbo 1834. Heads, valve train, new piston and cylinder set, turbocharger complete with all manifolds, both intake and exhaust, prop flange, cam ground for aircraft use, good crankshaft, chrome valve covers, cylinder air shields, Diehl accessory case with starter, magneto, motor mount and some instruments. All for \$750 plus freight.
Wood prop, 52 x 7, with spinner, \$100 plus freight. Prop made by Props, Inc. New.

Dick Nichols
6025 Idylwood Dr.
Corpus Christi, TX 78412
512-992-2844

FOR SALE

ENGINE CONVERSION SPECIAL: VW 1835 Firewall forward except mount. Ellison TBI and much more. Runs great! Call for details and photos. \$3,500 plus shipping.

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN



KR NEWSLETTER

ISSUE 228 -229 228-229
MAY -JUNE, 1996



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



LESTER PALMER'S KR-2 N202LP, DALLAS, TEXAS

Lester's KR-2 was narrowed to firewall width, making it a one place and lengthened 24" at the tail. The canopy is a dragonfly and the cockpit is extensively soundproofed. Engine is a 100 HP EA81 Subaru with a belt reduction unit that Lester designed and offers for sale. Carburetor is a 5200 series Chev Vega. Prop is a 58 x 60 Hagi and can pull the plane to just over 212 MPH. One of the many unique features of the plane is that it incorporates air conditioning (something every Texas pilot would certainly appreciate), Lester said he will be sending detailed information on this plane for a future issue. If you would like to talk with him, he can be reached at 214-241-4387, 3247 High Lark, Dallas, TX 75234.

Sid Wood is a KR-2 builder and an Electronic Engineer. He has worked as a civilian for the US Navy for the last 25 years designing, testing and installing navigation systems in Navy ships and aircraft. He has been associated with Global Positioning System development since 1978. Sid conducts KR related construction demonstrations at the EAA convention at Oshkosh each summer.

Global Positioning System

Aircraft Navigation News
by Sid Wood

In August 1995, the US Department of Transportation released the 1994 Federal Radionavigation Plan (FRP). Mandated by Congress, the FRP has been jointly produced by the DOT and DOD every two years since 1980. Institute of Navigation (ION) and GPS World also provided data for this report and are acknowledged.

In formulating policies for the FRP, DOT considers both user requirements and scarce government resources. DOT Secretary Pena said "This FRP is consistent with my goal of implementing GPS as the world standard in civil navigation and positioning." Pena emphasized that DOT does not plan to phase out land-based systems that are heavily relied on until GPS is available at acceptable user costs. ("acceptable" was not defined.)

Some of the changes noted in the new FRP are:

- systems transition period is now defined as "suitable transition period," no longer as "10-15 years"
- discussion of cost recovery mechanisms and economic considerations were included (could mean user fees)
- listing of GPS as the first system in all cases
- "differential GPS" now referenced as "augmented GPS"
- addition of Great Lakes and western rivers as part of coverage for USCG DGPS system
- WAAS (Wide Area Augmentation System) and LAAS (Local Area Augmentation System) discussed in the FRP policy statement
- Loran-C phase-out accelerated to 2000 from 2015 (overseas phased-out at end of 1994)
- acknowledgment that GPS WAAS may replace VOR/DME, with planned phase-out of VOR/DME to begin in 2005, end in 2010
- TACAN phase-out target set for 2000
- deletion of MLS as replacement for ILS; augmented GPS will now replace ILS
- FAA to work with ICAO (International Civil Aviation Organization) (read airlines) to work out transition to augmented GPS for precision landing
- WAAS to replace ILS for CAT I, LAAS for CAT II/III (CAT IIIB is zero vis, zero ceiling)

- phase-out of ILS to begin in 2005, end in 2010
- phase-out of non-DGPS maritime radiobeacons by 2000, instead of "after the year 2000"
- NDB phase-out to begin in 2000 with most decommissioned by 2005

The FAA spent the last year doing 208 CAT IIIB landings using LAAS GPS. Touch down average error was 0.9 meters lateral and 1.3 meters vertical with one type of GPS receiver, and 0.3 meters lateral and 1.6 meters vertical using a second GPS receiver on a Boeing 727/200. The CAT IIIB "box" is 1.2 meters wide and 4.0 meters long. See if you can come that close on your next spot landing. The bottom line: LAAS GPS technology is ready now.

In August 1995 the FAA let a \$485 Million contract to develop and place two WAAS satellites in orbit by 1998 to provide WAAS for North America; one will be active while the other will be on hot standby. WAAS will provide three dimensional GPS navigation with less than 10 meters error in any direction. That's about a wing span for many airplanes. GPS today provides 100 meter accuracy.

A consortium of the European Space Agency, the European Commission, and Eurocontrol (FAA equivalent for Europe) will deploy the European Geostationary Navigation Overlay Service (EGNOS), and the Japanese will operate their MTSATs in linkage with WAAS GPS to provide precision navigation for North and South America, Europe, Africa, Asia, and the Western Pacific by 2000. The Russian GLONASS will be linked with WAAS GPS by 2005.

Inmarsat, a commercial consortium based in London, England, is debating on including a "navigation package" on their next series of communications satellites to provide GPS compatible navigation without the Selected Availability restrictions that are imposed by the military. The inherently more accurate Inmarsat "GPS" system receivers would be enabled using a "smart card" sold on a subscription basis. A decision to deploy this "GPS-like" system is due in February 1996. The system would be providing navigation services by 1998.

What does all this mean to the low and slow airplane driver? It means: Your trusty Loran-C will become ballast in five years. Most NDB's will shut down in five years. VOR, DME, and ILS will start turning off in five to ten years, maybe sooner if the "suitable

transition period" is done and WAAS and LAAS is on-line. You will need to have a certificated augmented GPS (or two) in your "spam can" or expiemental if you file IFR; and it shall be compatible with the airline systems being developed now. If you are going to do any type of instrument navigation any where after the next five years you must start using some type of GPS. And you may have to pay the FAA each time you fly.

Finally, the bottom line: What's it gonna cost Me? GPS prices now are comparable to VOR/DME units of similar functionality. Hand-held GPS receivers can be had now for about \$400 to \$500; fancy hand-helds are up to \$1,500. Panel mount units start about \$700 for basic units on up to \$3,000+ for moving maps and data base jobs. There are no WAAS GPS certificated units at this time; look for these in two or three years. The same goes for LAAS GPS units. You can buy USCG DGPS marine receivers for your aircraft but these will not be certificated and will only provide augmented GPS in coastal areas. The Coast Guard will likely drop USCG DGPS in about eight years in favor of WAAS GPS. The cost of the GPS receivers is not technology driven, but determined by the "marketing infrastructure" (read "all that the traffic will bear"). Manufacturers' costs are generally one fourth the advertised retail prices. The present DOT policy does not impose user fees; but, Congress could change that real quick.

CONT'D PAGE 4

REQUEST FOR INFORMATION

I'm in the "boat stage" of building a KR2S, Dan Deil fixed gear, nose dragger. The mains are on- the impending installation of stick/aileron hardware prompts this request for info.

I'm considering doing away with the inboard flap assy's entirely, going to spoilers for roll and glidepath control and using push-pull & torque rods to control these surfaces. The objectives are; reduction of weight/complexity and elimination of adverse yaw. Obviously, the request is for info from anyone who has experience with any of this in this aircraft.

On another issue- I have developed what appears to be a very workable brake pedal arrangement, for HUNG rudder pedals. When the photos get back I will write this up and send it in.

Thanks, in advance.

Dan Harrington
RT 107 P.O.Box 169
Gaysville, VT 05746
(802) 234-6361

FAX: (802) 234-6780 e-mail: river@sover.net

The following information is an excerpt from Chapter 74 Newsletter, submitted by Foster Schuren, Maitland, Florida.

WITH GREAT SADNESS.....

Tom Jones died Sunday, June 9, 1996 at Columbia Park Hospital of complications from surgery. Tom joined Chapter 74 in the late 1970's, assisted in the construction of the Chapter hanger at Kissimmee Airport and served in 1984 as Vice President of the Chapter. In 1985, he moved his membership from Orlando to Sanford. Tom learned to fly in 1943 and served as an Air Force pilot for 30 years, While in the military, he won the All-Service Skeet Shooting Championship.

Tom was one of the first EAA members in the country to build a KR-2, which he first flew in 1985 at Sanford.

Tom is survived by his wife Florence and three sons, Michael, Richard and Rudy.

Global Positioning System

General Aviation Considerations

by Sid Wood

The intent of this paper is to give you some insight in the Global Positioning System (GPS) as to what it is, how it works, and how to use it. In the next five years or so, you will need to start to use GPS for aircraft navigation. The FAA will begin to gradually shut down the conventional VOR/DME beacons in about 5 years. GPS will be much cheaper for the FAA to operate and maintain than VOR/DME, and will provide much more accurate navigation world-wide.

The US Air Force developed GPS to provide precise world-wide navigation services for US and Allied Forces. GPS is composed of three segments:

Space Segment consists of 24 satellites in 11,000 nautical mile high orbits.

Control Segment consists of satellite tracking stations, up-link transmitter sites, and the system control center located at Colorado Springs, CO.

User Segment consists of every one that uses the GPS for what ever purpose. This used to mean military only, but not any more.

Using GPS in a moving platform is much harder to do than when you are stationary. There are also larger errors. To reduce some of the errors, the Air Force designed in some redundant features that permit better accuracys. GPS uses two fundamental frequencies, 1575.42 MHz (called L1 channel) and 1245.6 MHz (L2), to allow correction for refraction of the signals coming through the ionosphere. Coarse Acquisition (C/A) code permits quick acquisition of the signal. Precision (P) code messages then provide data for fine tracking. Coarse acquisition usually takes 30 seconds to 2 minutes for most GPS receivers today. When the Air Force was designing the GPS system, the idea was everyone would use both carrier signals and the fine tracking message on these carriers. There was no need to put the coarse message on both carriers. So only the L1 carrier has the C/A message.

The Air Force also foresaw the need to limit the GPS to friendly forces. They put in capability to

encrypt the P message called Y code. Users that do not have the authorized crypto key could not use the Y code message. As it turned out, the coarse message with the single carrier signal gave about a 30 meter error in actual position. The Air Force thought that was too accurate. To further degrade the GPS accuracy for non-authorized users, the Air Force incorporated Selected Availability (SA) into the signal format. SA jitters the last few least significant bits in the navigation message. This still allows a position fix, but the series of fixes from one second to the next will jump around randomly. By turning up the SA at the system control center, the military can instantly degrade the accuracy of GPS as they see fit. Presently SA restrictions result in 100 meters CEP (Circular Error Probable) error. (This means 50 percent of the position fixes are inside a circle 100 meters in diameter and the other 50 percent are outside the 100 meter circle.)

If you count the number of GPS receivers in operation today, the predominant users are land surveyors. GPS has revolutionized the land survey business. It used to take a field team of 3 to 5 working for at least 3 days to establish a monument. (That's the reference that established the accuracy and basis for any local survey.) If the sun and stars were not visible, it could not be done at all. Now, using a GPS survey receiver, one person can do that task in less than 5 minutes, rain or shine, and far more accurately than any celestial based survey. GPS survey accuracys within one centimeter are typical.

For General Aviation GPS users, the 100 meter error is OK for enroute navigation, but not adequate for approaches. In lots of applications, including General Aviation, there is a need for better accuracy. Experiments conducted by the equipment manufacturers and the US Coast Guard resulted in development of Differential GPS. The Coast Guard set up a stationary GPS receiver at a known surveyed site and then broadcasted correction signals based on the apparent SA and ionosphere errors detected by the stationary GPS receiver. As a result, mobile DGPS receivers could obtain position fixes with less than 1 meter error. The Coast Guard is now deploying a DGPS system using selected low frequency marine beacons as the telemetry transmitter. This system is only available in

CONT'D PAGE 5

coastal areas and limited in range by the maximum signal strength of the individual low frequency beacons. The RTCM-104 format refers to the Radio Technical Commission Maritime committee number 104 that made the recommendation to the Coast Guard.

The FAA looked at the RTCM-104 format for aviation application and found that the digital differential message modulation sometimes interfered with the automatic direction finders used on general aviation aircraft. There was also the possibility of tuning the wrong beacon and thus getting the wrong correction information for that area without the pilot knowing it. The Coast Guard is using 57 beacons to provide DGPS coverage along the coastal US and the Great Lakes. To get similar DGPS coverage for the land area of the US would require 2,841 beacons, 720 of which would need new construction. \$500 million per year was the estimated operating cost.

The FAA did a lot of theoretical study and some practical experiments with different types of DGPS. They concluded that broadcasting GPS error corrections from a single geostationary satellite could provide DGPS coverage for all North America, including Alaska, Canada, Mexico, Central America, and Hawaii. The format would be totally different from RTCM-104, and would use the LI carrier frequency that the GPS receivers could tune directly. The standard GPS receivers will need some software and firmware modifications. The new system name is Wide Area Augmentation System (WAAS) GPS. This would produce accuracies of 6 meters CEP; great for enroute and non-precision approach, but not quite good enough for precision approaches. WAAS has no altitude or terrain limitations on coverage. The error correction telemetry does not require a separate receiver. WAAS will also remove any degradation due to SA, much to the chagrin of DOD GPS managers. WAAS will provide more accurate navigation than the current best dual-frequency crypto-aided military GPS receivers that now get about 16 meter accuracy.

The FAA awarded a \$485 million contract in August 1995 to deploy WAAS. Thirteen US monitor stations and a system control station in Oklahoma are being built. The space segment will have two satellites, one active and the other

on hot standby. WAAS will be operational end of 1998 according to the current schedule. Annual operating cost estimate is \$27 million including \$5 million prorated for satellite replacement at 10 year intervals. In comparison, the VOR/DME system costs \$54 million per year to operate in the US. The European Geostationary Navigation Overlay Service (EGNOS) and the Japanese MTSATs will link with WAAS to provide precise navigation for North and South America, Europe, Africa, Asia, and the Western Pacific by 2000. WAAS will link with the Russian GLONASS by 2005. At present there are no WAAS GPS receivers on the market. There are some advertised to be WAAS compatible. That means for a few dollars later on you could modify that receiver for WAAS.

What about precision approaches? The current ILS requires maximum error less than 10 meters in azimuth and 6 meters in elevation for Category I; 6 meters in azimuth and 2 meters in elevation for Cat II; and 1.2 meters in azimuth and 1 meter in elevation for Cat III. Flight tests with ILS and MLS (Microwave Landing System) have demonstrated these accuracies to be consistently achievable. To get these accuracies with GPS, the FAA needed to develop a local error correction beacon. The FAA calls this Local Area Augmentation System (LAAS). A single LAAS beacon would serve all runways at a single airport and would have a line of sight range of 50 miles. This would be similar to the RTCM-104 except the aircraft GPS receiver would tune the carrier directly on the LI channel. Each airport LAAS will have a unique identification code to preclude any confusion in the GPS receiver to get the proper correction for the destination airport. The International Civil Aviation Organization (ICAO) in conjunction with the FAA is developing LAAS now to be operational in 1998. Since airline companies compose ICAO, the LAAS GPS will probably be an airline solution. It will be a long time before non-controlled fields have LAAS.

By now you should be adding up all the stuff being hung on this one LI GPS channel. All the 24 GPS satellites use the same carrier frequency, as do the WAAS satellites and all the LAAS ground beacons. Eventually there will be thousands of LAAS beacons; one for each precision approach airport. It turns out there is

CONT'D PAGE 6

a lot of capacity on this LI channel, because each GPS transmitter uses digital spread spectrum modulation. Each satellite and beacon has a unique modulation sequence so that none can overlap the others. What makes this nice for the user is channel or frequency selection knobs are not needed. The GPS receiver sorts out this blizzard of pseudorandom noise signals buried in industrial and cosmic white noise, calculates position in latitude, longitude, and altitude, and the correct GMT, velocities associated with each direction, and finally has plenty of time to calculate steering displays, moving maps, look up airport data bases, take revised waypoints and flight plans, and then wait for the next little bit of data coming from a satellite at a 50 Hz rate.

This is why most GPS receivers only calculate the position once a second; the real data to make the calculation is only coming in from the satellites at that 50 Hz speed. Simple GPS receivers, like most hand-held units, derive velocity information by comparing the difference between successive positions. For real-time navigation and enroute steering the information is extrapolated and averaged from the last few positions and velocities. The more sophisticated units track the doppler shift associated with the data modulation and the rf carrier to obtain velocity as a fundamental measurement. This velocity can be integrated with the precise GMT previously obtained from the satellite data to then calculate position at millisecond intervals. That makes automatic pilots and humans chasing the needles a lot more responsive. Just think how much fun and excitement you could have shooting an ILS approach in IMC if the Az and El needles only moved once a second, then were always about 4 seconds behind actual position and never indicated when the signal was lost.

In all megabuck government programs politics is a fact of life. GPS is no exception. In August 1995 President Clinton directed the White House Office of Science and Technology Policy (OSTP) and the National Security Council (NSC) to carry out a comprehensive review of policy governing the use of GPS. This was in response to a May 1995 National Academy of Public Administration (NAPA) and National Research Council (NRC) study recommending that DOD discontinue immediately the use of

SA, and that SA be fully deactivated in three years. The study notes that denying the full precision of the GPS signal to non-military users serves little or no purpose. Enemies capable of deploying GPS-guided weapons also are likely to be capable of using the DGPS system. The Defense Department has issued a statement calling the NAPA/NRC recommendation "premature." DOD says that it would be a "virtually irrevocable" step that would place the US military in a disadvantageous position, without time to prepare for combat against adversaries with access to undegraded GPS signals.

The NAPA/NRC study also points out that, since the introduction of GPS navigation, commercial use of the system has grown far faster than defense applications; commercial users buy nine out of 10 GPS receivers. The value of the worldwide GPS market is expected to total \$11 billion in 2000; by 2005 the figure is projected to reach \$31 billion.

Big bucks are being put into GPS development for aviation use. As in most human endeavors, it has to be quite complicated to make it simple to use. The technology is virtually rocket science; the FAA vision is to make cockpit use of GPS simple enough for a student pilot to be proficient on or before first solo. The idea is to let the computer handle the details while the pilot concentrates on the big picture.

There are a few panel mount GPS receivers available today. Some are TSO'd. Most of these will be obsolescent in the next three years, as will be all the hand-held units currently in use. WAAS and LAAS will be the units of choice after 1998. In my next paper we will look at the aviation GPS receivers currently available, some of their features, and list prices.

CONT'D PAGE 7

THE KR NEWSLETTER IS PUBLISHED BIMONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - • EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$20.00 PER YEAR- U.S., \$25.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS. SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN INDIVIDUAL COPIES \$2.00 EACH, ANY REPRODUCTION IN PRINT OR ELECTRONIC OF THIS NEWSLETTER WITHOUT WRITTEN PERMISSION WILL BE CONSIDERED COPYRIGHT INFRINGEMENT AND SUBJECT TO AGGRESSIVE LEGAL ACTION.

Global Positioning System Receiver Survey

by Sid Wood

In the last paper I outlined some of the features and operational considerations for the Global Positioning System (GPS) especially as pertains to general aviation users. Now, I would like to outline some of the GPS receivers currently on the market and venture some guesses as what the future holds.

There have been numerous market surveys of GPS receivers and associated user equipment. Currently there are 342 listings from 52 manufacturers. Four years ago, 68 receivers from 12 manufacturers were available. The broad categories are Surveying, Timing, Differential Base Station, and Navigation receivers. Some manufacturers also produce single-board GPS receivers that are intended for use in other vendors products. This survey concentrates on navigation receivers that could be useful for general aviation. Military GPS receivers and those costing over \$4,000 are excluded.

You need to know some general considerations that apply to all GPS receivers. The GPS signals come from several satellites and from all directions from overhead and down to the horizon. Most units have software that will not use satellite signals if the satellite is less than 5 degrees from the horizon. Signal refraction effects cause large errors at these low angles. The antenna must have the best possible clear view of the sky for best operation. The GPS signal travels line of sight. Any metallic structure or other conductive object will block the signals. GPS antennas, that are intended for permanent installation, are usually flat about one half inch high and 3 or 4 inches across either round or square. Hand held units generally have attached or built-in antennas. Some hand held units have optional external antennas; these are handy to place forward on the glare shield to get better reception.

In order to obtain a position fix, i.e. latitude, longitude, altitude and time, the GPS receiver must track at least 4 GPS satellites simultaneously. Most GPS receivers can track more than 4 satellites using 6, 8, or 12 channels

to provide smooth transition between rising and setting satellites, aircraft maneuvers, and redundancy to select the best available signals. The GPS receiver needs almanac (the GPS satellite constellation recent history), ephemeris (individual position reports from each satellite), initial receiver position and time data. The initial position and time are usually the values at the last position fix. Most units have a low voltage battery powered clock to keep time and remember the last position fix when the unit is shut down or satellite signals have been interrupted.

For a cold start (batteries dead or pulled, and hours or days since the last fix) time and position parameters are unknown. Even if the receiver is stationary, time and the GPS satellite constellation are constantly moving on. A cold start is a worst case situation. For a warm start, the GPS receiver uses recent tracking data stored in battery powered memory. The warm start is considerably faster to obtain the first position fix. For most GPS receivers, the interrupted signal reacquisition is the same as a warm start.

If the aircraft is flying, the actual position will continually change from the initial (assumed fixed) position. This will extend the time required for a first position fix. Depending on the sophistication of the individual receiver and the velocity and possible maneuvers of the aircraft, a cold start and possibly warm start may not succeed in getting any position fix. Hand held units intended for marine and hiking use, usually do not have the fast tracking capability needed for the higher speed aviation environment. On some models you can literally fly away from the GPS signals during high speed maneuvers, even if you have valid tracking on the ground or in straight line flight. The manufacturers included on the following listing indicate their hand held units have the necessary tracking ability for aircraft speeds up to 250 knots. Panel mount units usually are good for up to 700 knots. Aircraft acceleration is a very critical parameter for GPS receivers; you can pull away from the expected GPS signals' time slot faster than the software tracking loop systems can keep up.

Now assuming your GPS receiver is up and running, it will proceed to tell you your location,

altitude and time. That would be home base airport, but you really want to go some where. Now what? You must enter the latitude and longitude of your intended destination. These numbers could be scaled off a chart, looked up from an airport listing, or remembered by your GPS receiver from the last time you were there. Most likely you will need to punch in these numbers. With the usual call up and enter buttons, this will require about 21 key strokes for North, South, East, West, degrees, minutes, seconds and tenths. Mis-key one key stroke and you could find your self a mile or so off your destination or maybe even heading the wrong way to Diego Garcia. If you want to avoid restricted areas, and otherwise not go direct, you will need some way points. That means another 21 key strokes for each way point; and they must be done correctly too. For 5 way points you can do a lot of button mashing. LORAN-C users will be familiar with this routine.

There is a better way. Some, but not all, GPS receivers incorporate a data base that has look-up tables for all US airports, most airway intersections and locations of restricted air space. These locations have standard 3 to 5 character designators identical to the chart and approach plate call-outs. Select the designator and the location numbers are instantly accurately entered with no fooling around. If you have a moving map display, you can scroll to the spot you want to go, punch the enter button, and it's done.

As with cars, airplanes, computers, etc. extra features and higher performance command higher prices. Definitely, "try (thoroughly) before you buy". The GPS is on a fast track for developments. Manufacturers are continually introducing new equipments. The FAA is developing WAAS and LASS that may obsolete current state-of -the-art equipments in two to five years. Parallels with the computer industry, that introduces faster more powerful models every year, are valid with GPS also.

CONT'D PAGE 9

AERO-CORE FUSELAGE BUILDING SCHEME

Jim Hill expressed an interest in seeing some sketches of an aero-core fuselage building scheme I used on my plane.

The formers are built from OSB or ply in the shape of your fuselage and mounted (I used C clamps) to the open table cross members. Obviously, you must place these

where you wish the formers to be. The fuselage is then built, upside down beginning at the top longeron which rests upon the top of the 2x6 table. The top longeron is made form spruce, fir, hemlock or whatever you choose and each fuselage side is started with this. They are attached thru a combination of "sheet rock" screws, glue of your choice and alignment between formers is maintained with toothpicks. The aero-core is layed up, layer by layer atop the solid longerons. The aero-core strips that I used are approximately a half inch thick and three quarters wide. They are eight feet long (I think) and have dove-tailed ends which must be glued together and allowed to set before each days work begins. The scheme I followed leaves only the firewall and the tailpost intact after the boat is done. All the "false" formers (with wax paper over the edge) are ultimately removed. After the aero-core is completed, cracks are filled and sanded and when you're satisfied... a couple layers of glass are layed up. That's the outside... this is prior to removing the C clamps and turning it over. You then fill and sand the inside and apply one layer of glass. The first guy who built a fuselage like this claims to have finished in 10 or 12 days. He was an experienced composite man and already had the inner spars done before beginning. It took me about a month and I had no help on the glass and I am a novice at composites. So you can see, even a guy of my age with no plastic experience can put together a slick, strong fuselage in less than a month. I have a tape of its construction which I made for the FAA and my son, an Army helicopter instructor pilot. If anyone is interested, just shoot me a blank tape and I'll dub you a copy.

As you might imagine, there are a lot of details that I've deleted here for brevity but I'd be happy to chat with anyone interested and a fair amount of additional stuff is on my construction tape.

Happy building! SEE SKETCHES ON PAGE 13

Art Smart
HC05 Box 14-A
Park Rapids, MN 56470
218-732-5295

Source of aero-core is:
Jan Updike, 8646 W. Monterosa
Phoenix, AZ 85037

[illegible]

EARL: This is a letter that I wrote in response for information to a builder in Italy. I would like to hear from other builders in the KR Newsletter about their opinion about Revmaster, Great Plains Aircraft or any other supplier of VW engines or parts. Any response must be printable.

Dear Franco Bucci,
VIA M. Panti 8
50019 - Sesto Fiorentino(Fi)
ITALY

5/12/96

I'm glad that you liked my KR2 in 'Sport Aviation' and some of the 'KR Newsletters'. It took me eleven years to build my KR, but most of those years I did not do much. I bet you thought it was going to take almost as long to write back to you...I apologize.

The engine is a Revmaster 2100D(D=Dual Mag), but actual size is only 2078cc. The carburetor is a Posa Supercarb which means that it is a regular Posa with mixture control. After the initial testing and adjusting of the carburetor mixture needles, the Posa has virtually trouble-free and a fuel pump is not needed. I have thought about testing other carburetors, but haven't found one that I really like enough to give up the simple trouble-free Posa.

I purchased the Revmaster from someone that started a KR, but never finished it. The engine had never been started until I put it on my airplane, 13 years after it had been originally purchased from Revmaster. I have never had a problem with the engine, except normal maintenance until I had a prop strike.

My original landing gear, which I designed, worked great until I put a wheel pant on the nose gear and wheel shimmy caused the nose gear to collapse during taxi.

After the prop strike, I took the engine apart and found that the cylinders were only 90cc and should be 92cc. I could not get new rings for 90cc so I upgraded (new pistons and cylinders) to 92cc which now makes the engine 2078cc. While I had the engine apart, I put new bearings and had it balanced. Since then, I have flown my KR for about 150 Hours with no problems.

My Revmaster engine has been just about perfect, but I want to tell you my personal opinion of Revmaster as a company based upon my own experience and other KR builders that have talked with.

Even though Revmaster still manufacture and sell VW Aircraft engines, I don't feel that they truly support the aircraft engine as they once did. When I have requested information, I have felt that the person, I was talking to, either didn't have the time or desire to help me except for Roberta(a office staff member). Other pilots using Revmaster engines have told me that the Revmaster engine has a design problem in that the engine block will develop a crack between the old distributor hole and the nearest cylinder at about the 200 hour mark. I have a total of 195 hours on my engine and have seen no problems yet, but I am keeping my eyes open. I am very careful to torque any stud or nut on this engine evenly and never over-torque. From the positive reports of many other pilots and the dedication to the VW aircraft engine, I will buy my next engine or the parts to build my own from 'Great Plain Aircraft'. This is my personal opinion. Hopefully, I will not need to buy another engine.

CONT'D PAGE 11

The only thing that I plan to change is the exhaust system. I currently have tuned exhaust(designed myself) with four exhaust pipes. It looks great and sounds fantastic, but it is loud in the cockpit. Great Plains Aircraft(Steve Bennett) has a 'Four into One¹' exhaust system that is supposed to add horsepower and be quieter. I plan to purchase Steve's exhaust system if will clear my Nose gear.

I now have almost 200 hours on the KR2 and would have a lot more if I lived closer the airport where I keep it. I have moved about 65 miles(about 98 Kilometers) away from the airport and started a new business so I don't get to fly as much as I would like. But I did fly to Oshkosh, Sun N Fun and a few other airshows last year.

Franco, I am sorry that it has taken so long for me to answer your letter. If you care to write again I promise to write back faster.

Bobby Muse
3145 Justin Towne Ct.
Antioch, TN 37013

FOR SALE

KR2S Plans and Construction Manual, mark-up copies of blue prints, "Actual Size"¹ copies of prints for templates, Spruce Kit (Partially assembled), Plywood Kit (Still in box), everything goes for \$500.00. Bring a truck and you can have the 14' x 4' layout table also.

Charles Mottram Jr.
15 Christian Dr.
Pittsgrove, N.J. 08318
(609) 358-8146
[cmottramjr@aol.com]

FOR SALE

KR 2S - 80% complete. Includes engine cowling, (less FWF). Fuselage has 16" extension and is 4" wider. Diehl tricycle gear with 500 X 5 tires and Cleveland wheels and brakes. ELT and Comet Flash Strobe mounted. Dual control sticks with push/pull tubes. Removable header tank with 6 gals capacity. Reinforced firewall for 0-200. Dragonfly tented canopy. Tail control surfaces completed. Wings are closed out (Diehl skins) with 6 gal. fuel tanks in each. Nav lights. Keith James stub wing skins with flaps. Some flight instruments, circuit breakers and other items included. Asking \$4,000.

New Great Plains 2180cc with dual spark plugs, magneto and GDI ignition. Force one prop hub with Sturba prop. Engine assembled under Steve Bennett's supervision. Ellison EPS I carburetor and 4 tube to 1 headers. Diehl supercase with alternator. Only ran 30 min. to break in at Great Plains. \$6,300 invested, asking \$4,500.

Edward Carr
316-683-8711

I wrote the article on the SUPER EPOXY MIXING BALANCE fully aware that most readers were better craftsmen with better shops than myself and would run with the ideas. However, some want more help.

The pivot system. To retain the pin and keep the ends from scratching make two thin wall spacers to fit the 1/8" spaces between the braces but allow about 1/32" beam movement. A drilled out spoke ferrule might provide the spacer tubing. Flatten one or both spacers until it takes a moderate force to push the pin through. This force retains the pin. Cut the pin length so the ends are 1/32" or so inside the braces. The deep brace chamfers are not needed. Check that each pair of holes is fairly well aligned. Except for my first oversized holes the pivot system has worked just fine.

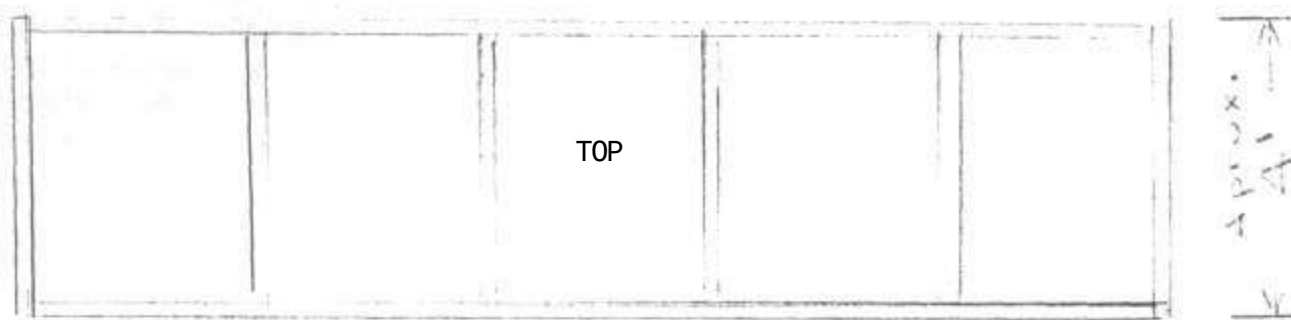
The beam. I will make a thinner, lighter beam. Epoxy a 1" wide strip across the underside of the beam to prevent the brace screws from protruding. Locate the datum and cup positions very carefully. Try to do much better than $\pm 1/32"$. For accuracy center punch and progressively drill all holes. For my new beam I am considering a 6.000" resin dimension for more compactness.

The magnet balance weights. I found rectangular metal cans used for paint thinner etc. are good for the flat magnetic sheet. My magnets are hard to move on the side of a file cabinet but slide well on the thinner can metal. Make the sheet full beam width and drill right through for the permanent balance weight bolts. Dimple and/or c'sink for these flat head bolts.

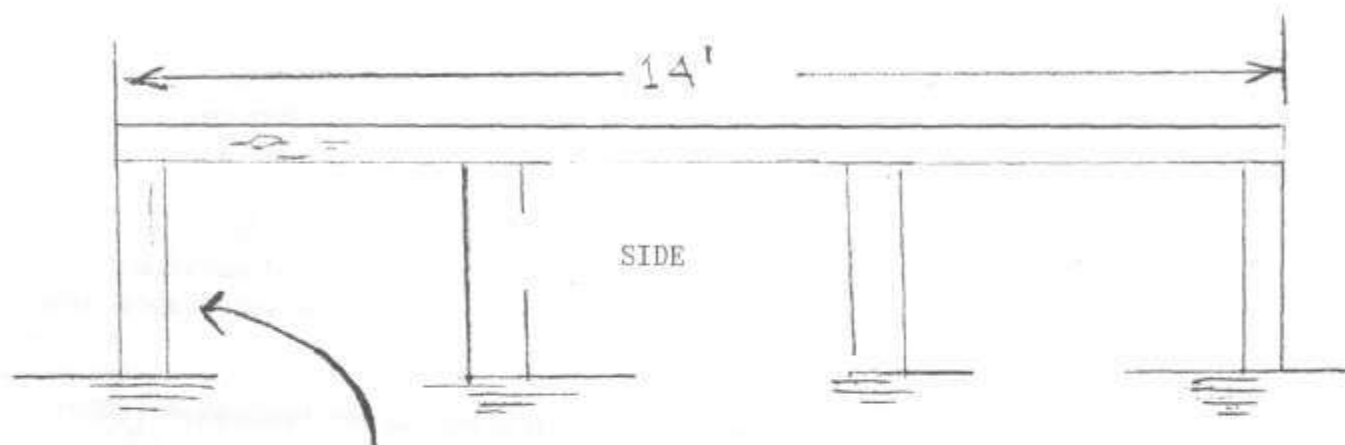
Cup positioner. With a lathe you can easily make cup positioners for non-recessed base cups. Otherwise epoxy several nested cups together and cut off the bottom 1/2" or so squarely. Drill a centered bottom hole and epoxy in the dowel. On the balance rotate this positioner holding 1/2 cup of water. Some out of balance will be indicated (with any cup positioner) but if it is minimal concentricity is OK. A best angular position for a cup positioner can be found, marked and used with little operational trouble.

Tare cup wetting is hard to quantify and I think my first attempt was poor. I will just put 3 or 4 drops of water in the cup to represent the resin not contacting the hardener. I think this resin is mostly in the cup bottom-to-side joint. A split tongue depressor mixing stick provides a sharp

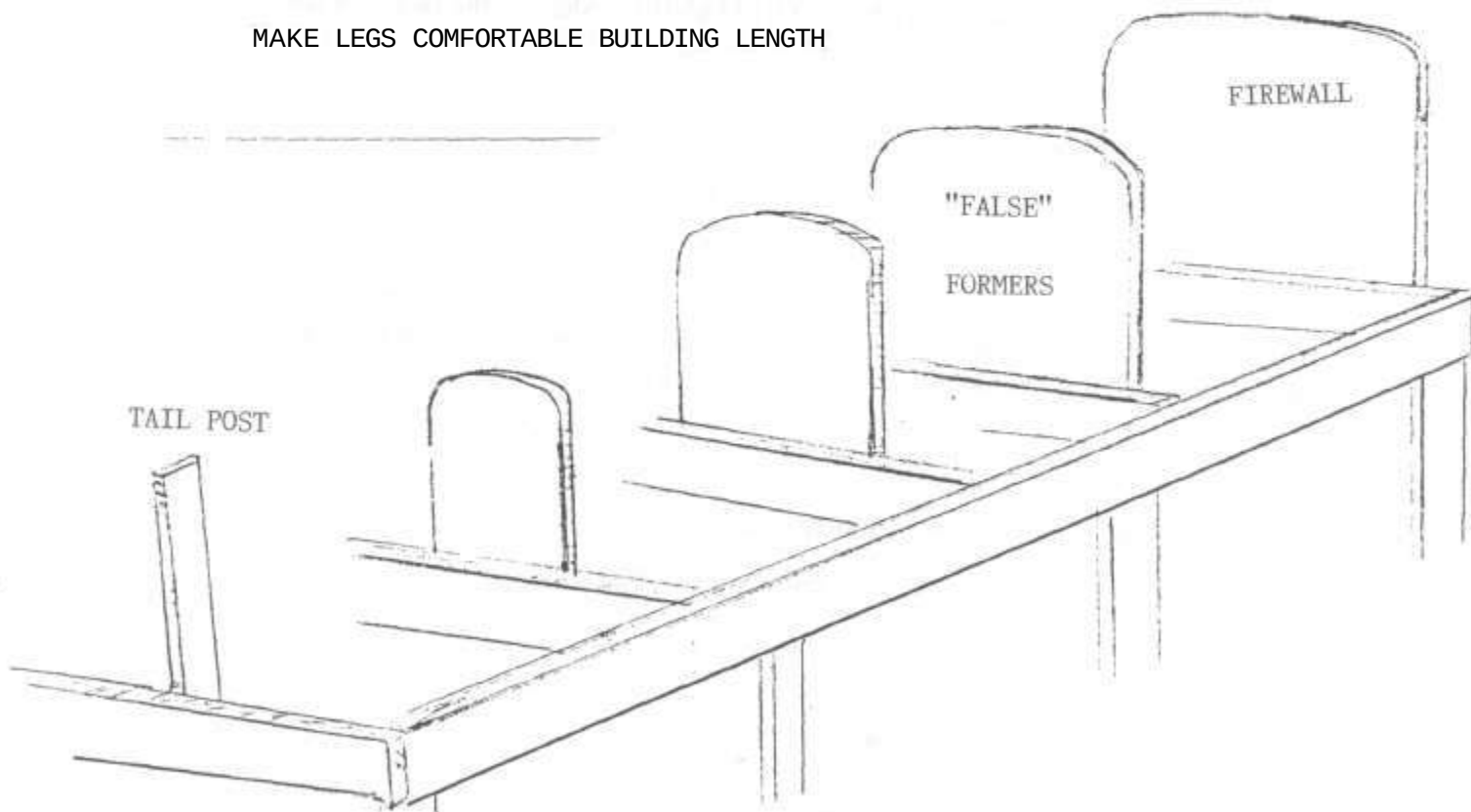
Construct 2 x 6 table to the length of fuselage - firewall to the tailpost.



2 x 6 OPEN TOP TABLE



MAKE LEGS COMFORTABLE BUILDING LENGTH



KR'S AND THE MYSTIC FORCES OF THE UNIVERSE

I have come to realize that in building an airplane not all things are as they appear.

We were contemplating modifying the fuselage shape to achieve a little more shoulder room. Our attempt at using a minimal amount of material resulted in a shape that was a bit unorthodox, raising concerns about additional drag. A friend resurrected a wind / smoke tunnel that he had used on his project. We carved a model of the fuselage and were ready to go except for a smoke source. Our friend had used incense cones in the past with acceptable results. So off I went in search of incense.

The next town over had a mystic shop which I constantly passed but never had a reason to go into. How bad could it be, there always was a blue Z-28 parked in front.

This is where things started to get complicated.

I entered and asked the lady behind the counter for the brand of incense that would produce the most smoke. In no uncertain terms and with a very gruff voice I was told that this was a reputable mystic shop. They did not sell incense, they only sold holy smoke. The lady then asked for what purpose I needed to make holy smoke.

A bit chagrined, I told her of the wind / smoke tunnel. Her eyes light up. To my amazement she knew exactly what it was. Her college had a wind tunnel and as an engineering student she worked on several research projects. She knew more about what I wanted to do than I did.

Her excitement mounted, she ran around to my side of the counter. Instinctively I tried to jump away. She took hold of my hand, OH MAN!!! i! She had the face of a lady. She had the body of a lady. She had pretty long blond hair. She had the hands of a MULE SKINNER. What did I get my self into!!?

"Come into the back room, I have exactly what you need." The hairs on the back of my neck bristled. I had her (?) by about 4 inches and 25 pounds, worst case I would finally get to use my martial arts training. I cautiously followed.

The back room was filled with various containers, which I presumed, held the smoke medium I desired. Nothing seemed out of the ordinary, if you discounted the shelf with the human skulls and the sword standing in the corner.

"Here is a compound of Frankincense and Myrrh."

"Good, that stuff is in the Bible" ! stammered.

"Then I'll add this for strength, you don't want to lose your wings at 9,000 AGL" she stated.

On and on she went, finally giving me a canister along with special coals and explicit instructions not to use this stuff near a smoke alarm.

She asked for a donation and I refrained from making any comments about conjuring up demons in my hanger. (I don't believe in ghosts, but I don't go out of my way to make fun of them either.)

I initiated my escape, successfully avoiding any additional attempts at hand holding. I jumped into my truck, and as I shoved it in reverse the lady ran out of the shop. She handed me a small green vial. "I almost forgot, use a drop of this Reality, you don't want to fly off into infinity" I'm sure glad I bit my tongue about demons, she was probably testing me.

We got the tunnel to work. It didn't appear that the modified fuselage shape had any deleterious effects.

In the end a smoldering shop rag soaked with WD-40 generated the most smoke. Well a smoldering shop rag soaked with WD-40 and a drop of Reality.

B.P. Wisniewski
37183 South Lake Shore Blvd.
Eastlake, Ohio 44095
(216)942-691,

CONT'D PAGE ,2

corner to scrape more of this resin out. Cup wetting is a small part of the small (relative to the epoxy batch) cup weight and should be a minor error factor. Using the balance it is easy to determine the tare. Put the cup positioner with the wetted cup in the resin (outermost) position and balance the beam. Remove the cup and positioner and hang a weight on the resin position tare nail. Reduce or add to the weight until the beam again balances and that is the correct tare. A filed-to-weight fishing line sinker would be a fine tare weight.

Epoxy is different from almost all other materials you will use in your aircraft. Steel, aluminum, Plexiglas, synthetic fibers, etc. are produced to specifications by large manufacturers with QC facilities. With epoxy you - the user - are the manufacturer and usually the only QC is does the stuff harden or not?. This is really amazing considering the amount of epoxy in many homebuilts and how critical it is. It is up to you to thoroughly mix the correct ratio of resin and hardener thus making a material which meets its expected properties. Work carefully so you can fly safely.

I didn't mention retaining the pivot pin or non-recessed base cups in my first article because I had no answers. I think I have now touched all bases. My apologies to Erie Terpin and other contributors for taking up so much space in his fine newsletter. I will write a final letter when I finish and test the balance. If any of you make and test one please report on it to the newsletter. Don't wait on me.

ff.el Levine 15 March 1996

WANTED

VW based engine, 1835 cc or larger with starter or charging system. Revmaster, Hapi or Great Plains. . Revmaster engine mount. (Prefer West Coast)

C.J. Morehead
1068 Smith Ave.
Campbell, CA 95008-4538
(408) 378-9467

FOR SALE

Continental 85 HP. Zero time since overhaul. \$3,000 or B/O.

KR-2, fuselage on retractable landing gear. Contact:

Ken Wright
15123 Brockhurst #218
Westminster, CA 92683
714-531-1273 nights
310-593-8106 days

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 228-229 MAY-JUNE 1996

1996 KR GATHERING

It's my pleasure to host the 1996 KR Gathering in Pine Bluff, Arkansas at Grider Field, Friday through Sunday, September 20, 21 and 22.

Those of you who have attended the event in the past should be familiar with the activities and for those who haven't....you will be in for a treat!
If 15-20 KR aircraft and three days with 100-150 KR people doesn't get you excited, then you won't need to make the trip.

For hotel reservations, please contact the Best Western Pines at 501-535-8640, fax 501-535-2648 and tell them you are with the KR Gathering.

Bring those photo albums and be prepared for three days with the best airplanes and people in the world.

For information about the event, please contact:

Tommy Waymack N995BG
501-535-3294

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN



KR NEWSLETTER

ISSUE 230-231
JULY-AUGUST 1996



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



CHUCK PATRICK'S KR-2, MALTA, NEW YORK

FOR SALE: Tri gear with 2180cc VW engine, 190 hours total time, tuned exhaust, dual port intake, Ellison carb., 360 Nav/Com, Diehl wings with gas tanks, strobes, nav lights, landing light, cabin heat, LORAN.

Excellent condition in and out! \$10,500. Call or write:

Chuck Patrick
565 May Apple Way
Malta, NY 12020
518-899-9049

VW ENGINE ASSEMBLY

Building a KR2 is very rewarding especially when a major milestone is completed. For me assembly of my Great Plains 2110 VW was one such milestone. The building process proceeded in an orderly manner each Saturday afternoon from March '95 thru Thanksgiving '95 by following the construction manual supplied by Great Plains. Several EAA Chapter 240 members were helpful including Bob Wetzels, Rick Heckman and Tom Smith. Bob was there every step of the way with his 'third hand'¹. Steve Bennett put up with some very dumb questions from a mechanically challenged customer. Thanks to everyone!

Photo #1 shows the completed inside of the engine. The cam gear was exchanged several times with Great Plains to get the right size. We started with a '0' and finished with a '-2'. Steve's directions on determining the fit of the cam gear were clear. I also had some trouble putting the cam and distributor gears on the SCAT crank, so NAPA finished the job for \$10. I only missed the key by a hair but it was enough to snag the gears. All the clearances inside the case checked out fine. I think Bob and I spent 6 Saturdays checking and rechecking clearances, tolerances, etc. I want everything tight but free moving. We found that engaging the main bearings on the dowel pins can be tedious, especially the bearing at the flywheel end. The oil seal is shown being installed and sized at the flywheel end. The seal is tapped into place with a wood block and the case closed to size it to the flange. Also the cam plug is sized this way. We used a couple lock nuts to close the case to do the sizing and once we succeeded(?) in freezing a locknut on a case stud, requiring another stud from a junk yard near Bob's home. Such setbacks were expected and not too frequent.

Photo #2 shows the case as first closed. Note the coathanger 'springs' holding the cam lifters. On the first closure of the case we forgot the top halves of the cam bearings and I had to reopen

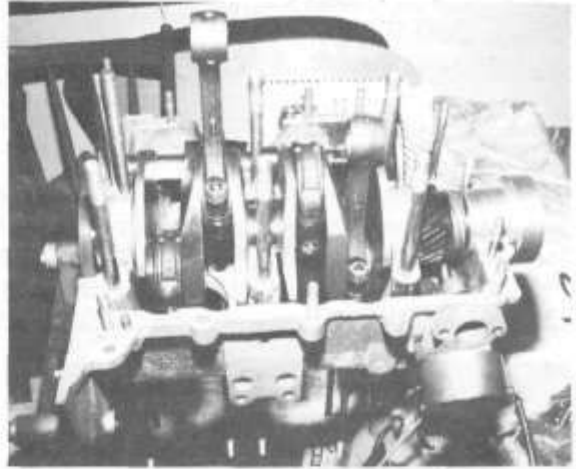


PHOTO #1



PHOTO #2

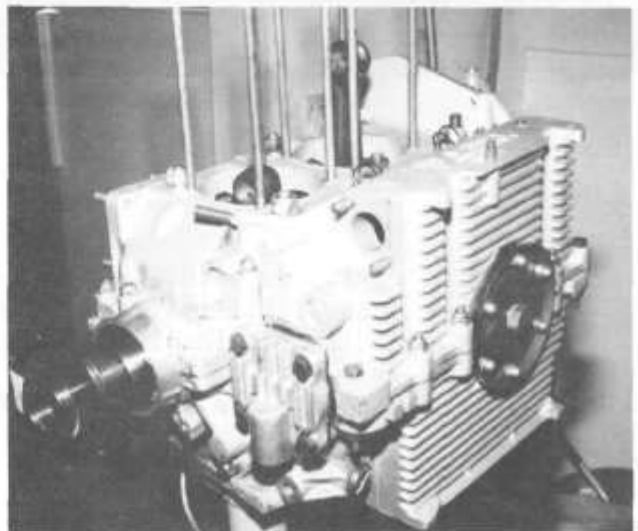


PHOTO #3



PHOTO #4



PHOTO #5

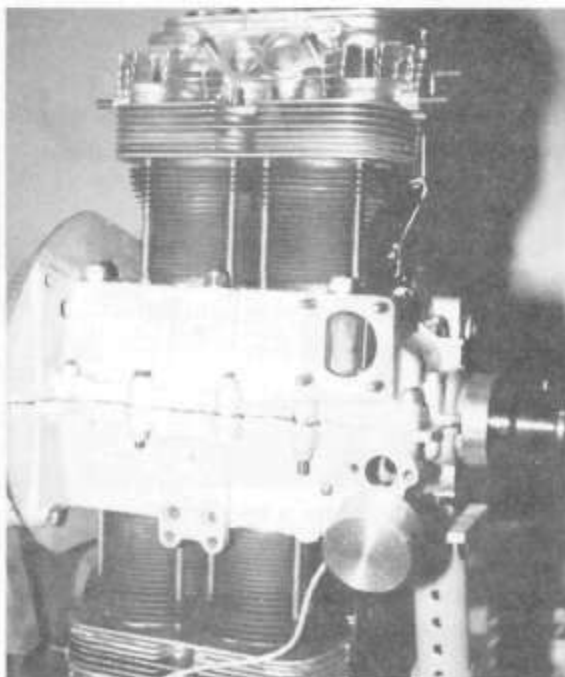


PHOTO 16

CONT'D FROM PAGE 2

the case and scrape off the case sealer with a razor blade. The next Saturday we did the job correctly!

Photo #3 shows me putting 220 ft-lbs torque on the flywheel. I used a cheater pipe to make my 180 lbs. look like 220. Let's see... $220\text{ft-lb}/180\text{lb} = 1.22$ feet (15 inches).

Photo #4 shows the oil sump, oil pump and prop hub installed. We had no significant problems with these installations. A heavy hammer works better on some jobs like the flywheel and prop hub. Hammer only near the center of the hub using a wood block to soften the blow. You might bend the hub if hitting edges.

Photo #5 shows the initial fit of the cylinders to the case and a check for level. No shims are installed yet, but the cylinders were lapped to the heads by this time. You know you're getting close to the finish at this point.

Photo #6 shows the top view of the nearly finished engine. Cylinder shims were ground by Rick Heckman to give a compression ratio of 7:1. This should allow use of 90 octane fuel (Hi-Test auto or 100 octane AV gas). Later the oil cooler, case breather, rocker arms and covers were installed.

The Diehl Accessory case, the magneto and the starter were quickly assembled. One grows accustomed to mechanicals after a time.

Still remaining is the test run of the engine. The entire engine is enclosed in a 33 gallon trash bag with 1 pound of CaCl_2 dessicant. The test run will use a Revmaster carb and Westach instruments once they are purchased.

Now I can work on more fiberglass parts.

I'll keep you informed of additional progress as it's made.

Ken Jordan
328 Green Ave.
Carney's Point/NJ
08069
(609) 299-0498

NOTE FROM THE EDITOR: The following is an accident report that was submitted by Rem Walker, Chairman of the EAA Canadian Council. I'm including it in hopes that we can learn from this tragic accident. Earl ^^

CANADIAN AVIATION OCCURRENCE REPORT

OCCURRENCE NUMBER: A93W0072
TYPE OF OCCURRENCE: Collision with Terrain
(Accident)
DATE OF OCCURRENCE: 30 May 1993
LOCAL TIME: 1008 MDT
LOCATION: Grande Prairie, Alberta
21 nm S
TYPE OF AIRCRAFT: Rand KR2 (Amateur-built)
REGISTRATION: C-FFJG
TYPE OF OPERATOR: Private Owner
TYPE OF OPERATION: Pleasure/Travel
DAMAGE CATEGORY: Destroyed
PILOT LICENCE: Nil

field. Closer examination revealed that this was aircraft wreckage, and that the two occupants had sustained fatal injuries. The RCMP were notified and, upon their arrival at the accident site, the wreckage was identified as being that of the missing amateur-built aircraft.

1.2 The Pilot

1.2.3 Experience and Qualifications

The pilot did not possess a Canadian pilot licence, Licence Validation Certificate, or pilot log-book, nor was he qualified to give flying instruction to non-licensed pilots. The only supporting documentation of his aviation background was an American commercial pilot licence issued on 21 May 1959, by the Federal Aviation Agency, and a letter dated 23 June 1976 to the Ministry of Transport indicating his flying background and qualifications. The pilot had an extensive aviation background in the design, construction, and flying of aircraft.

1.2.2 Flight Currency

The pilot usually did not fly during the winter months. A calendar/diary, located on his hangar wall, indicated he had flown a total of 3.4 hours in the preceding 214 days. The occurrence flight was the pilot's ninth flight of the year, and the sixth of the year with his son.

1.2.3 Medical Information

The pilot had undergone a medical examination by his family doctor three days before the accident. He was reported to be in excellent health for a person of his

PILOT-IN-COMMAND

PILOT HOURS:	Last 90 Days	Total
All Types	3	5,000
On Type	3	58

INJURIES:	Crew	Passengers
Fatal	-	-
Serious	-	-
Minor	-	-

1.0 Factual Information

1.1 History of the Flight

The pilot and his son had departed their private airstrip in their amateur-built aircraft at approximately 0940 mountain daylight time (MDT) on a local pleasure flight. An eyewitness saw and heard the KR-2 fly overhead at approximately 0945 MDT, and reported that the aircraft appeared and sounded as though it were operating normally. When the aircraft did not return, authorities were advised, and a friend was dispatched with his aircraft to search for the missing KR-2. At approximately 1200 MDT, a motorist driving on a rural gravel road noticed debris scattered in an adjacent cultivated

age, and was described as an unusually healthy 82-year-old. The autopsy report indicates no significant evidence of coronary artery disease or any other medical factors which may have contributed to this accident. Toxicological test results were negative.

1.2.4 *Intended Flight*

The pilot did not file a flight itinerary, nor did he discuss his flight intentions with anyone prior to take-off on the day of the accident. On a number of previous flights, the pilot and his 20-year-old son were airborne for about 20 to 30 minutes, and the pilot gave flying instruction to his son.

1.3 *The Aircraft*

The original Rand-Robinson KR2 kit plans describe the aircraft as a two-place, side-by-side, low-wing monoplane with removable wings, retractable main gear, and a steerable tail wheel. The aircraft is constructed of wood, polyurethane foam, fibreglass cloth, and epoxy resin. The pilot purchased the aircraft in kit form, and began assembly approximately seven and a half years prior to the accident.

Modifications to the original kit construction plans were incorporated by the pilot; thus, this aircraft was considered to be unique. There was no evidence of the aircraft having a journey, technical, or construction log-book documenting the certification, maintenance, and modifications process. Some construction information was gathered; however, details of the procedure were vague.

1.3.2 *Powerplant*

A Great Plains Volkswagen conversion, 2200 cc, horizontally opposed, four-cycle, air-cooled engine, rated at 70 horsepower, was installed in the aircraft. Automotive premium no-lead grade gasoline, and Valvoline 20W50 oil were the fuel and oil types utilized.

1.3.2 *Emergency Locator Transmitter (ELT) and Radio Communication*

The aircraft was not equipped with an ELT or a radio communication system, nor were they required by regulation. The absence of such equipment hampered search efforts.

1.4 *The Environment*

Examination of the weather data for the morning of 30 May 1993 indicates that the accident area appeared to have excellent visual meteorological conditions with no ceiling or restrictions to visibility, and no significant wind shears. The weather was not considered to be a factor in this occurrence.

1.5 *Post Accident Examination*

1.5.1 *Airframe and Systems*

The aircraft appeared to have struck the ground in a nose-down angle at high speed. Because of the almost complete destruction of the aircraft by the impact, it could not be conclusively determined whether any pre-impact failure or system malfunction, including fuel exhaustion or starvation, contributed to this accident; however, none was identified.

1.5.2 *Weight and Balance*

Weight and balance calculations could not be determined because of the lack of documentation pertaining to the aircraft modifications incorporated by the pilot/owner.

1.5.3 *Engine Examination*

The engine was disassembled and examined at the TSB Regional wreckage examination facility. No pre-impact damage was identified.

1.5.4 *Aircraft Instruments*

The aircraft instruments had sustained severe impact damage and could not contribute any useful information to the investigation.

1.5.5 *Propeller Examination*

The propeller was identified as a Warp Drive 5 (5-357-6000) USA, serial number R2806. The propeller was constructed of wood composite material and found to be mostly intact. The fact that there was little damage to the propeller indicates that the engine may not have been developing power at the time of impact.

1.6 *Amateur-built Aircraft Standards*

1.6.1 *The Regulations*

The Transport Canada (TC) Regional Director of Airworthiness was contacted by the pilot regarding the inspection(s) required during fabrication of the aircraft. The pilot was advised that certain

standards in accordance with TC Airworthiness Manual Advisory (AMA) 549 would have to be met in order to register this amateur-built aircraft. In addition, the Canadian regulations pertaining to aircraft registration and personnel licensing were outlined to the pilot.

1.6.2 *Certificate of Airworthiness*

Air Regulation 210 states that no person shall fly or attempt to fly any aircraft unless there is in force in respect of that aircraft a certificate of airworthiness (C of A). Section 7 of AMA 549/1A states that the Regional Director of Airworthiness shall require inspections of amateur-built aircraft during fabrication to determine compliance, workmanship, and disposition of any unsafe features. Any unsafe feature shall be reworked, or otherwise changed to be acceptable to the Regional Director of Airworthiness. Prior to the issue of a Special C of A for amateur-built aircraft, a final inspection shall be made when construction is completed and the aircraft is equipped and ready for a proposed test flight. Section 7 of AMA 549/1A states that the applicant should inform the Regional Director of Airworthiness when the aircraft is ready for final inspection. There is no evidence of the pilot applying for or conducting a test flight in accordance with AMA 549.

1.6.3 *Inspections*

Two inspections were carried out by TC, the first on 23 April 1986, and the second on 01 June 1989. Discrepancies were noted and the inspection reports were filed. Correspondence from TC dated

20 October 1989 indicated that the pilot was to state the present disposition of the aircraft by 20 December 1989. A letter from the pilot to TC, dated 12 April 1990, indicated that the KR2 was being re-built.

1.6.4 *Registration*

Correspondence from TC dated 27 September 1991 indicated that the registration C-FFJG had been reserved for the pilot until 01 October 1992. Correspondence from TC dated 11 September 1992 indicated that the pilot was to state his intentions regarding formal registration by 01 October 1992. There is no evidence of further correspondence between the pilot and TC. The aircraft was never formally registered.

1.6.5 *The Carriage of Passengers*

Section 9 of AMA 549/1 A, regarding initial standard operating conditions for amateur-built aircraft, states that the carriage of persons, other than for dual instruction, is prohibited. The pilot was not qualified to give dual instruction.

1.7 *Modifications to the KR2*

The pilot incorporated extensive modifications to all the flight control surfaces, and to the basic airframe structure of the original KR2 kit design. The following are some examples of the modifications:

- The horizontal stabilizer was lengthened and constructed of aluminum.
- An additional trim tab was added to the elevator.
- Spoilers were installed on the wings.
- Droop wing tips were fabricated and installed, which lengthened the wings.
- The original aileron length of 215 cm was reduced to 115 cm. This reduction of 100 cm was utilized to incorporate an additional flap section.
- The landing gear was changed from retractable to fixed.
- The flaps were interconnected with the elevators.
- The tail wheel assembly and attachment aft of the stern post was constructed of metal tubing and had been extended in length.

Page 7 paragraph 1 of the *Construction Plans for the KR2* manual states:

"Modification of the basic airplane structure and proportional changes are not encouraged."

2.0 *Analysis*

2.1 *Introduction*

The post-accident investigation revealed that there was no evidence of medical factors affecting the pilot's performance. The possibility of environmental factors contributing to this accident is remote.

The analysis of this accident will concentrate on the construction of the KR2, and the pilot's flight intentions, flight currency, and non-compliance with regulatory requirements.

2.2 *The KR2 Construction*

The pilot had deviated from the original KR2 kit construction plans during the assembly. Any of the numerous modifications that were incorporated, particularly modifications to the flight controls, would have altered the aircraft's flight characteristics to the extent that they would have been unpredictable without elaborate flight testing.

2.3 *Flight Intentions*

Evidence indicates that the pilot may have been instructing his son to fly, and in doing so may have subjected the aircraft to unusual flight attitudes. The nose-down angle and high speed at impact indicates that the aircraft was in an unusual attitude from which recovery was not accomplished.

2.4 *Pilot Flight Currency*

The lack of flying during the preceding 214 days would have caused the pilot's flying skills to deteriorate somewhat. The extent of deterioration is difficult to measure; however, it can be surmised that the pilot's recognition of and recovery from unusual flight attitudes would be unfavourably affected.

2.5 *Pilot Non-compliance*

It is apparent that the pilot, through correspondence and telephone conversations with Transport Canada, was aware of the regulatory requirements. However, during the construction phase, standard procedures were not followed. A final inspection by Transport Canada and a test flight were not performed. The conditions required for a Special C of A were not met, and no C of A was issued by Transport Canada. Initial operating conditions were not in accordance with the standards of AMA 549/1 A.

3.0 Conclusions

3.1 Findings

1. The pilot did not possess a Canadian pilot licence.
2. The aircraft was not formally registered or certified for flight.
3. The aircraft was substantially modified from the original KR2 kit plans.
4. The aircraft had not received all of the necessary Transport Canada inspections prior to a test flight.
5. There is no evidence of the pilot/owner applying for or conducting a test flight.
6. The aircraft struck the ground in a nose-down angle at high speed.
7. The carriage of a passenger was prohibited.
8. The ailerons were reduced in length, thereby reducing the rolling performance.
9. The pilot had flown approximately 3.4 hours in the preceding 214 days.

3.2 Causes

Although evidence indicates that the aircraft may have entered an unusual flight attitude from which the pilot did not recover, the cause of the accident could not be conclusively established.

4.0 Safety Action

The Board has no aviation safety recommendations to issue at this time.

This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Gwirperson, John W. Slants, and members Gerald E. Bennett, Zita Brunei, the Hon. Wilfred R. DuPont and Hugh MacNeil, has authorized the release of this report.

TRANSPORTATION SAFETY BOARD

THE KR NEWSLETTER IS PUBLISHED BI-MONTHLY AT P.O. BOX 579, LAKEVILLE, MINNESOTA 55044. 612-435-7275 - EVENINGS AND WEEKENDS. EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$20.00 PER YEAR- U.S., \$25.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS. SET OF ALL AVAILABLE BACK ISSUES (OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN INDIVIDUAL COPIES \$2.00 EACH.

DEM BOWED LONGERON BLUES

Having been a faithful and contributing subscriber to the *KR NEWSLETTER* for more years than I can really remember, there are a few things that are guaranteed to pop up from time to time. One is the ongoing discovery that you cannot physically bend a plywood covered fuselage side frame into a compound curve without a naturally occurring bow, or curve, in the component. This discovery often leads to massive hand wringing and some rather complex reinventions of the wheel. Mind if I add my two cents?

I believe that the concern of these new builders is very valid and is fueled by the desire to do a quality job in constructing their KR. The problem is related to the need, somewhere in the future, to level the fuselage in preparation of setting spar incidence angles, engine thrust line, tail surface alignments, etc. How are you supposed to find a level spot on a bowed longeron? Hum...

Let me back up a bit and let the readers know that my personally constructed KR-2, N684LM, has been flying for a few years on an 1835 VW putting out, maybe, a big 60 hp. It weights 509 lbs empty and at a gross weight of 900 lbs, will fly two people at a cruise speed of 145 mph with a top speed of about 165 mph. This is with a climb prop. The cruise prop that hangs on my EAA chapter room wall was able to pull the KR to a top speed of 195 mph indicated. All this with, dare I say it, *bowed longerons*!

Here's a suggestion that might help relieve the anxiety of building a banana boat. Get it? It's a pun. KR...boat stage... curved...banana... OK, OK. Simply build according to the plans and, here's the biggie, level the fuselage by utilizing the

firewall as a vertical. A spirit level laid across the fuselage will then square up the entire airframe. Still skeptical? Ol' Ken Rand had it figured out years ago. Further reading in the builder's manual will turn up a brief sentence, buried back in the section regarding the installation of the horizontal stab, that a shim of approximately 3/32" will be required under the forward most spar. This little bitty scrap of lumber takes care of that big valley running between the firewall and the tail!

Let's fast forward to the day when you must do a weight and balance sheet for the certification of your project. Those longerons are now buried within the airframe and you need to level the aircraft to get a true weight on each wheel, along with calculation of the CG. It's easy if you simply use a plumb bob down the face of the firewall.

One other item to consider, if there's not enough already, is what might happen to the designed-in wing incidence angle if you elect to alter the design of the fuselage side frames. It's the old "domino" theory. One change forces many more changes right on down the line.

Homebuilding experimental aircraft is supposed to be a fun, leisure time activity. The modifications and changes to a design can be part of it, should a builder wish to do so. By the same token, if you build your KR by the plans, be assured that you will end up with a solid flying aircraft that you can take great pride in.

Relax. Don't worry, be happy!

Monte Miller
1900 Parkside Dr.
Denton, TX 76201
817-566-5871



CAM LOCK INSTALLATION TOOL

Manufactured cam lock pliers list for \$30-\$35 in the various supply catalogs. I made mine from a spring clamp valued at \$1.50.

One lip of the clamp was modified by bending the lip slightly so that the lip is in the same plane as the handle. The nose of the lip was then modified by filing a slot 3/8" deep in the center of lip using a 1/4" diameter round file. The opposite lip was modified by bending it approximately 45 degrees or to a position where it will contact the center of the cam lock.

Should the springs be too weak to compress the cam lock fully it may be necessary to insert some shims between the spring leaf and the handle. I used 1/2 and ice cream bar stick under each spring leaf. This seemed to work just fine.

This tool has several advantages over the store bought model. It is less expensive, can be made in a few minutes, is lighter and easy to manipulate, does not require any squeezing action and, best of all, it can still be used as a clamp.

Try it, you'll like it.

Mike Matre
3828 E. Kemper Rd.
Cincinnati, OH 45241
513-769-0724



PHOTO #3 FROM LEVINE ARTICLE ON PAGE 13

FOR SALE

Looking for KR project, plans, parts, engine or what have you? Please call or write with information.

Jerry Bunner
7214 East 19th St.
Indianapolis, IN 46219
317-352-0393
FAX 317-352-1510



PHOTO #3

SUPER EPOXY MIXING BALANCE

I finally finished my Super Epoxy Mixing Balance, in fact two of them. One has a 6.000« resin dimension and the other is 7.000¹. The two shaft spacers are made from drilled out bicycle wheel spoke ferrules which are brass and easy to work with. One is partially flattened and exerts a clamping force on the shaft fixing it axially. Photo #1 shows the 7.000* balance as I was making the tare weight. The beam is first balanced with the cup positioner, the cup and four drops of water. Then a tare weight at the same position is made to balance the beam. The 1 oz. lead fishing sinker proved too light and I had to hacksaw and file a 2 oz. sinker to weight. The cup positioner is a plastic disk I cut from a refrigerator vegetable bin and epoxied to a hardwood dowel. Having no grain the disk can be spun in a drill or drill press and filed to final size without becoming eccentric. A big time consumer was epoxying things together and applying some four coats of latex gloss paint.

I used pennies as test weights to check the balance.

100 pennies = 9.3 oz. = 247 grams - and so - 1 penny = .093 oz.

One penny between the two cup positions deflects the bubble about 4/32". You can pretty easily detect 1/32« deflection which equals .023 oz. This is .4% of a 6 oz. resin load or .9% of the required hardener. All these figures are approximations based on weighing several rolls of pennies on a kitchen scale. The per cent figures are not errors because if you can detect a deflection (error) you will presumably reduce it. They are mainly indicative of sensitivity and a little non-repeatability.

Photos #2 and #3 show how I tested the balance accuracy. The large bag has 100 pennies representing the resin and the small one has 41 with two pennies left loose in case the resin + hardener position balanced with less than 143 pennies. Indeed it balanced with 142 f pennies as the photo shows. 143 pennies is about 14 oz. Testing again I would cut a penny in half and test with 50 and 21 | pennies which is a more usual epoxy batch

weight. This is really a check of the tare nail positions, not the cup positions although they should be the same. The only way (I can think of) to directly check the cup positions is to use a good graduated measure to dispense liquid into the cup. You cannot just put the pennies into the cup as their mass certainly will not be centered at the hole positions. At least one manual actually advocates this wrong procedure to check balance accuracy. For the same reasons the beam should really be level at the balanced position insuring the C. G. of the epoxy loaded cup is directly over its correct position. I shimmed the small beam levels to agree with a good 6« torpedo level.

CONT'D PAGE 13

CONT'D FROM PAGE 12

Overall, I am very satisfied with the balance. It is rugged but the swing is quite smooth taking about 25 seconds to come to rest from a large displacement. Sensitivity and repeatability are good and I found no systemic errors. A major improvement would be to drill all the beam bearing and cup position holes on a machine tool thus eliminating significant dimensional errors. Short of that, if I ever buy a CAD program for my computer, I will make a plan layout of the shaft and beam center lines with concentric circles at the cup positions. Aligning the layout with the beam center lines should insure accurately placed position holes. I finally realized the distance between the two cup positions is the primary dimensional factor for accuracy of the resin-hardener ratio. The cup positions relative to the pivot are less important. The total ratio accuracy of the balance is within $\pm 2\%$ for all the things I was able to check and it is easy to use and relatively fool proof. True, it is not as easy to use or fool proof as a ratio pump which I assume has equal or better accuracy. If you can purchase or build a ratio pump for anywhere near the cost and time of building this balance I would urge you to do so. Good luck.

Melvin Levine
201 E. 79th St., Apt. 6D
New York, NY 10021

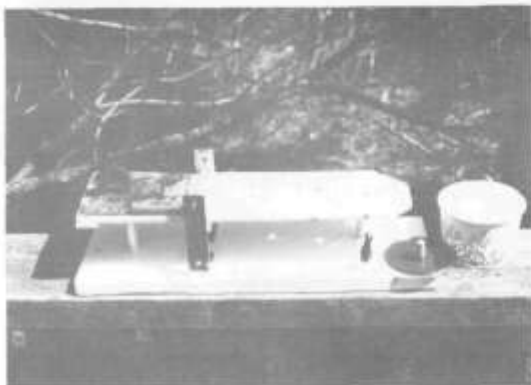


PHOTO #1

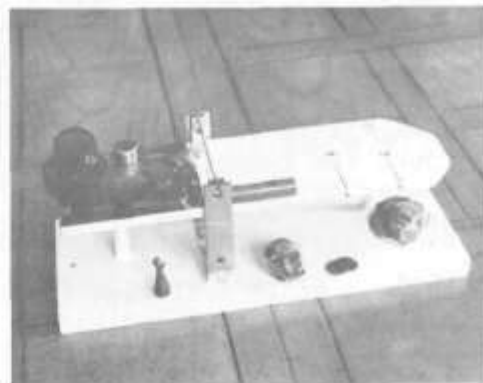


PHOTO #2

SEE PHOTO #3 ON PAGE 11

THE FOLLOWING ARTICLE WAS SENT IN EARLIER THIS YEAR FROM ART SMART.

Greetings again from Northern Minnesota. Arrived home about the first of April to huge banks of snow which happily have disappeared leaving only humble little piles in their place. Still down to freezing every night up here... but hey, this is Minnesota.

After dealing with a sick boiler and unpacking the Windstar, I was most happy to get back to my plane. After debating with myself all winter while in Alabama, I decided to install flaps... and so I began. I have dreaded this part for a couple reasons, I was concerned about getting the flaps cut evenly on both surfaces and I hadn't completely reasoned out my actuating linkage. Well...I was right about the cuts, I was a bit off here and there but nothing a little foam, glass and epoxy wouldn't cure. My wing root is longer than a standard KR extending about 2 feet from the fuselage so that's the length of the flaps which extend longitudinally from just aft of the drag spar. I hinged them on the bottom with that expensive extruded piano hinge which I attached to quarter inch mahogany ply mini-spars. I pop riveted the wing spar hinge half and affixed the flap half with 8-32 nut plates. I figured there was no need to make both sides removeable as long as I could detach the flap itself. Couple of tips here... apply grease or Vaseline to the back of the nut plate thread area so the resin won't ruin your threads. I tried two different ways to maintain alignment of the little spar while it dried. I first drilled tiny holes thru the skin whilst holding the spar in position and penetrated a quarter inch or so into the spar then inserted toothpicks. These held the spar back into the cavity but the contact with the skin wasn't great so it still had to be clamped. And as I'll bet a lot of you know, when you clamp that pie-shaped structure, the clamp tends to head for low country. I finally came up with a slick system. I had some outside 90 degree molding... took a couple 2 foot sections of it and placed these over the spar skin juncture. This produced a clamping surface with half of it hanging over the front of the spar and the other half atop the skin. This way, when the clamps are tightened, the wood won't slip down the flap or aileron. Naturally, put wax paper under these outside 90 pieces. Next day, I pushed a toothpick into the nutplates... and sure'nuf a couple had a bit of resin in there. So I popped most of it out with the toothpick and then carefully ran an 8-32 in there to clean out the rest. If one failed to do this, I'm sure they'd be ruined.

A couple additional ideas for any fellow northern builders with cold shops. To keep your resin nice and workable, buy a cheap styrene picnic cooler and place a plastic one gallon milk jug in there with a fish tank heater in it. I had an old heater that wouldn't hold a constant temp for my fish and that worked fine. Even with the gallon "heat sink" in there, I have room for 2 pints of 5 minute epoxy, a gallon of epoxy and a quart of hardener. I mentioned last year how superior latex gloves were over vinyl even though more costly and that they could be re-used. I've re-used these things 4 or 5 times before they self-destruct but I've found the re-use goes a lot easier if you dust your paws with cornstarch, baby powder or talc. They slide on better and with a big layup, they'll soak up some of the sweat. Am I scotch or what?

Well... since I started to write this, I finished both flaps, fabricated linkages, cut out and hinged both ailerons, foamed and glassed one wing tip and the past 2 or 3 days, I began my instrument panel. Made it out of quarter inch mahogany ply and does it look slick. Already have my split master, ignition, all my switches and breakers installed and all the holes cut for engine gauges and flight instruments cut. Tomorrow, I'll set it up there, climb in my seat and do some "head" flying. If I was having any more fun... they'd probably arrest me. Until next time... so long from the REAL Northern Exposure.

Greetings again from Northern Minnesota...warm weather already waning here but progress on my plane is coming nicely. I cut the "gullwing" doors in my canopy..made hinges and latches ..mounted them plus cutout the sidewindow recesses and mounted the plexi That types fast but took hours and hours in the execution Weather stripping will be the next pain to face there. I have also finished the empenage...mounted the stab and elevator and all control cables are cut and crimped and installed. I was dubious of the KR permanent mounting of the hor. stab since I feel the tail angle of attack on a hombuilt like mine can only be optimally determined in flight. I therefore made mine adjustable and removeable which will make it both easier to transport and to "fine tune."

I was going to use Clark foam for the turtledeck but had 4 pieces of poly-u left so decided to see if I could simplify and speed up the KR protocol. Instead of starting with a wooden former fitting planks..removing and replacing with a foam former...! began with a 1" foam former {3 of them} to which I glued 1" pine wedges in a radius about the circumference of the former matching the inside margin of the planks. My plane is 14 feet, firewall to tailpost so I used 3 formers; one behind cockpit, midway to the fin and just anterior to fin. I began with the center plank as it was large , somewhat flat hence easier. {I could see if it was going to work that way} I epoxied mating surfaces, took 1-1/2" sheetrock screws with big flat washers on them and tightened it down. It worked great...I was impressed With these wooden wedges I was able to bend the urethane better than you'd ever guess If it was to great an arc, I made many longitudinal cuts with a hack saw blade until the bend was possible. Naturally, I used alot of toothpicks to align adjoining planks and even a giant cumberbund about the entire fuselage to tighten up the joints. Using this method, I needed only 5 planks for the forward half of the deck and 3 for the back Less joints, less glue, less fill= less time Afjter drying, I took my heat gun and heated the most curved planks to relieve stress. Just heat until the urethane begins to darken {melt}. Just today I did my initial forming and it turned out very well.

So..I'll be glassing the deck this week...wiring after that and then my initial weight and balance to determine where the engine needs to hang.

A couple more ideas for you fellows. I've been in alot of shops where I noted rough, out of round grinding wheels to which I often query..why don't they fix it and the owner usually says how? There's an ancient tool called a stone dresser and when held against your rotating wheel, it will smooth it right out as you move it from side to side, {remember when they used to grind down out of round tires?} Yes, it does sacrifice a bit of you stone...but they grind so much nicer and indeed, are less dangerous...less likely to self destructfrom imbalance induced stress cracks.

The other tip is..when you're drilling the three sixteenths pivot holes in your rudder and elev. hinges, first make sure the chuck and the work table are at a 90 degree angle .it not adjust. Secondly, be very fussy about removing tailings from around your work while drilling. If you don't, you will often end up with "cocked" holes due to the aluminum shavings creating mis-alignment of your work.. Of course they can be mounted crooked to achieve axial alignment but it doesn't look as nice.

As always, .my door is always open if you're in the area and my shop phone is always ready to talk airplanes

Best wishes to you all from the REAL Northern Exposure
Art Smart
HCD5Box14-A
Park Rapids, Mn. 56470
2187325295

FOR SALE

KR-2 approximately 60% complete fuselage on retract gear, controls, brakes and pedals installed, gas tank, some instruments, wings built but need filling and paint. Removable front deck. Asking \$2000.00 negotiable. You pick up.

Nelson Heinrichs
177 Mill St.
West Creek, NJ 08092
609-296-4349
No Collect Calls

FOR SALE

KR-2 kit. 25-30% Complete. Dan Diehl wing skins, inboard wing panels, tail surfaces and engine cowl. 2- 1600cc VW engines. All for \$2,500.00.

Stephen Williams
2323 Charlestown Pike Lot 47
Jefferson, IN 47130
(812) 288-2130

WANTED

KR-2S kit (tri-gear version), parts, or a partly completed project. Contact:

Nick Bragger
55 Ashley Drive South
Ashley Heath, Ringwood
Dorset BH24 2JP
Phone 01425-477550 or fax 01703-237500

FOR SALE

Abandoned KR-2 project all pre-molded parts in unused condition. Diehl tri gear, Matco brakes, Dual stick, foam, glass cloth. All priced to sell. Upstate New York area. Call:

Phill Canosa
607-369-2600 no collect calls please

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 230-231 JULY-AUGUST 1996

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN





The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



TOMMY WAYMACK'S N995BG, AT 1996 KR GATHERING, PINE BLUFF, ARKANSAS

Thirteen KR aircraft attended the 16th Annual KR Gathering. The 1996 Gathering was held at Grider Field, Pine Bluff, Arkansas. The event started on Friday, September 20. Three KR's arrived on Thursday to beat the weather. Bad weather was predicted for Friday and about 1.3 inches of rain fell at noon when a level 5 thunderstorm crossed the field.

(Cont'd page 2)

After the storm, the weather was just great... cool and dry. Saturday was busy with aircraft judging, rides for some of the builders and a spot landing competition.

At least 100 to 200 people drove and flew in for part or all the weekend activities, including a dinner Saturday night at the hotel with awards given to:

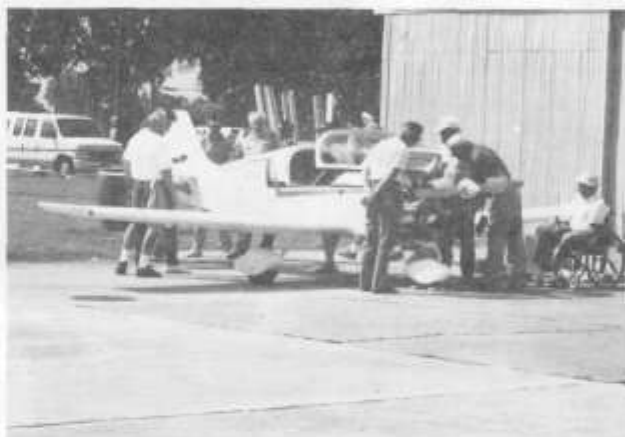
BOBBY MUSE FROM ANTIOCH, TENNESSEE for
"BEST INTERIOR" (no photo available).



JIM FAUGHN, ST. LOUIS, MISSOURI
BEST KR



STEVE ALDERMAN, DENVER, COLORADO
FARTHEST FLOWN TO GATHERING



LESTER PALMER, DALLAS, TEXAS
PEOPLE'S CHOICE



TROY PETTEWAY, COLUMBIA, TENNESSEE
BEST ENGINE INSTALLATION



MARTIN ROBERTS, TULSA OKLAHOMA
SPOT LANDING CONTEST (IN KR'S)
 (Photo taken at a different event)



DON BETCHAM, PERRY, OKLAHOMA
SPECIAL RETRACTS (HODAKA FORKS)

Sunday, the weather was severe clear and everyone departed for home with smiles and best wishes till next year in Perry, Oklahoma, September 1977.
 See ya then! Fly Safe.

Tommy Waymack
 2901 W. 26th
 Pine Bluff, AK 71603
 501-535-3294

FOR SALE

KR-2, approximately 70% complete. The fuselage and tail feathers, canopy and canopy frame, forward deck and fuel tank and wings are complete. The landing gear is installed and is a Diehl fiberglass. The plane is constructed as a taildragger. Also installed are Matco brakes, master cylinders and wheels, including tires. The instruments are new and include: Altimeter, compass, airspeed, tach and CHT. Also included are an engine mount, single center stick control, rudder control assembly with pedals, 50 x 50 Ed Sterba prop, zero time Revmaster rebuilt engine w/Diehl back plate, starter and alternator. The ignition is a dual magneto system.

KR-2S that is in kit form and still crated as was shipped. Included are the spruce, mahogany, foam and glass cloth. The sides have been constructed.

Two sets of KR-2 plans and one set of KR-2S plans. Also included are other misc. items and a cradle for transporting the KR-2 on a 16 ft. trailer. Planes located near Clifton Airport, 100 miles so. of Dallas/35 miles no. of Waco.

David Corpier
 Rt. 1, Hillcrest Road
 Clifton, TX 76634-9801
 817-675-8064 (home and fax)



EXPERIMENTAL AIRCRAFT ASSOCIATION

WITJMAN AIRFIELD OSHKOSH WI 54903 3086
 PHONE 414/426-4800

**HELP!!!! WE NEED ARTICLES
 AND PICTURES FOR THE NEWSLETTER.
 THANK YOU FOR ALL YOUR SUPPORT!!
 EARL TEPORTEN, EDITOR**

The following article was submitted by John Cromwell, Tucson, Arizona. Author is unknown but he thought the information might be of interest.

HOW TO MAKE A PROPELLER

THE WOOD: Some propellers are made of one solid piece of wood and others are made from lots of small strips of wood glued together. Custom cabinet shops usually have a large variety of woods and they can cut the wood needed to make a propeller. We make no recommendations on the type of wood to use because propellers are made of different types of wood depending on the size, width, length, pitch, etc. If you are duplicating a propeller, use the same wood as the one being duplicated. Long straight grain wood fibers with no knots are the best.

LAYOUT: Draw lines on the propeller and on the piece of wood that you are going to make the propeller out of. Draw the lines the front and back side of the wood and also on the sides. The lines should be about 1 inch apart. Draw one line down the center of both, on both sides.

Draw two circles in the center of the wood on both sides, one for the bolts and one for the propeller center. Number all of the lines. The line in the middle should be 0.

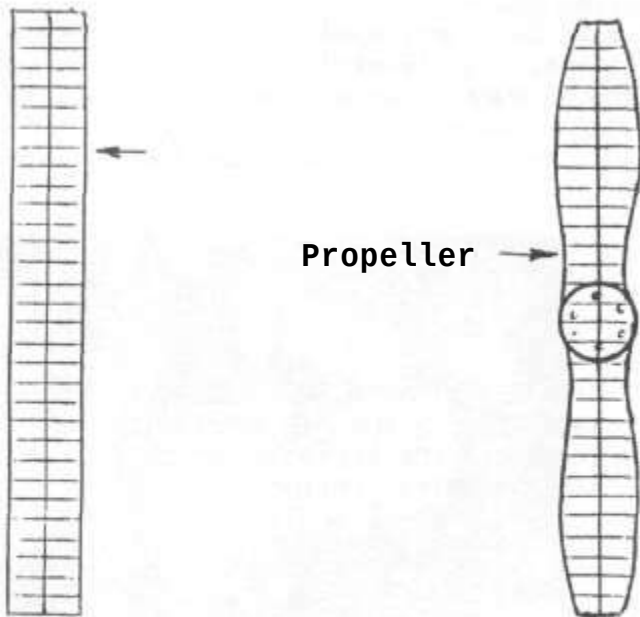


DIAGRAM 1

DIAGRAM 2

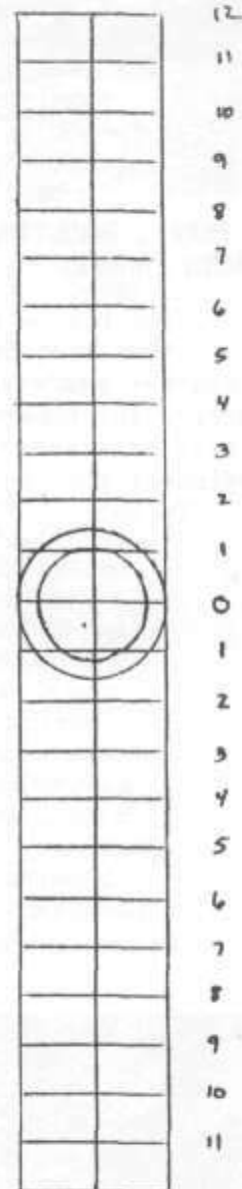


DIAGRAM 3

CONT'D PAGE 5

Starting at line 1, take a measurement from the center line to left edge of the propeller and to the right edge of the propeller. Put the measurement on line 1 of the wood. Use a pencil DOT to mark the measurement on line one. There are two line one's, put the measurement on both lines. Do this over and over for every line.

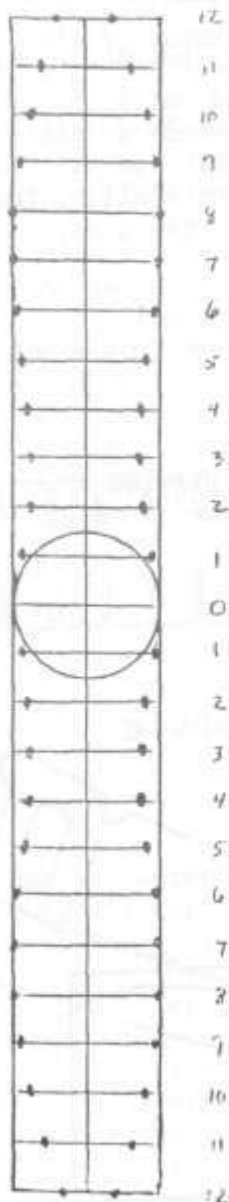
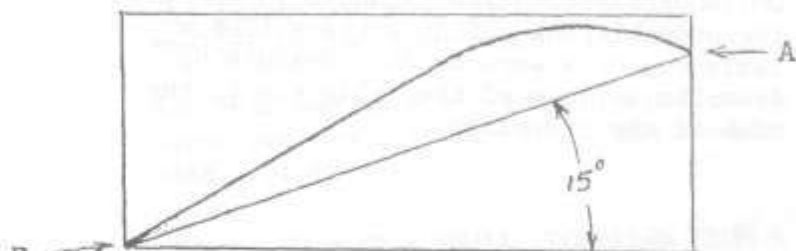


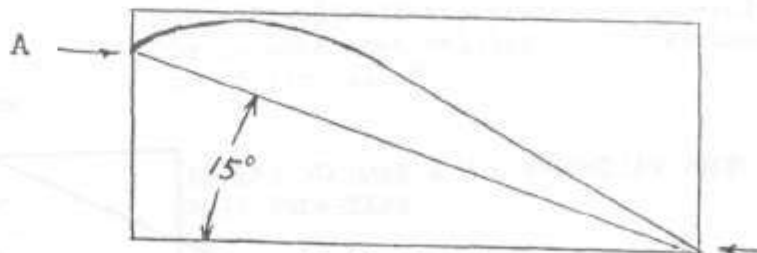
DIAGRAM 4

Check the angle or pitch of the propeller being duplicated on the back side only. On the end of the wood draw a line the same angle. If you want to change the angle this is the time to do it. You can make the propeller any angle you want. Next draw a curved line on the end of the wood to make the end view of the propeller look like the end view of an airplane wing. This is the time to make the propeller left hand or right hand, just change the direction of the curved line.



Right hand

DRAWING 5



Left hand

DRAWING 6

CONT'D PAGE 6

Draw a line down the side of the propeller from point A and point B. See the drawing on page 4. We will now call these new lines on the side of the propeller lines A and B.

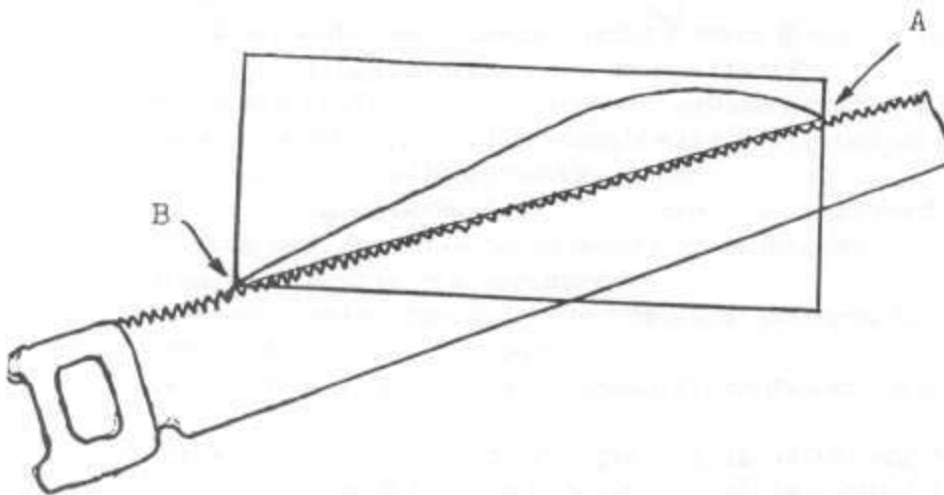
Some propellers have the appearance of having been twisted. In that case line A and B will curved. Starting at line 1 on the propeller, take a measurement and put the measurement on edge of the wood using a DOT to mark the location. Do this over and over again for every line. Use a pencil and connect the DOTS to make lines A and B.

The best way to take measurements for the DOT locations of lines A and B is to put the propeller on a flat surface like a table top or a work bench. Measure up from the surface of the table top to the edge of the propeller.

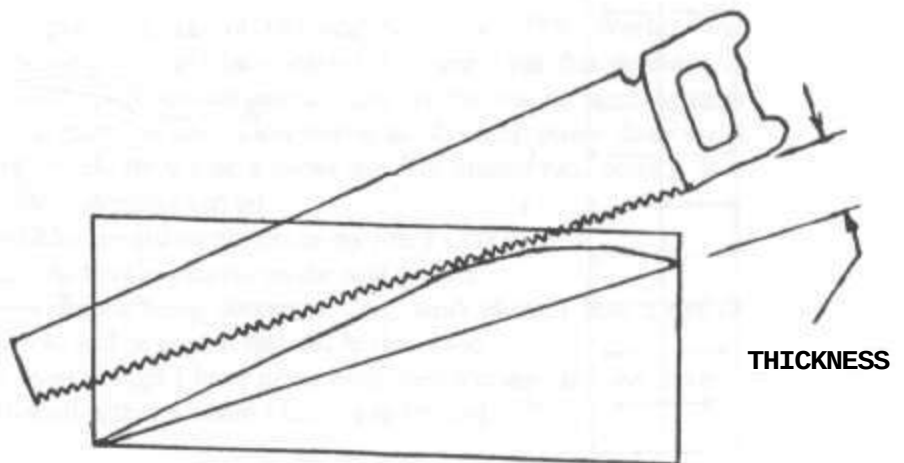
With a pencil connect all the DOTS to make lines A and B. Also connect the DOTS on the front and back side of the wood to make a picture that looks like a propeller, see diagram 4.

On the back side of the wood, use a hand saw and make a cut on line 1. Saw into the wood until the saw blade touches line A and B. Cut only on the back side and do not cut threv lines A and B. Make another cut on line 2 the same as you did on line 1. Then cut line 3 and 4 and so on until all the lines are cut. See drawing 7.

Measure the thickness of the propeller at line 1. Make a cut in the wood on line 1, cut into the wood until the wood thickness is the same thickness as the propeller thickness. Do this for all the lines. See drawing 8. Make all of these cuts on the front side of the wood.

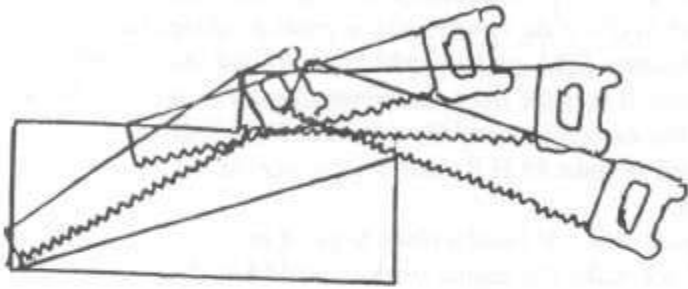


DRAWING 7



DRAWING 8

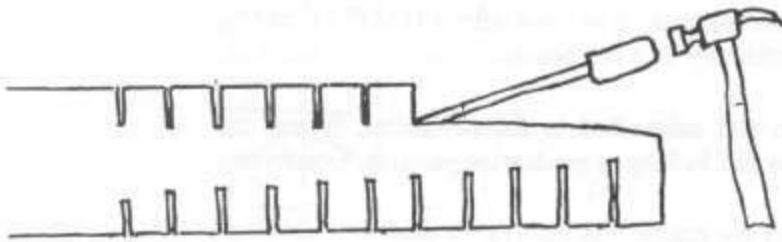
Use a hand saw to curve the front side of the propeller by making cuts on all of the lines. Make the cuts come all the way down to lines A and B. Do not cut through lines A and B. See drawing 9.



DRAWING 9

Use a narrow blade hand saw or a jig saw and cut on the dotted line of the wood on the front side. See diagram 4.

Next use a hammer and a wood chisel to chisel out all the wood pieces between all the cuts on the wood. See drawing 10.



DRAWING 10

Use a wood rasp to shape up the wood and remove all the ruff surface. Sand the new propeller smooth. Drill the bolt holes.

Place the new propeller on a flat surface like a table top or a work bench. Place a 1/4" inch wooden dowel or a round pencil under the new propeller at line 0. The heavy end of the propeller will stay down on the tape top surface. Use a sander to remove some of the wood on the heavy end. Balance the propeller again on line 0 to see if the propeller is still heavy on one end. Do this over and over until the propeller is balanced.

Varnish or paint the propeller and let it dry. Lightly sand the propeller again then varnish or paint it again.

Mount the finished propeller on the engine and run it at high speed for about 5 minutes to test it. Do not stand at the side of the propeller, if it breaks you may be hit and killed by flying wood pieces.

MAKING THE PROPELLER BIGGER OR SMALLER

Put all of the propeller dimensions on a piece of graph paper, or make a blue print. The print can be used to make lots of propellers.

To make a propeller bigger or smaller, all the dimensions must be made bigger or smaller by the same percent.

Now that you have all the information on paper you can transfer it to the wood to make a propeller.

FORMULA TO MAKE A SMALL PROPELLER FROM A BIG PROPELLER

Example: I have a propeller that is 40 inches long and I need one that is 36 inches long.

$$\frac{1}{(\text{length of large propeller})} \times \text{length of small propeller} = \text{Multiplier}$$

$$\frac{1}{(40)} \times 36 = .9$$

The multiplier is the number that you use to multiply all the propeller dimensions by to make them smaller. In this case the multiplier is .9.

FORMULA TO MAKE A BIG PROPELLER FROM A SMALL PROPELLER

Example: I have an 8 inch long model airplane propeller to use for a pattern. I need to make a propeller 36 inches long.

$$\frac{1}{(\text{length of small propeller})} \times \text{length of large propeller} = \text{Multiplier}$$

$$\frac{1}{(8)} \times 36 = 4.5$$

In this case the multiplier is 4.5

Hello Fellow KR Builders,

This is the first aircraft I have ever built. I have restored an AD-3 Skyraider for the US Marine Corps Air Museum, so I was not totally unfamiliar with working on them instead of simply flying them. It all began when I saw a half-time TV advertisement during the 1994 Superbowl. Companies often display their fancy stuff there. I saw a Subaru sports car, and there under the hood was an engine that when I saw it—I blurted out WOW that would make a great airplane engine. After a little research, I realized that the predecessor E-81 model would be better for my needs. This engine has a great reputation in it's auto role. It is made from aluminum alloy by Fuji Heavy Industries (the same people that brought you the Zero), horizontally opposed, and about the same size as a WV based motor. It was manufactured to make 89 H.P., and is water cooled.

The intake manifold is even heated to prevent carb icing.

I figured that I would build the engine, and if all went well-, I would build a plane to put it into.

Sounds bass-ackwards eh? I reasoned that if I could not make the engine work, I could kill the project early without lots of cash & time invested, because I simply could not afford a "real airplane engine" like an O-200. I have put a maximum limit of \$10,000 on the finished product. The photo you see of N221HA - *"One Homesick Angel"* is at about \$3,800.

So off to the junk yard I went searching for a "phoenix" to reclaim from the ashes. I purchased one from a 1984 Subaru Brat 4x4 truck that looks like it died from trauma, not heart failure, for \$150.

I carried it out to the trunk of my Ford Taurus and put it in myself to cart home. My wife purchased an engine stand, as a Fathers day gift, and I went to work rebuilding it to my specs. I actually thought at that time, that I was the only person in the world with this wacky idea, well I was not the first.

I purchased parts from a company called Formula Power and they seemed helpful as well as knowledgeable. The engine should now produce 113 H.P.

All this time I had been thinking about what airframe to stick it in, and after LOADS of reading settled on the KR-2. A plane that I thought was within my skill set, besides it was pretty, fun, fast, sturdy, simple, and had been around for a while.

I joined the EAA, helped form a local chapter, and subscribed to the newsletter. It was the newsletter that helped encourage me onward. It was like looking at graduation pictures. Comforting to see other people could achieve success.

I have vowed to keep modifications to a minimum (the engine was plenty), so stock-retractable is what you are looking at in the photo.

There has been enough engineering questions to keep me awake at night.

October 5th, I finally started the engine with lots of technical help from "The Worlds Best Mechanic", my brother G.Scott Clinthorne. I would have started it sooner, but that would have required building a separate test stand. That seemed unnecessary as the engine went together without a hitch. I would have enclosed more "action" shots during the building phase, however, I did not even know at that time that I should have kept a photo log. The engine runs perfect. It is LOUD now as I don't have the exhaust system hooked up.

Anyway this has been the most personally rewarding project in my life. I LOVE IT.

I'm hooked on building aircraft, and even have my sights on the next project.

My family is most understanding, and despite being obsessive, I try work about 1 hour a day on N221HA. I still have to work a real job, and be a good dad and husband too.

I feel a part of the KR family now, even though I have never even seen a completed one. I know there is a KR gathering at Toledo Metcalf- (that's where I learned to fly too).

If anyone wants to contact me, please feel free by mail or e-mail. Phone probably will not work as I travel so much.

Happy Landings,

Dave "Daddyman" Clinthorne -3706 Wilbum Dr. Fredericksburg, VA 22407
clinthorne.dave @ Lilly, com



QUESTIONS

I am beginning a KR-2S and still trying to create a reliable network, to that end, I wonder if you would consider inclusion of the these questions?

1. Jeanette Rand advises some builders have been glassing the fuselage with a very light glass and actually been saving weight. Anyone done this with success?
2. At a composite workshop, a very experienced instructor made two points:

. He stated that urethane was by far the weakest of all foam to glass bonds and that they were prone to delamination and difficult to repair... any truth to this?

. He also reported several composite gear meltdowns associated with repeated landings (in hot weather), unvented wheel pants and possible failure to post cure. Has anyone had problems with the Diehl gear?

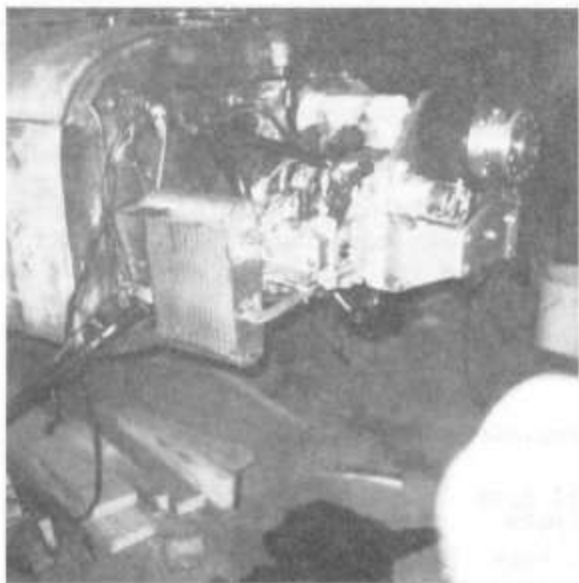
Appreciate any feedback.

David Root
Box 1978
Edgartown, MA 02539
508-627-7480 phone/fax



Hello again from the increasingly frosty northland. Well..almost another season of work is coming to an end on my plane and we'll soon be heading south for 3 months, so I tho I'd catch you up on my progress As I remember it, I was about ready to do a preliminary weight and balance as I last wrote That was completed, albeit on a cold rainy and windy Saturday morning and I have been busily doing "engine" stuff since. My Legacy engine is now hanging on the plane. (i enclosed a picture in case Earl wants to use it.) I removed all the OEM fuel injection plumbing and fashioned an intake manifold from mild inch and a half exhaust elbows, thin wall PVC for the center log and lengths of fuel filler hose to connect to the center section. The ends of the log are regular PVC caps and on the carb end I drilled a hole for the inlet and fashioned a steel flange with a matching center hole with 2 AN3 bolts welded to this flange which then protrudes thru the end cap to attach the carb. The flange was popriveted to the cap before gluing the cap to the log. I'm going to try a 40 m.m. Rev-Flo carb which the boys at the company assured me would feed my baby. We'll see. Believe it or not, that 2 2 Legacy engine never burned more than 4 gallons an hour with the factory fuel injection et al so this may be adequate. Failing that, I have 2 constant velocity Mikuni cycle carbs (similiar to the Bings on the Rotax 914) which I will use. I'm using a ford escort distributor with 2 modules for my ignition, and with a back up battery, I should not have an encore of my problem with the Emeraude.. For cooling, I've mounted 2 GM A>C> evaporators, and an Audi remote plastic pressure tank to absorb expansion and to provide a coolant fill cap. One other mod perhaps of interest...! had a piece machined that will allow me to drive my alternator from the end of my cam pulley. I took a pu'ley and had a spacer fashioned that places the pulley in the same plane as the crank pulley so this will slow my alternator down, take less power and create less heat. Before we head south I hope to have the entire engine plumbed and runnable...with muffler mounted and all, and if this is or interest, you may hear a short missive from me on this. And perhaps, if i'm lucky, I may even have the cowling started. Couple of tips to pass along..(hope I'm not repeating myself) for any of you fellows resusing hardware like me, I'm using blue loctite on any nylock nuts that seem worn. I was ignorant of the types of loctie available when I built my other plane and had some red loctite that I used. Please....be,vyar.e this stuff is for virtually permanent installations....if you ever intend to remove the part, it will either take a torch or destruction of the bolt to get it off. The Blue is for less permanent situations. Have you fellows tried the unfits? These are so clever and work so well on thin materials. You've no doubt seen them, they enlarge by steps and look quite odd, but believe me, they really work. You still need your regular bits for thick material but these are unbeatable for thin stuff. I have an old Black and Decker jig saw, but for some reason a new Skil caught my eye. Well, OK it was on sale..but aside from that it said "orbital blade" As I read on I decided it made sense...orbitalff cutting action and variable speed. Well..I opted for the lesser model with just the variable speed feature and I love it. jRemember all those times you were using you jig saw and it was dancing around furiously and you had to stop it to salvage the situation? Well...this solves it, I know I must sound like a tool salesman, but I like to share anything I can that might help my fellow builders. Well, I must go....had a nice visit from a fellow from the south of Minnesota and really enjoyed comparing notes, and as I always say, my shop is always open and I' ready and anxious to talk airplanes if anyon e wishes to call me. My best to you all. So long again from the "real" northern exposure.

Art Smart
1 218 732 5295



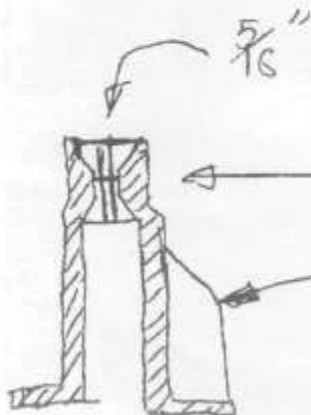
FROM ONTARIO, CANADA

I have a KR-1 that I've built with an 1835cc engine. I did my weight and balance and found that I was tail heavy with full wing tanks, no fuel in the header tank and one liter of oil in the engine (worse case scenario). So I was busy last winter making a new engine mount, lengthening my cowl and such. What made it especially interesting is that my mount is the original one with the lord black box mounts.

I worked out something spiffy using 2" OD 6061 T6 aluminum bar stock machined to accept continental conical rubber engine mounts and tig welded to 3/8" 6061 T6 plate. I used the original mounts as templates for my firewall mounting bolts and didn't have to rework my firewall. It's very robust and didn't add much weight as most of the aluminum was machined out anyway.

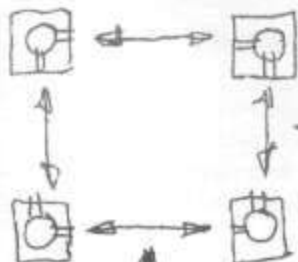


CONTINENTAL CONICAL RUBBER
BUSHINGS PART *22387
\$2.00 EACH



5/16" BOLT THROUGH RUBBERS
TO ENGINE MOUNT U CHANNEL
TO BOLT ENGINE TO FIREWALL

CONTINENTAL CONICAL RUBBER
BUSHINGS (2 FOR EACH
MOUNT)
REINFORCING SPINE
(CUT AWAY SECTION)



VIEW LOOKING HEAD ON AT
FIREWALL

POSITION THE SPINES SO
ANGLE CAN BE USED TO CROSS
BRACE ENGINE MOUNTS.

I went 6" forward (I've gained 20 pounds since I started this project).

You never know, my idea might be useful to someone else. I know I'm not the only one that built that kind of mount.

I've got a maybe wacky idea...it looks like a natural to me. I'm toying with the idea of using a KR wing on a Soneri fuselage. The two aircraft have similar performance profiles and the KR wing is much easier to build. The way the wings mount in the fuselage is very similar (it looks like the KR wing would be stronger). There is a weight penalty but not much of one that could be corrected with an A frame and bungee main gear (a bit of a drag penalty) but all is a compromise anyhow.

I would build the spars first, then jig mount the center section then do the outer panels, complete with ailerons, stick and ailerons rigged all to be disassembled. The center section would be glassed after the spars are installed in the fuselage.

My idea is to build an aircraft that is broken down into subassemblies that can be completed separately to be assembled into a complete aircraft in a short period of time in a minimal space. Here in Canada, as where you are, building a foam composite airplane is difficult if you don't have a properly heated, sufficiently sized space. If you don't, you can only work on the plane about 5 months out of the year (during the fiberglass phase of the airplane). I'm thinking five months is plenty of time to do the wings. Steel tube is not critical of temperature. Fabric on this aircraft is as minimal as it gets. It looks like a natural.

Don Chisholm
20 Daniela Crt.
Georgetown, Ontario
Canada I7G 5C2
905-873-9783

FOR SALE

Revmaster 2100D, 65HP, zero time since manufacture. Has dual ignition w/Bendix dual mag, geared starter, 2 amp alternator, forged balanced crank. Asking \$4,800 or best offer.

Philip Visconti
1 Clarke Dr.
Marlboro, MA 01752

WANTED

KR-2S kit (tri-gear version), parts, or a partly completed project. Contact:

Nick Bragger
55 Ashley Drive South
Ashley Heath, Ringwood
Dorset BH24 2JP
Phone 01425-477550 or fax 01703-237500

THE KR NEWSLETTER IS PUBLISHED BI-MONTHLY AT

P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.

612-435-7275 - EVENINGS AND WEEKENDS.

EDITOR, EARL TEPORTEN. SUBSCRIPTION RATES ARE \$20.00 PER YEAR- U.S., \$25.00 PER YEAR- CANADA AND \$30.00 PER YEAR- OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES

(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN INDIVIDUAL COPIES \$2.00 EACH. ANY REPRODUCTION IN PRINT OR ELECTRONIC OF THIS NEWLETTER WITHOUT WRITTEN PERMISSION WILL BE CONSIDERED COPYRIGHT INFRINGEMENT AND SUBJECT TO AGGRESSIVE LEGAL ACTION.

FOR SALE

Rand Robinson Diehl conventional landing gear kit, still in package. \$300.00 U.S.

KR-2S complete plans less than a year old \$120.00 U.S.

Don Chisholm
20 Daniela Crt.
Georgetown, Ontario
Canada L7G 5C2
905-873-9783

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 232-233 SEPTEMBER-OCTOBER 1996

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN



KRNEWSLETTER

ISSUE 234-235

NOVEMBER - DECEMBER 1996



P.O. Box S79
lakeville, MN SS044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



**JACK SCHNUKR'S N44729, NORTH POLE, ALASKA
BUILT BY LARRY RICE (1984) REBUILT BY JACK SCHNURR (1995)**

A 4500 MILE TRIP IN A KR-2: After completing the required 25 hour fly-off on my KR-2, I decided to put it to the real test and head south, out of Fairbanks and fly it to the Reno Air-races and then on to the KR Gathering in Arkansas.

(cont'd page 2)

A 4500 MILE TRIP IN A KR-2 (con'd)

I loaded up with 40 lbs. of camping gear spare clothes, tools and survival gear. I then had to wait several days for some terrible weather to clear out of the Fairbanks area. There went the Reno Air Races, they were finished before I left Fairbanks. Hey, no problem, I can still get to the KR Gathering if the weather is good enroute (at this point I needed some positive thinking).

On Monday afternoon I was able to point the nose down the runway, power up, accelerate, and at 70 MPH, gently rotate the nose to about 10 degrees and I was on my way. The airplane was much heavier than it had been on my test flights but it sure didn't show it, the climb out and level off was normal. The first leg to Whitehorse, Canada proved to be a real learning experience. 4 hours after leaving Fairbanks, battling 35 knot headwinds, I landed at Haines Junction, Canada on a gravel runway (I had not landed on gravel with the KR-2 and was worried about getting nicks on the prop and chips in the paint) to get 4 more gal of fuel so I could make it to Whitehorse. After getting the fuel, I was pleased to continue on my way with only a 10 knot headwind. I got no nicks or chips as a result of the gravel runway experience. I realized that I needed to lean much more to get the correct fuel burn, I was able to burn 3.2 gal an hour instead of 4.2 GPH that a I got on the 1st leg of the trip.

There is a great place to overnight in Whitehorse, right at the airport next to the flightline for about \$30 US. It was very comforting to look out the window that night and see the little KR tied down, just waiting to propel me on my way the next morning. At about 2 AM the wind woke me up, gusts to 35 knots at 90 degrees to the tie-down direction were rocking all of the airplanes heavily, except the KR, the wind had almost no effect on such a sleek little machine. The tie-down arrangement that I used worked very well.

The next morning brought high winds and reports of moderate and severe turbulence. Not wanting to miss the Gathering, I made a very dumb decision. The winds 1 hour away, in the direction I was going, were calm so I decided to just be uncomfortable for an hour.

The idea of losing another day to bad weather was unthinkable so off I went. Uncomfortable does not begin to describe what happened 20 seconds after take off, the reports on turbulence were correct, I had all I could handle to just turn downwind and return for landing. This would be my first high wind landing with the Diehl tricycle landing gear. I was really impressed with the excellent control response of the KR in the pattern even though the airplane was in moderate to severe turbulence it was controllable and my head slamming into the canopy repeatedly didn't dislodge any of the canopy locks (I have three of them, 2 on the left and 1 on the right). As soon as the wheels touched the runway, the airplane was in complete control and the excitement was over. I happily taxied in, tied down and waited until the next morning, hoping for light winds.

The next morning was beautiful, no winds, no clouds and great weather with landings at Watson Lake, Fort Nelson and Fort St. John where the weather again held me up. The last hour into Fort Saint John was flown in light to moderate rain, the canopy did not leak a drop and the super posa carb showed no tendency to ice up.

The following morning was beautiful to the south where I was going and black skies to the north with 1/4 mile visibility and rain. The engine started instantly and while it warmed up, flight service called urging an immediate take off before the field went IFR. A hasty takeoff and departure got me on the way to Whitecourt where again I had to wait for the next day for the clouds and low ceilings to disappear. When I checked the oil the next day during the pre-flight I was stunned to see two flakes of metal in the oil on the dipstick. There was no mistake, the metal was there so I drained the oil through a filter and checked the flakes on the dipstick with a magnet. The flakes were aluminum and no more flakes were in the filter. Feeling much better, I was taken downtown by a very nice helicopter pilot who helped me find the right kind of oil and drove me back to the airport. The helicopter pilots, mechanics and the management could not have been nicer or more helpful. They were a perfect example of the great people that you meet when you are dealing with grass-roots aviation.

It was getting dark by the time I was ready to go so one more night in the tent and I would be ready for an early start.

The morning brought 1/3 of an inch of frost all over the airplane so it was 10:30 before the sun melted it and I could get going. A beautiful 3 hour flight to Leathbridge and a quick refueling got me ready to go again. I was crushed to hear that Cut Bank Montana had 35 knot winds, I was not going to make the Gathering, there had been just too many delays. I stopped for the day hoping for light winds in the morning. An early takeoff into smooth air and beautiful blue sky helped to make me feel a little better about missing the KR Gathering. 20 minutes later my feeling "somewhat better" disappeared when the reported winds at Cut Bank were 22 knots with gusts to 35. Will it never end, Mother Nature was playing with my emotions like they were a yo-yo, up-down, up-down I was getting real tired of this. I gritted my teeth and pressed on to Cut Bank. The first attempt at landing resulted in early go-around because the nose of the airplane was 45 degrees off of the runway heading when I was stabilized (kind of) on final. The second attempt on another runway was much better, only 30 degrees off the runway heading when established on final. At this point I was willing to bet that this landing would be ugly and I prayed that I wouldn't wreck my little airplane. Thanks to the Diehl tri-gear and the Matco wheels and hydraulic brakes the landing was a "piece of cake", no problem at all. I was starting to have a lot of respect for this tough little homebuilt, it was a lot more airplane than I had expected. The rest of the day was spend adjusting the valves on the 1835cc Hapi engine, hoping for light winds on the following day. My super little homebuilt had brought me 2,000 miles through rain, wind, snow and turbulence without any problems. The cost of refueling was about \$20 for a three hour flight, now how can you beat that? I was cruising about 125 MPH, a nice easy cruise for my machine. My KR-2 has a 3 feet wider wingspan than normal to compensate for the 12 gal of fuel each wing tank can hold and of course the invaluable tri-gear, each of those decreases my cruise speed some.

Next month I will write about the trip from Cut Bank to Kansas City and then on to Colorado where the KR is hangared.

From Colorado I will also discuss some of the great features that I added when rebuilding my airplane.

Jack Schnurr
1164 Vasi Way
North Pole, AK 99705

TIP FROM ART SMART...

I guess one of my notes wouldn't be complete without at least one tip. Those lids on Bondo cans... you know, the clear plastic thing. Too small to mix filler in and you can't get the stuff out of the corners anyway. But... try it for 5 minute epoxy. It's the right size and the dried resin pops right out., clean as a whistle.

I'm doing my engine cowling now. I modified the KR protocol and I think it might be of interest to any fellows who are scratch building. I've been dreading this part of the project since I thought it would take forever to complete. I can't quote a total time yet, but I've been working on the foam formers for five or six days. I'm filling some low places and misc. cracks...but I think I'll be glassing before we head south. We'll be in Gulf Shores from January - March and I'd sure appreciate talking to any builders in that area and especially... seeing any projects while we're there. Our winter address is:

Art Smart
1023 W. Beach Blvd. #5
Gulf Shores, AL 36542
334-948-7405

Quest for the Perfect KR-2

This all started when George Huber walked into my shop with a set of plans under his arm. "I want to build a KR-2," he said. After several discussions, we made a deal, and I became involved in building a KR-2.

Since I am an A&P mechanic with a fair number of tools, I figured that it wouldn't be that much harder to make an extra part when I made one for George. So, I acquired a old set of KR-2 plans for myself. Now two KR-2s were started.

I gathered a few articles on KR-2s from old flying magazines and listed some major things I wanted to incorporate into my KR-2. I wanted a single-place KR-2, and it had to be a taildragger with a Subaru engine. The single-place KR-2 is roomy enough inside for us mature men who find "travel broadens one." After reading Neil Bingham's article on his KR-2, I was absolutely enthusiastic and ready to start making sawdust and aluminum chips!

I sawed all of the wooden parts for the complete airframes. I also made most of the small aluminum or steel parts.

If you could see my KR-2 next to a standard KR-2, you'd note some changes. My fuselage is 24 inches longer in the tail and has 1-1/2" less upsweep of the bottom longeron forward of the front wing spar. It has a stock firewall width in the front. The firewall height was extended above the top longeron for aircleaner clearance and to have a straight line from canopy to prop spinner. The top longerons are straight back to the seat back brace, with just enough bow to make a pleasing line back to the tail post. The whole airframe is covered with 1/8" birch plywood.

CONT'D PAGE 5

My airframe is all Douglas fir. George went with spruce. With both piles of wood cut, the next stop was the scales. My pile outweighed his by four pounds, but my wallet was a lot fatter.

Next, I built a table, and the 5/8" square pieces became a canoe in 30 days. Except for the changes just noted, I followed the plans for the standard KR-2.

Having read all the information I could lay my hands on, I looked at some other aircraft in the Dallas-Fort Worth area. I think this was a vital step because now that I knew what to look for, I could see how the results looked. A few modifications were in order.

First, firewall strength was increased to hold a 200-lb. engine. I fabricated aluminum brackets for the top longerons and aluminum angle across the bottom and down the lower longerons. Once installed, engine mount loads were transferred to the longerons, not just to the 5/8" sq. wood. I left the top shelf at the top longeron stock. Next, to take the flex out of the top longerons, I installed diagonal braces from the seat backward in every bay to the tail. Finally, I installed 1/8" plywood gussets each side of the forward wing spar. The 5/8" sq. was already there; I only had to face it with plywood.

Next came wing spars and center sections of Douglas fir and plywood, built according to the plans. The only change I made was putting plywood on both sides of the outer wing spars, which I modified for Dan Diehl wing skins. Using his wing skins saves a lot of building time, and you can be sure that both wings are mirror copies of each other. Instead of using external bob weights to balance the ailerons, I put these completely inside the wing.

Now for the tail, and more changes. The stabilizer and elevator are 20 percent longer, as is the rudder and fin. I put elevator balance weight 100 percent inside the vertical fin on a steel control horn of my own design. Other than this, the tail was built according to the plans. Having limited space for elevator cables, I used an aluminum push/pull rod of 1/8" x 1 1/4" flat stock from bottom elevator horn to a point in front of the solid bulkhead in the tail. From there, 1/8" cable goes forward per the plans.

Now for the fun part, installing the gear and engine. I built fixed landing gear from 4130 steel tubing and rubber pucks, with 1" axles. It looked real great, except no wheels with 1" axles were available. Here is where a little homework could have saved a lot of time. So, more mods. I melted scrap aluminum and poured sand-casting hubs for sealed bearings of 1" diameter. I made wood patterns and shipped them off to the foundry, getting back rough-poured rims back to finish.

The result is 6.00x6 tires mounted on aluminum rims and hubs, with steel rotors for disk brakes of my own design that use Cleveland 6" calipers for stopping power. The brakes stop the airplane very well. However, the engine puts out so much power above 3,200 rpm that with the brakes locked, the tires skid forward on the pavement.

That brings me to the engine. I'm using a Subaru EA-81 100-horsepower Asian version. This engine was not sold in the U.S. It came with dual carbs, and the engine has some internal differences. A pull test with a large fish scale told it all. After a few tests, I could see no need for dual carbs versus a single 5200-series Weber-Holley on a single-carb intake from the EA-81 American engine.

CONT'D PAGE 7

I made a belt reduction drive 1:1.69 reduction. All-up weight of engine and redrive is 200 lbs. Next I designed a motor mount that's a little different than most. The mount is bolted directly to the engine with rubber isolation on the firewall. Now all the twisting and moving under load is done in the same plane, at the firewall.

Modifying the engine was about the easiest part. Eight holes in the flywheel end of the crankshaft were re-tapped to 3/8x24Nf so long 3/8" bolts could be installed for the redrive pulley. A 3/8x24 tap and a wrench, and the work was done. No special parts to install, nothing to send out to have modified, just bolt on the reduction drive, and it's ready to run.

Sure, you can add a lot to the engine, but you don't need to. The Japanese put a lot of effort into making a reliable engine. In my opinion, the best way to keep that reliability is to make as few modifications to the engine as possible.

The push water is carried in three aluminum tanks, four gallons in each wing stub and 16 gallons up in front. The eight gallons in the wing stubs only feed into the front tank via an electric fuel pump under the seat.

Now the sad news. Early July 4th, 1995, while doing high-speed taxi tests down the runway, I applied the right brake too hard and zoomed off the runway. The airport designers had thoughtfully provided a ditch parallel to the taxiway. My braking problem was solved immediately through the loss of both main gear legs in the ditch. Other than this, damage was insignificant. The problem was poor pedal design on my part, and the taildragger design that provided little vision to the front.

This was the beginning of another modification. I designed a new fiberglass main gear and installed it, along with a 4130 steel nose gear using Dan Diehl aluminum fork. I also changed

the brake pedal design. Then I went back to the airport for more punishment.

This time, water temperature was the first to do me in. It was just too high and refused to go down. So I took the plane back home to design a new radiator. I relocated it in the bottom half of the lower cowling instead of against the firewall.

Saturday, October 4, 1995, was a bright spot in my KR-2's life, a very small and very short the first flight.

Randy Smith was doing the test-flying of my airplane. He had just completed some high-speed taxi tests and asked me for further instructions. "Go have fun," I said, "if you have trouble, make sure you can walk away. Don't try to save the plane." So Randy went to the other end of the runway and started to have fun.

It felt great *e standing along the runway and watch^{jng}, something that I put together go by and fly. Just at point of no return, the engine lost power. I heard it and saw the plane start to settle back to what I knew was going to be an off-field touchdown. But Randy decided to trade airspeed for altitude. Then my KR-2 went up and over the trees, did a sharp 180[^] turn, and started coming back low and fast... but toward the runway... and on the field for a downwind landing! The only damage was to the nosewheel pant – three short wheel shimmy episodes just about took it off. Randy got my pride and joy on the ground and stopped. He taxied back to the parking ramp and opened up the canopy, and only then did either of us begin to breathe normally.

"What happened?" I asked.

"On takeoff, everything was going great until I lost power," he said. "Playing with the throttle, I was able to manage the 180 and put it back on the runway going downwind. "

"What happened to the off-field landing?" I asked.

"I had this great field all picked out," he said. "Always think as I fly over it what a great emergency landing spot it would be. Well, this time it's got those ugly growths called cows all over it. But I'm back okay, and I brought your KR-2 with me."

What caused this is the #3 spark plug. It sits deeper in the head, which lets the piston contact the center electrode, close up the gap, and crack the porcelain insulator. This only happens at high rpm's. Later, I learned that my KR-2 will still fly on three cylinders at between 110-115 mph. Then I replaced the #3 spark plug with a shorter one.

With all these problems worked out, how does it fly? Well, I can't say because I haven't done it yet, but Randy is always ready to fly it.

So far, water temperature is 206°, oil temperature is 210°, airspeed is 180 mph. He's seen 195, but can't hold it in level flight.

Now having put to paper some thoughts on my KR-2, I'd like to say something about flying a new airplane. If you don't feel you can handle the first flights, find someone to do it for you. I did with Randy Smith and will always be in his debt. Thanks just can't express my feelings.

At the 1996 KR gathering at Columbia, Tenn., my aircraft received the following awards: Best KR-2, Best Engine Installation, People's Choice. For an old mechanic like me, that's like a farmer winning top honors at the state fair. For me, the only thing better is to help other KR-2 builders add to their airplanes what they seem to like so much in mine. Air conditioning, anybody?

Les Palmer KR-2 N202LP
3247 High Lark
Dallas, Texas 75234
214-241-4387

SUBARU AUTO CONVERSION CONFERENCE

Greetings from north of the border to my fellow KR builders, aviation buffs, and all round gear heads. On Saturday, November 23rd, I was very fortunate to be able to attend the first Subaru auto conversion conference (Subaru Conference). What started out as a small venture, spread only by word of mouth (and then by the Net), can now be seen as a real turning point in the ongoing saga of auto engine conversions.

At 9:00 a.m. that morning, there were maybe six or seven attendees. By 2:30 p.m., there were sixty seven (last count) in the almost full FLY PAST hanger located on Kitchener-Waterloo Guelph Regional airport (N43.27.32, W80.23.04) Ont.

It was about 10:00 a.m. when everyone was seated, and the first speaker took the floor. The ever forceful Hans Mayer launched into a fairly detailed explanation of torque curves in various auto engines, and their resulting suitability to auto conversions.

According to Roger Enns and Robert Broberg, who followed Hans, the man is now "world famous", very visible on the Internet, and his word seems to be gospel! The two pilots, both from the Kitchener area, both engineers and quite young considering their accomplishments - have a direct drive, turbo-charged EA-81 with over a hundred hours of flight time logged. The turbo Subaru is mounted on a (DragonFly) home built, which was originally powered by a V.W. engine.

Now, what's an auto conversion forum without at least one individual from General Motors? Peter Conboy's very professional-looking conversion was an EA-81, featuring a G.M. distributor, G.M. fuel injection, and a direct drive hub of his own engineering. Peter intends to have his unit running early in the new year, and flying the following year - mounted on a KR-2 with nose gear.

After a short break for lunch, Bill Hall introduced himself, and gave an interesting background on his early ventures involving the E.J. 2.2. While Bill is a pilot, he and his wife Judith, have put a lot of miles on their V.W. bus touring parts of North America. Powering this bus is an E.J. 2.2 litre engine, installed and maintained by the two. Bill and Judith are currently very busy designing and building their own reduction drive for E.J. 2.2 engines for flying purposes.

I should mention that the conversion projects appeared at the conference in various stages of completion. Some, like the DragonFly project, were nearly four years in development. Others, like Rod Bell's newly purchased EA-81, had been flown for quite some time by its previous owner. This one sports a reduction drive made of, I believe, domestic truck and auto parts.

One other project with considerable flight time is Helmut Arndt's EA-81. Helmut had pulled his engine, he says, not for the conference, but for maintenance reasons. This engine uses a Ford carburetor, and an AMAX "redrive". It is basically stock and puts out about 80 to 85 horses, mounted on his Karatoo. For the kind of flying he does, he's happy and has no plans to make any significant changes.

CONT'D PAGE 11

Eventually the floor was opened for a question and answer period, most of which were put to Hans Mayer. Let me tell you that if you ever have the opportunity to hear him speak, don't let it pass. His rapid-fire responses (to questions), backed by many years of engineering experience, allows for no dull moments. He has an answer for everyone!

In closing, I'll say many thanks to Bill Weir for making the first move and getting this all off the ground successfully, and also to Art Mitchell of FLY PAST for hosting this memorable event! I hope we do this again soon. Happy New Year.

Patrick James
3364 Keele St.
Toronto, Ontario M3J165
416-661-9491



PETER CONBOY (CENTER) WITH FELLOW BUILDERS AND ENGINE MEN



PETER CONBOY (CENTER) AND PROJECT



ROD BELL WITH HIS PROJECT IN BACK OF PICKUP TRUCK!



CONT'D PAGE 12



HELMUT ARDNDT (LEATHER COAT) AND EA81
NOTE: TUBES IN OLL SUMP. TUBES RUN THRU
BUTTON AND HELP TO KEEP OLL TEMPS LOWER



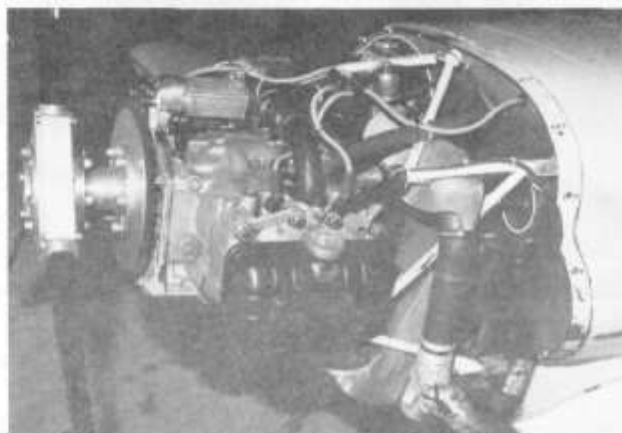
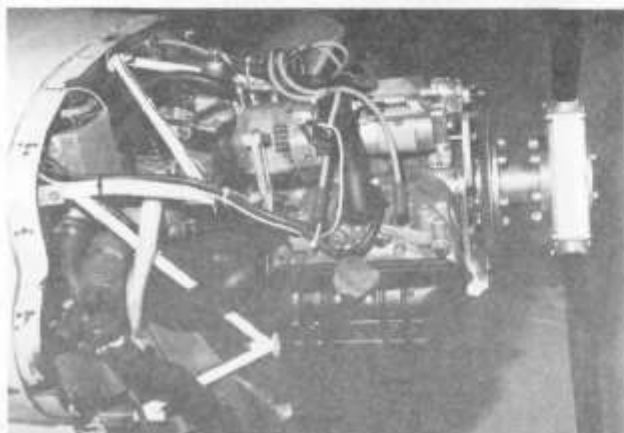
BILL HALL AND E.J. 2.2 LITRE (BILL'S
WEARING HAT)



DRAGONFLY



HAAS MEYER AT WORK



DRAGONFLY INSTALLATION: WITH VW RAD FOR
COWLING-BY ROGER ENNS AND ROBERT BROBERG

BULLETIN....BULLETIN FROM OLE MAN ART!!!

IT RUNS AND IT RUNS GOOD 11 ...not good grammar ...but I am SO pleased at how my Legacy engine runs with my homemade manifold that I could....well..sit down and tell you folks about it. As I explained last time, I have a 40 m.m. Rev Flo carb (2nd or 3rd "iteration of the Posa) and the Escort Distributor with dual modules to replace the OEM electronic fuel injection and ignition. I started the engine briefly several times before and after installing the muffler, just for a few seconds tho as I had not yet added coolant. It's response was brisk and it idled even with no adjustment to the carb or timing. Since I wanted to run the engine longer, I filled it with 50-50 glycol and water and fired it up. Again...started well, idled well and responded cleanly to the throttle..BUT after 2-3 minutes..it loaded up. Sounded rich I theorized and validated when it cleared up upon turning the fuel pump off I figured I either had too much fuel pressure or too rich a mixture or perhaps both. I borrowed a fuel pressure gauge and sho nuf..too much pressure. Joe Horvath of Revmaster tells me they like a pound and a half to two pounds...I was force feeding it 3 and a half even with the recirculating circuit returning fuel to the tank. I'll delete the day and a half I screwed around with a "mystery complication" only to determine that the fuel tank was empty. (I was so proud) So I began looking for a fuel pressure regulator. Found one 50 miles away..and picked it up. Awful roads...a slush storm 2 days prior had been allowed to freeze. The regulator was a Purolator....cost me 20 bucks. Someone had told me that cheap fuel pressure regs are no good...but I didn't have a choice since this was the one and only one available in my area at any price. So....I hooked the reg up to the output of the fuel pump, and after determining how much pressure was being delivered at each of the settings. (it has 5 numbers with half clicks between.)..I hooked it to the carb and crossed my fingers AND it worked. The engine again started and idled well, responded to the throttle like a motorcycle, and after the extended run test...it didn't load up. Naturally, the acid test is running with a prop and since my 3 blade warp suffered a triple fracture when I crashed and has not yet been replaced, I will wait until spring to do that. I almost forgot...I set the regulator at 2 lbs.

I am extremely pleased with the Rev Flo carb. I know alot of them are running on VWs...and some guys love 'em and some hate 'em. jTo my knowledge, this is the first one on a Legacy. I feel the reason guys don't like them is the floatless construction. All this requires is a different starting and stopping routine to forestall unwanted fuel flow to the carb. I think it's a great unit and I recommend it highly.

Some guys are very big on Ellison throttle body carbs but few are aware that they to, are a derivative of the Posa. The Ellison uses a clever metering rod with tiny holes in it, that varies fuel delivery as the rod is rotated. The Posa and RevFlo use a valve to vary the fuel delivery to the main jet. On the Rev Flo and the Posa the throttling system is like a Mikuni...with a slide to vary air delivery and an attached metering rod with a ramp on one side to vary fuel flow beyond the mixture valve. To my mind it's a marvel of simplicity requiring only a change in operating routine to satisfy the pilot..and for a fraction of the price of Ellison or certified carb, I know where my vote is cast.

By the way, I think I read in the newsletter that someone thot that Revmaster was out of business. NOT SO....talked with Joe Horvath just a few days ago. They're still building the larger VWs on order, supporting their existing fleet of VW & ero conversions, manufacturing carbureters and they have a new 3 liter air cooled engine in the final stages of development .which they hope to have ready for sale in 1997. I have no interest in them except that I think we all need to support the companies trying to produce goods for experimental aviation.

Art Smart
1023 W. Beach Blvd.#5
Gulf Shores, AL 36542
334-948-7405

Last August(96) I was cruising along northern Ohio when Poof, smoke, shake, rattle and severe stress on me occurred. I was at 1300 ft AGL going 120 MPH indicated, 1250 on the EOT, and 350 on the CHT.180 oil temp.,55 psi on the oil, 3200 RPMs, and it was a clear calm day. I had been up for 1.9 hours when my 1835 VW ate the head of an exhaust valve from my number 4 cylinder. The valve was a stock VW exhaust valve with 57 hours on it. I was on my way home and only 4.5 miles from a 5000 ft big paved County runway when I declared a Mayday. My rpms dropped to 2800 and I proceeded to gain altitude at 100 mph. When I was about 2 miles out and was sure of making the runway I started to shut my KR down, the shaking had not gotten worse and the smoke had disappeared after 10 or 15 seconds. I did a beautiful dead stick landing and came to a halt at the midway turnoff point where I was met by a truck and a half dozen guys carrying fire extinguishers. I was in such a hurry to get out of the plane that I forgot to take my headset off. I stretched that cord about 15 feet before I realized that I was still wearing my headset. The Bosch sparkplug was attached to the plug wire and hanging out the front of the cowl. The #4 cylinder was in hundreds of little pieces, the connecting rod was twisted and had been beating against the engine case. The engine had been running on the # 1 and #2 cylinders. When I got the plane home I drained 2 quarts of oil (1 in the filter and 1 in the case). That Volkswagen engine is an amazing piece of machinery.

Now that I've had the experience of a lifetime maybe I should quit flying...(NO WAY)! This was an opportunity to go to a larger engine, but thats more bucks too. I replaced the 1835 with another 1835. I did make a few changes. I installed a heat muff for cabin heat so I could fly all winter. I replaced two right angle bends in the intake system with pipe that were more smoothly curved. All of my exhaust valves are now one piece stainless steel. I installed my oil pressure sending copper tube to the top of my remote oil filter housing (see enclosed blurry photo). My oil pressure reads about 10 psi higher than it did before but thats because of the filter resistance. This modification keeps the delicate 1/8 inch copper tube away from the severe engine vibrations and engine heat.

We've had some really lousy weather here lately so I've only gotten 1 hour on the new engine as of today. The engine is running great and the KR pilot can still handle those 20 knot crosswinds.

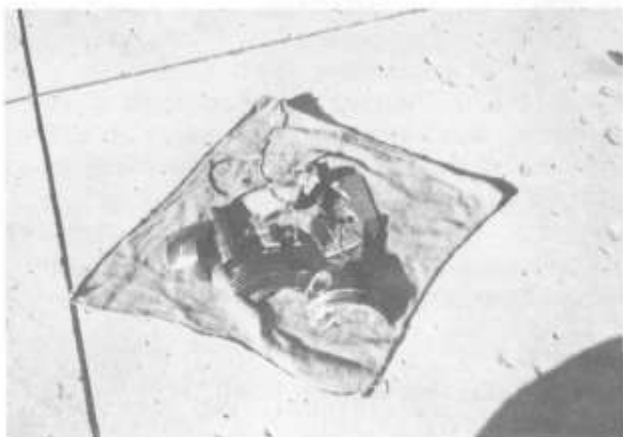
I've been asked What did I learn the most? My answer was BE PREPARED. Have an emergency checklist, not that your going to read it during an emergency (I didn't) but at least you will have thought out what to do in various emergency scenarios. BE PREPARED.

I hope to see everyone at the Toledo Metcalf KR flyin next June.

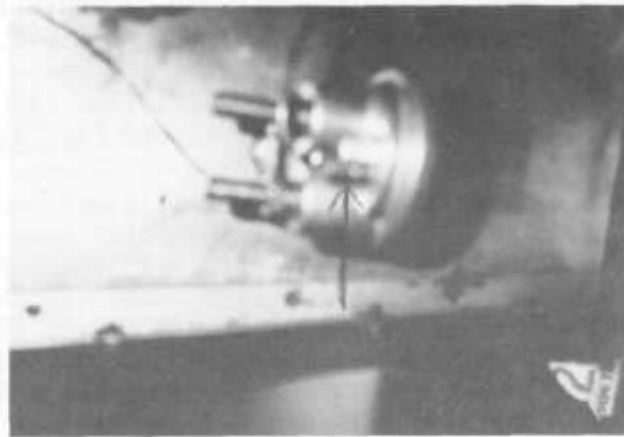
Bob Hawk
821 Jamestown Ave.
Elyria, Ohio 44035-1811
216-365-6867



N685RH FLEW AGAIN 11/4/96



REMAINING PIECES OF PISTON & CYLINDER



REMOTE OIL FILTER ON FIREWALL

HELLO KR DRIVERS AND WANNABE'S, (WILLBE'S)

IT'S BEEN AWHILE SINCE I LAST WROTE IN. BEEN BUSY ON MY STRETCH. HAD PROBLEMS WITH THE VYNYLESTER EPOXY. EVERYTHING FROM LOUSY BATCHES TO TOXIC REACTION TO THE STUFF. YOU CAN DIP ME IN HEXEL AND WEST SYSTEMS EPOXIES AND ONLY COME OUT GLAZED, BUT I WOUND UP DIZZY AND UNABLE TO EVEN WALK STRAIGHT FOR 4 WEEKS. THE DR.'S DIDN'T SEEM TO UNDERSTAND ENGLISH WHEN I KEPT TELLING THEM *I* WAS WORKING WITH FIBERGLASS RESINS. EVEN THOUGH I WORK IN A HANGAR WITH WIDE OPEN DOORS AND FANS THE STUFF KICKED MY BUTT. I FINALLY FINISHED THE WINGS, AFTER THE COLD WEATHER LAST WINTER AND BAD BATCHES OF VYNYLESTER.

MORE IMPORTANT I AM FINALLY COMING DOWN TO THE END OF THE LINE ON MY SUBARU STRETCH TRIGEAR KR-2S. AFTER DOING THE SUN N FUN WORK SHOP ON SUBARU ENGINE INSTALLATIONS WITH STEVE MAKISH AND BOB LESTER, MY OWN ENGINE IS ALMOST READY TO RUN. AS YOU KNOW STEVE HAS RACKED UP ALMOST 300 HOURS ON THE SOOB, AND SINCE HE GETS A HONEST 160-165 INDICATED STRAIGHT AND LEVEL CRUISE AND A 185+ FIREWALLED SPEED, I FIGURED THAT FOLLOWING MOST OF STEVES SETUP WOULD BE MY BEST BET. WE HAVE MADE MANY PARTS FOR THE SOOB TO FIT IN KR'S, AND ARE CONTINUING TO UPDATE OUR PACKAGES AND PARTS. JUST THIS WEEKEND BOB HAS FIGURED A WAY TO LOSE 17 LBS FROM OUR COOLING SYSTEM WHICH IS ALREADY ONLY 39 LBS WITH COOLANT IF HIS NEW SYSTEM WORKS OUT WE WILL OFFER THAT SYSTEM TO SAVE WEIGHT. HE HAS BEEN CRUISING AT THE 150+ INDICATED MPH.

MY BIRD HAS A BELLY SPEED BRAKE, ELECTRONIC LED GAUGES PUSH PULL RODS, ELECTRIC TRIM, DUNE BUGGY LIGHT WEIGHT FIBERGLASS BUCKET SEATS, WHELEN STROBES, STANDARD VFR INSTRUMENTS, AND A CUTE LITTLE ALUMINUM KR ON A STAND AS A GRAB TO OPEN THE CANOPY. THE "MISTRESS" AS I CALL HER, (I SPEND SO MUCH TIME WITH HER) HAS 8.5 USEFUL GALLONS EACH WING AND RAND ROBINSON HEADER TANK WITH 12 GALLONS. RANGE WILL BE AROUND 1000 MILES OR HOW LONG MY KIDNEYS LAST. BOB SAYS I'VE GOT SO MUCH JUNK IN THE PLANE MY WIFE EDNA WILL HAVE TO LOOSE WEIGHT. NO PROBLEM, I TOLD HER SHE'D HAVE TO WEIGH IN AT 15 LBS TO GO WITH ME ANYWAY. HOPE TO MAKE IT TO S.N.F. THIS YEAR, WE'LL SEE. IF ANYONE WANTS MORE INFO ON OUR PARTS AND ENGINES WRITE ME AT S.W.B. ENGINES, C/O W.G. DISTRIBUTORS, 7500 WEST COMMERCIAL BLVD. LAUDERHILL FL 33319. IF YOU FEEL LIKE TALKING YOU CAN CALL DAYS 1-800-373-2799 OR EVES. 954-749-6783. KEEP ON BUILDING AND FLYING. WARRON GRAY (447WG)

THE KR NEWSLETTER IS PUBLISHED BI-MONTHLY AT
P.O. BOX 579, LAKEVILLE, MINNESOTA 55044.
612-435-7275 -• EVENINGS AND WEEKENDS.
EDITOR, EARI TEPORTEN. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER YEAR-
CANADA AND \$30.00 PER YEAR-
OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES

(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH. ANY
REPRODUCTION IN PRINT OR ELECTRONIC OF THIS
NEWSLETTER WITHOUT WRITTEN PERMISSION WILL BE
CONSIDERED COPYRIGHT INFRINGEMENT AND SUBJECT
TO AGGRESSIVE LEGAL ACTION.

WANTED

Reasonably priced 2100D Revmaster Engine.
Call:

Donald Clarke
10013 Conover Lane
El Paso, TX 79924
915-755-0588

FOR SALE

New 3500 RPM recording tach (AC)
Arc 328-T 720 Channel Nav-Com with glide
slope amp, dual needle OBS and tray with
all wires marked. Cost me ~~\$800.00~~— give
me an offer.

New Bendix aircraft ignition, L-R mag.
etc. -what do you think?
Between January and April, 1997 call:

Art Smart
334-948-7405 thereafter call:
218-732-5295

FOR SALE

1984 EA81 Subaru engine just rebuilt for
~~\$800.0~~ plus shipping. Call for details:

Donald Clarke
10013 Conover Lane
El Paso, TX 79924
915-755-0588

KR NEWSLETTER
P.O. BOX 579
LAKEVILLE, MN 55044
ISSUE NO. 234-235 NOVEMBER-DECEMBER 1996

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN



KR NEWSLETTER

ISSUE 236-237

JANUARY - FEBRUARY 1997



P.O. Box 579
Lakeville, MN 55044

The KR Newsletter is devoted to the promotion of education and safety in the construction of KR Aircraft. Opinions and ideas expressed in this publication are solely those of the individual writer. Responsibility for application of any ideas or suggestions contained herein is solely that of the experimental aircraft builder. The KR Newsletter is intended to provide the builder with reliable, unbiased information and is not affiliated with Rand Robinson Engineering, Inc.



4,500 MILES IN A KR-2 — PART 2 (CONTINUED FROM LAST ISSUE)

After flying from Fairbanks, Alaska to Cut Bank, Mont. I readjusted the valves and took off early in the morning heading to Kansas City, Mo. to visit a cousin of mine that flew gliders during WWII. I had not tested the KR-2 at high temperatures or high elevations so the next few legs would give me a chance to evaluate it under those conditions. 20 MPH winds on take off 30° off of runway heading were not any problem at all and with good GPS reception I turned to the exact heading to Roundup, Mont., my next stop.

The beautiful weather turned to snow showers near the Big Snowy Mountains, so I deviated south a little to avoid poor visibility. I did fly in continuous snow showers for 45 minutes with no problem. Garb heat was placed on for 10 minutes then off for 10 minutes with no discernible difference in engine operation other than the normal slight drop in RPMs. An uneventful landing lead me to some GREAT people. It was Sunday morning and the airport was deserted. The local fixed base operator had a small door built into the wall so you could reach inside and use his business phone to call him for fuel and to close your flight plan. Now this is trust, you could have called long distance and he wouldn't have known until his bill came in. After calling for fuel, the people started to show up. The local telephone network was in action, local airplane buffs were notified and they came out to the airport to see the homebuilt aircraft that just came in. What neat people, I was not charged a call out fee for my fuel (7 gal.) and the 10 people that showed up wanted to talk flying, you haven't met nicer, more friendly people anywhere in your life. An hour later, I didn't want to be impolite but I had to go, I excused myself and shut the canopy. Two men were still talking to me as the engine roared to life. As I taxied to the runway I looked back and they were still talking and giving me a "thumbs up" sign. Two hours later I was advised by Belle Fourche, So. Dakota traffic advisory to use caution for antelope on the runway. The landing was normal and no antelope were sighted on the runway. The landing was made an hour early because the cockpit temperatures were running 95°F which were too hot for a Fairbanks man wearing a heavy sweater. My cockpit is very tight and the one scoop on the right side just forward of the instrument panel does not let any air in. A 3 hour wait allowed the temperatures to cool down before I took off for Valentine, Nebraska two hours away. Enroute I passed over the Badlands National Park and was very happy to be flying over the rugged terrain rather than being on the ground working my way through such rough territory. I arrived at Valentine right at dark and was thankful for my wing tip lights, strobe light and interior lights. The landing light worked very well, it is a snowmachine headlight with high and low beam for taxi and landing light. I installed it in the right wing root and designed a bracket with a four way adjustment. The courtesy car at Valentine is parked in front of the small terminal with the keys in the ignition all the time so that any pilot that stops by can get to town, I was pleased to see that trust in your fellow man was being practiced in Neb.

An early morning flight the next morning proved to be exhilarating, calm winds, blue sky, and a fantastic airplane to hurl me on my way. Two hours later the turbulence progressed from light to moderate, I was no longer pushed for time so I landed at York, Neb. to wait for the rough air to subside. The airport manager offered to let me sleep in the terminal so at bedtime I rolled out my sleeping pad and bag and slept very well until an .intoxicated man took refuge in the terminal at about 2AM. I managed to quietly move two chairs against the door of the room that I was in without alerting the intruder so that when he got to my door he was unable to get in. At SAM he finally locked himself in the mens bathroom and began to snore very loudly. I went back to bed but slept in my clothes and very lightly until morning. The door to the mens bathroom was still locked when I got up the next morning. I was very careful to avoid disturbing "my friend" while I filed my flight

plan co Kansas City, Mo.. The first rays of the morning sun were shimmering across the horizon as I made the turn out of the traffic pattern, GPS direct to Richards-Gebaur. I couldn't help myself, I pushed the throttle up and cruised at 150 MPH for about 30 minutes "just because I could" then reason returned and I throttled back to an easy 130 MPH for the remainder of the flight. An hour and a half after taking off I was talking to Kansas City approach for vectors to final approach to Richards-Gebaur. Two miles out I slowed to 110 MPH, then 95 on short final and touched down light as a feather (easy to do with the Dhel landing gear) it was a fantastic ending for a flight that dreams are made of- -perfect. On post flight inspection my cousin noticed a crack in the propeller spinner, not a problem, my enthusiasm was still "high as a kite". A quick call to Steve Bennet at Great Plains Aircraft and a new spinner was at the door the next morning at 10 AM. Why did the spinner crack? The original builder cut the spinner to allow it to be placed over the prop, when he did, his cut had a square corner in it. That corner concentrated the forces and resulted in the crack, the cutout that I made has a rounded area where the 90° angle used to be, this will allow the stresses to be spread over a larger area and should prevent another crack. My stay in the Kansas City area was great, The Navy has a flying club at Richards-Gebaur and the people there were great, a forecast of rain was all it took for Charlie Smith and Marty Savin (former KR builder/owner) to push the flying club airplanes around to make room for my KR-2. I was glad they did as it rained very hard for two days. I decided to lighten the load in the KR so I bought a small tent that weighed 2 lbs. and took the 6 lb.tent out, I mailed lots of my camping gear home with the tent and went from 40 lbs to 25 lbs of cargo. I put 12 lbs of equipment in a small duffel bag that I laid on the floor in front of the main spar and secured it with a velcro strap that is attached by a sheetmetal screw to the spar. My legs go over the bag and it is not in my way at all. This really helps move the CG forward.

I decided to leave the KR in Colo, for the winter so I flew from Kansas City to Hill City, Ks. and then on to Greeley, Colo. This again was a learning experience because the outside air temperatures were in the mid 80's which put my oil temperature at 190°F, cyl head temp, at 385°F and the oil pressure was down to 28 lbs.. A quick call to Great Plains Aircraft calmed my fears, those readings are considered normal under those conditions. My last flight was out of Greeley, Colo, almost 4700 ft MSL at 80°F. I was certain this would have a profound effect on the performance of my spirited little machine with only a 60 HP 1835cc engine. I should have known, the KR jumped off the ground like a homesick angel, a short takeoff roll and 500 ft. per min. at 100 mph. indicated. My grin went from ear to ear, I didn't tell my wife but I have fallen in love again - this time with a beautiful, dependable, economical great performing little homebuilt airplane called a KR-2. I can never emphasize enough my heartfelt thanks to all of the people that made this possible.

I hope to make Sun N Fun in April this year, I just have to leave earlier this time. What! plan ahead? Well, I will give it my best shot. See you there for the 25th KR anniversa-ry.

Jack Schnurr
1164 Vasi way
North Pole, Ak. 99705

MORE FROM ART OR.."DOES THIS GUY ^{EVER} QUIT TYPING?"

For those of you who read my paper on composites,! thot a summary of what I've learned about finishing would be a logical follow-up. So..firstly, fight the urge to sand too soon!Doing this on resin that's a bit green will burn up lots of sandpaper and yield miserably slow progress besides. However, if you wait until the layup is nicely hardened..your edges will feather better, high resin areas smooth out quicker and you'll use lots less paper. Speaking of sanding..! have a Varieze builder friend who talks of sanding out the "weave." If I understand him ..I dc NOT like this! Here;s my reasoning, on a 2 layer layup, if you sand the "weave out"..you no longer have a 2 layer structure since you've sanded away most of the resin and cloth in the top layer. On the earlier KRs where a single layer of cloth was used in certain areas, this would have been a disastrous policy. So for my part, I sand and feather overlapping layups and the edges of patches but not the weave of my top glass layer generally.

So how DO you cover the weave? Alot of guys use a micro slurry, some type of commercial polyester filler or a sprayable filler. If you're using a bondo type filler in the weave, make sure it's fresh. You want a super thin layer squegeed on and if your stuff is old, it's tough to spread it thinly. When you sand, you need to remember the "whites." A bubble in your cloth is white, resin sands white and glass cloth sands white. Any bubbles will have been fixed by now so all you need to distinguish between is resin dust and glass cloth dust. Maybe one has to learn this thru experience but let me try. Altho producing similiar dust, resin sands alot easier than glass and resin. The glass-resin comple is real tough and you should be able to tell when you get there by the way your sandpaper is cutting. Play around with an overlapping layup until you get the idea. Hopefully, all areas needing feathering will have been fixed before you get to the "filling of the weave."Use your choice of the materials described above. For the first layer of weave fill, I use no heavier than medium paper. For succeeding layers, I progress downward to super fine wet or dry or very fine steel wool.

To retrogress a bit..we all learn to work with what we have and gradually evolve our techniques and tools thru personal experience. Here's a summary of what this school has taught me. For initial smoothing of fillers, I use various shapes of Stanley Surforms, files and rasps. A farriers file is very handy.These take care of the rough protrusions.If I still had alot of material to remove, I might carefully use a belt sander or more likely, an air random ordital. When I get the surface fairly good but not quite "sweet",! use a 15 inch long flat device from 3-M. This takes off the high points on flat or convex surfaces and works very well. For concave areas, improvise with something cylindrical or round with sandpaper beneath.

This tool is a must but it is so overpriced. I saw one a friend had..really like it and headed right for the parts store.

Foolishly, I asked for one without inquiring about its price.

After the guy dug it out, I was too embarassed to send it back. 47 bucks list!! He did give me a break at 27 but it was still too much. Harbor freight has a similiar tool for 10 to 12 bucks.

CONT'D PAGE 5

And finally, for medium material removal and/or finishing work, I use my little Black & Decker "sanding block" random orbital sander. I love this little tool, Of all my sanders, this one has saved me the most work. My old Craftsman orbital of several years back, is not even in the same universe in terms of effectiveness compared to these new random orbitals of ANY brand.

I hope some of this will help some of you guys standing in the wings. That's where I stood for 40 years or so, reading plane books and mags..dreaming of that "someday". Then I realized that someday has to have a beginning. If I've presented anything that prompts disagreement, please let me know. I'm always anxious to broaden my own understanding and as you all know, I'm writing these pieces only to help my fellow builders.

I'm writing this from southern Alabama where the wife and I head for 3 months to escape the worst of winter. My bird is basically done but that long list of small jobs awaits me around the first of April 97. I will then finish the engine cowling. I hope I can figure out camlocs. The empennage fairings need finished as well along with the tips of the elev and hor. stab. When all this and doubtless some others are done, we'll haul it to the airport where a friend will help me paint it. Hopefully, by midsummer (or?) I'll have a flight report. And maybe..just maybe one of these times, you'll see a 2nd cousin to a KR at a KR fly-in, piloted by a funny looking old man from Minnesota.. who'd be real pleased to make your acquaintance!

Good Luck!

Art Smart
HC05 Box 14-A
Park Rapids, Mn. 56470
(218) 732 5295 (after 4/1/97)

FOR SALE

KR-2 in boat stage. Complete running 1835 VW with MAPI electrical system, mag, prop and spinner on test stand. 2100cc heads and other parts. Dan's wing skins and tail feathers. Retract or Rand fixed gear with Rosenhan hydraulic brakes and tires. Aluminum kit, foam, Rand pedals, pulleys, bolts, newsletters and some instruments. Everything needed to build a flying KR-2 except canopy and resin! Make offer. Willing to sell some components individually.

Todd Nugent
2060 Greenwood
Olympia Fields, IL 60460
708-503-0606 evenings
nugent@chapman.com

FOR SALE

I have a KR-2 project I've been working on for the past two years. The fuselage is built, empennage installed and controls connected. The canopy is installed with tri gear retract and motor mount for VW. The outer wing spars are built and parts included. A moulded cowling with assorted hardware. I need to sell or trade this project now. What I really want is to trade the KR-2 project for any part or parts of a R.V. 3,4,6 or 6A project. I hope you can help me out.

Reggie Smith
P. O. Box 2205
Mission Viejo, CA 72670
714-855-6465

BUILDER NEEDS TRI GEAR HELP

I am sending also a snapshot of my own KR-2S: I'm trying to follow the manual, as close as possible: at present, my only minor mods are the aluminum wing tanks and the wooden wing walkways, installed after the photograph was taken: I glued six 1/2" x 3/4" spruce pieces between the inner ribs, and covered them with 2,5 mm plywood.

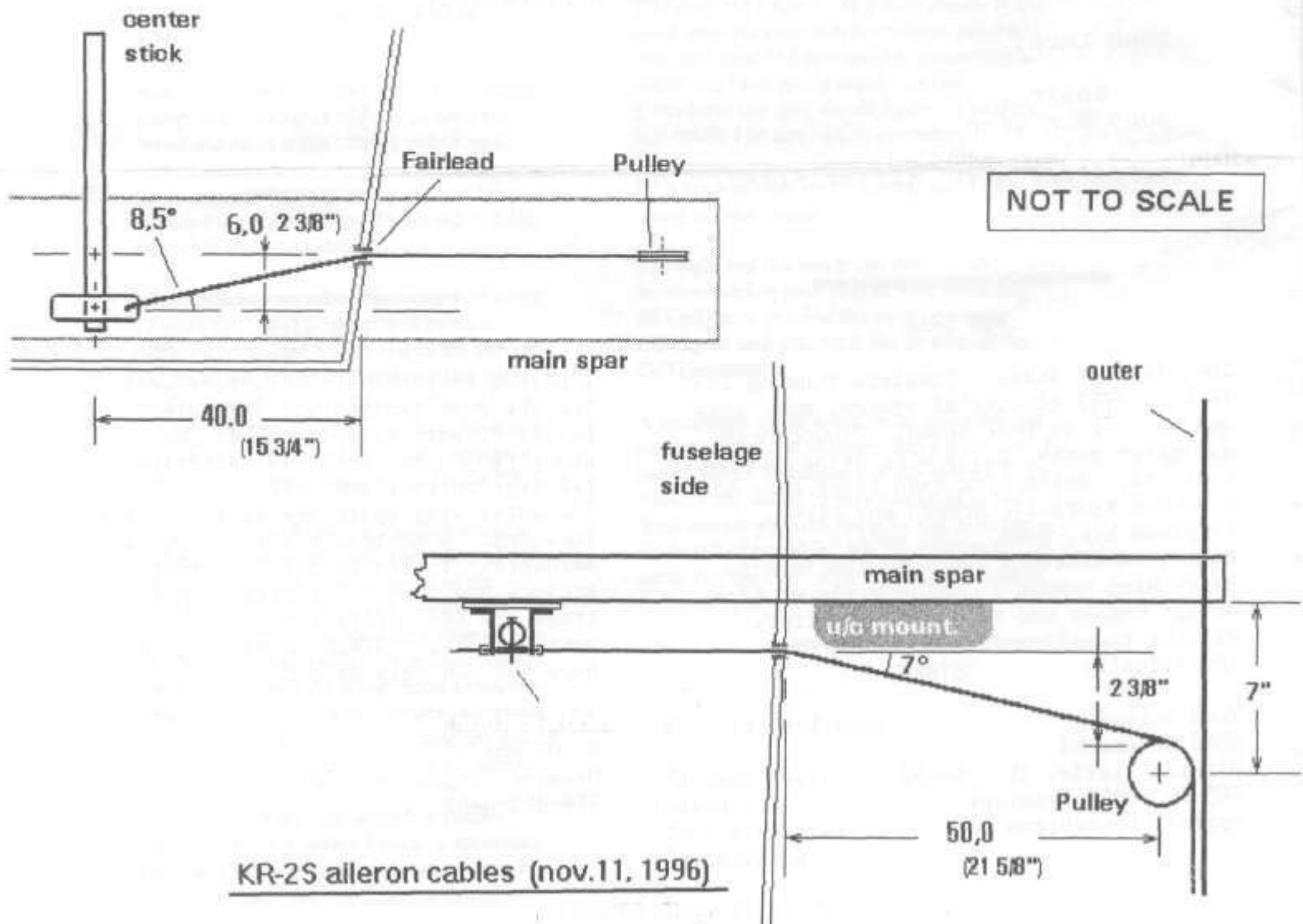
I should like to get in contact with somebody building the tri-gear option, as I need some help to design the guide for the aileron cables inside the fuselage: I tried with a fairlead, but it didn't work well (see sketch enclosed: cable makes an angle $> 15^\circ$).

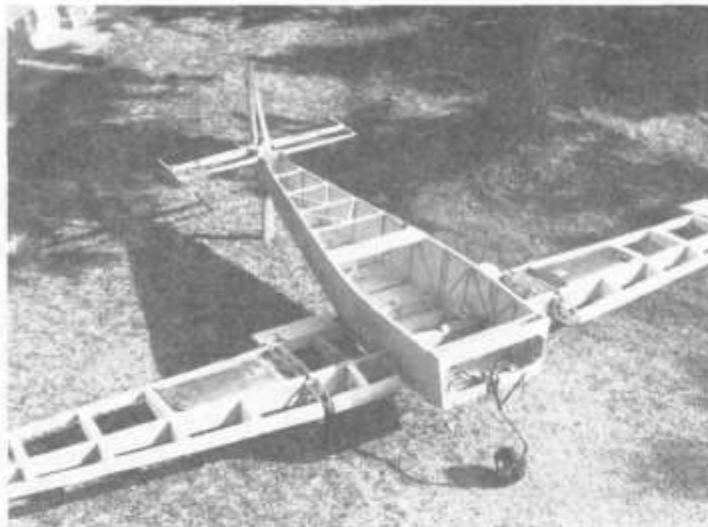
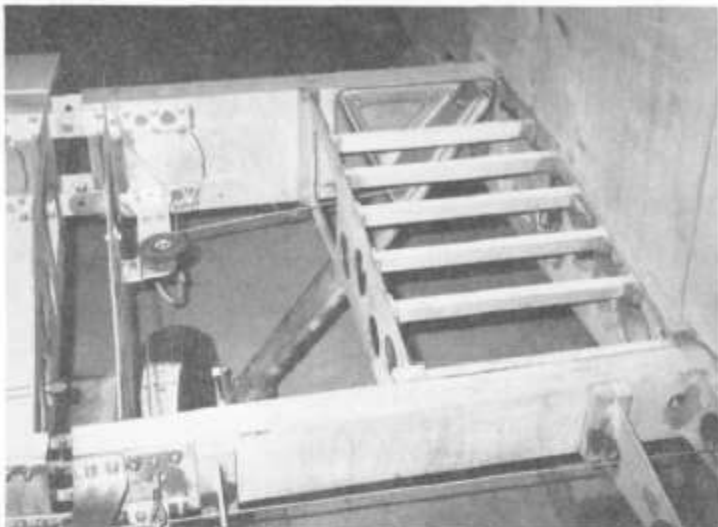
If anybody may give suggestions, I'd be very pleased to hear from him.

Best regards.

Alessandro PECORARA,
c/o TELECOM,
via P. Clotilde, 1
10144 Torino (Italy)

SEE PHOTOS ON PAGE 7,





NEED HELP

We need help from KR friends to inform us from where to obtain/supplier/vendor of: CHAPION SPARK PLUG TYPE C10S.

This is for Revmaster 2100 engine, lower plug set.

Our KR-2 was featured in Issue 214, March, 1995 of the newsletter. Your help is highly appreciated, kindly write or fax:

Herry Rudyanto
BePe - Natour Garuda
Jl Malioboro 60
Yogyakarta - INDONESIA
FAX +62 274 519774

FOR SALE

KR-2S Kit #1 (wood + epoxy + wing fittings), paid \$1500, will sacrifice \$800 OBO and include 4' x 16' worktable, plans and all issues of the newsletter. You pick up.

David Presley
2355 Amberbrook Lane
Grayson, GA 30221
73514, 1070 @ CompuServe.com
770-822-4752 no collect calls

FOR SALE

Turner T-40, 545 hours TTAF. Continental C-85-12-F 545 hours SMOH, full electric, metal prop, tri-gear, Cleveland wheels and brakes, single place, folding wings, all wood and fiberglass, VFR panel, nav lights, landing lights. Stable, easy flyer. \$8500.00

Thurman F. Longcrier
726 E. Limestone St.
Florence, AL 35630
205-764-8913

FOR SALE

KR-2 1846 VW power, T.D., very plans built, 0 time engine, 0 time A. frame, Diehl wing skins, A. W. cert. 7-26-94. Always hangared. For particulars, call:

John Feuerstein
Box 36, Rt. 2
Lake Benton, MN 56149
507-368-4593

O-200 ENGINE INFORMATION

In a recent telephone conversation with another KR-2S builder, I discovered that I may know something about O-200 engines that some other builders don't. I want to share this information with anyone else who may be planning on installing a "real" airplane engine in their project.

In the June 1994 issue of US Aviator, the following was written about the Continental O-200:

This venerable 100-hp four banger (an outgrowth of the C-85 and C-90) is very much worthy of the 1,800-hr factory TBO and probably deserves a 2,000-hr TBO when using new Millennium cylinders. (Also, when you use Superior's Millennium cylinders, you get to reset your timing to 28, which is good for a few extra horsepower). If the O-200 has a vice, other than the stupid sprague clutch starter adapter (which fails unpredictably and cost \$800 to replace), it's valve sticking. Many owners use Marvel Mystery Oil (which is not FAA approved) or Lenckite AVBlend (which is) to prevent stuck valves.

The reference to timing is the spark advance. In its original form, the O-200 used a 28 degree advance (spark firing at 28 degrees before Top Dead Center). Due to some problems, the FAA required a reduction to 24 degrees in all certificated aircraft.

The August 1995 issue of Sport Aviation had an article on B&C Specialty Products, a well known supplier of aftermarket goodies for aviation. In that article, the following was written about O-200 starters:

It had two basic types of starters, one which used a pull cable to engage the accessory case and a key type in which the two gears were always engaged while the engine was running and a Sprague clutch controlled the starter engagement. The pull type had a nasty habit of getting out of adjustment and grinding off the end of the gears and putting metal in the engine. The key type had a nasty habit of wearing out the clutch or galling the constantly turning gears and putting metal in the engine.

Although the O-200 itself was, and is, a great engine, it often failed prematurely simply because of starter problems. For a while it got so bad that some of the major overhaul shops refused to overhaul the engine because they would have to warranty the accessories and they didn't want the burden of engine failures caused by a starter.

B&C makes a starter for the O-200 that is supposed to be the best one available and avoids the problems with premature failure. It also has the advantage of being several pounds lighter than either of the original starters.

My project will skip the starter in order to save the weight and expense. It costs several hundred dollars and about twenty pounds for something that is only used a few seconds each flight.

Donald Reid
15256 Hopeful Church Road
Bumpass, VA 23024

804 883 6828

TRAILING EDGES

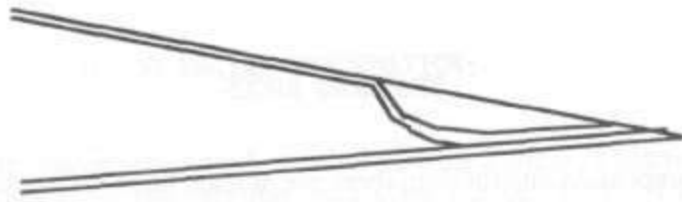
In moldless composite construction, there are at least three different ways to make trailing edges on the elevator, rudder, and wings. I know this because I have used all three.

In the standard KR method, one surface of the foam is sanded to contour and then covered with glass. The part being fabricated is turned over and the second surface is then sanded to the contour. A portion of the foam is removed from the last inch at the trailing edge. The foam is replaced with a mixture of flox and epoxy to serve as a reinforcement and extra bonding area for the second surface. A straight edge is generally used to support the piece when the second surface is being glassed. I used this method on the rudder and it gave me the most trouble of the three. The resulting surface was wavy and inconsistent in thickness along the length.

The second method that I used was to mill a trailing edge from spruce. It was approximately one inch wide and tapered with the profile of the trailing edge. I used this method on the elevator. After the foam was glued between the ribs, the wooden trailing edge was glued to the foam and the ribs, taking care to ensure that it was straight and true. The foam was then sanded to profile and glassed in the normal manner. This resulted in a good edge, but it involved the most work of the three methods.

The third way to make a trailing edge is similar to the standard KR method, but I think it is a great deal easier. The first side is glassed in the normal manner and after sanding the second side to shape, the same one inch of foam is removed from the trailing edge. This area of fiberglass is carefully sanded to remove all excess foam in order to get a good bond with the remainder of the glass. The second side is then covered in the normal manner, but the trailing edge area is now glass to glass instead of glass to flox to glass. This leaves a small depression along the length of the trailing edge as shown in the sketch. It is filled with dry micro and sanded to profile. It has the added benefit of being lighter than the floxed trailing edge, since dry micro is at least three times lighter than the same amount of flox. This lighter weight along the trailing edge results in less balance weight required which gives an even greater reduction in weight.

Donald Reid
15256 Hopeful Church Road
Bumpass, Va. 23024
804 883-6828



Dry micro is the lightest and cheapest filler material that you can find, especially if you use the correct epoxy in the mix. It has the drawback of being one of the most difficult to use since it does not spread well, takes longer to cure, and can be hard to sand. When I first started, I used Epolite (Safety Poxy) for both the structure and my dry micro filler. I did not know it at first, but that combination is very hard to sand. After switching to an Alphapoxy/micro mix as the filler, I discovered that it was lighter, slightly cheaper, and significantly easier to sand. It can be mixed to about 3.5 pounds per gallon, as opposed to 11-12 pounds per gallon for the paint type fillers.

Donald Reid
15256 Hopeful Church Road
Bumpass, Va. 23024
804 883-6828

1997 MIDWEST KR GATHERING

6th Annual Midwest KR Gathering will be held on May 24, 25 1997 at Toledo Metcalf Airport.

Motel information: Comfort Inn South
Oregon at Wales Roads
419-666-2600

Contact: Bud Shanks
419-693-1737

Ron Smolinski
419-882-8478

GEAR CASTINGS WANTED

Wanted: 1 pair unused gear castings for original retract set-up.

Ken
609-299-0498 leave message

1997 SUN 'N FUN

The Sun 'N Fun begins Sunday, April 6, 1997. The schedule is as follows:

Monday, April 7 6:00 p.m. start 9:00 p.m. end. Hospitality at EAA Museum tent.
Tuesday, 9:00 a.m. KR Forum tent one
Tuesday, 12:30 p.m. KR fly by
Tuesday, 6:30 p.m. KR dinner

Register at the Rand Robinson Booth A-5

For more information contact:

Bob Muse Sr. 770-973-3150
Virgil Salibury 305-271-3608 for dinner

1997 KR GATHERING

The 17th Annual KR Gathering will be held September 19, 20 and 21 at Perry Municipal Airport, Perry, Oklahoma (F22).

Motel accommodations:
Best Western Cherokee Strip
405-336-2218

Contact:
Don Betchan
405-336-4001 8:00-5:00 p.m.

IDEAS FROM CANADA.....

While talking to several KR2 builders, and especially after reading so many good Flight Reports, ideas from builders, and Tips, I have some ideas of my own.

I will likely fly from a Prairie Grass strip, about 10 miles away from my home. It is not rough, but neither is it Golf-Course smooth. Several Homebuilts and a "Spam-Can" or two already use it.

It appears likely that I will become the owner of an already started project, which has a set of the original R/R retractable hanging on it, plus a 2100 Revmaster, etc.... I was wondering if the R/R retractable aluminum spring-bar would not make for good fixed gear parts? In the Newsletters I read, I noticed a number of different ideas on fixed gear, ranging from bolting the original gear down with vertical fairings, to 4130 tubing, to aluminum bar stock (R/R, Monnet), to Composite (Diehl), to fiberglass (cut down American Tiger legs).

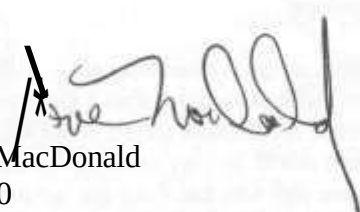
My idea is to:

- (1) weld up two 4130 1/8" thick spar plates with spring sockets (one left, one right),
- (2) cut the spring bar into two appropriately sized pieces, and bolt into the sockets,
- (3) weld up axles (to fit original R/R/ wheels) that have a connecting flange, which is -
- (4) angled towards, and bolted to, the unbent, downward angling aluminum bar stock (cut spring from original R/R gear).
- (5) with weight on wheels, they should be slightly angled inwards (a la Jodel).

Possibly someone has already tried this. If so, it would be good to correspond with that person. I know, the spring is straight cut, but, if you have it, why not use it? The shortness of each gear leg should make them strong enough to overcome the backward bending forces of landing ~ shouldn't they?? I did not read of any of the original retractable gear springs bending backwards in the original horizontal (loaded) position. The failures in the original gear all seemed to be in the latches.

Well, for a letter that is supposed to be a request for a subscription, this has stretched a bit. I feel like I am joining a family, and that I already know many of the correspondents. I look forward to many good reading episodes, and meeting more KR'ers through the Newsletter, if not in person.

I am:


Gene MacDonald
Box 60
Hague, SK S0K 1X0
Canada

FOR SALE

KR-2 Boat. Wing spars, tail feathers complete. Spoilers, push-pull tubes, installed. Gear legs, type IV black, misc. parts optional. \$1,000 now, Sun-Fun later.

Dean Smith
17204 Ronald Road
Prairieville, IA 70769
504-673-6356

THE KR NEWSLETTER IS PUBLISHED BI-MONTHLY AT
1900 PARKSIDE DR., DENTON, TEXAS 76201.
817-566-5871 - EVENINGS AND WEEKENDS.
EDITOR, MONTE MILLER. SUBSCRIPTION RATES
ARE \$20.00 PER YEAR- U.S., \$25.00 PER YEAR-
CANADA AND \$30.00 PER YEAR- OVERSEAS.

SET OF ALL AVAILABLE BACK ISSUES
(OVER 100) FOR \$85.00 U.S./\$95.00 FOREIGN
INDIVIDUAL COPIES \$2.00 EACH. ANY
REPRODUCTION IN PRINT OR ELECTRONIC OF THIS
NEWSLETTER WITHOUT WRITTEN PERMISSION WILL BE
CONSIDERED COPYRIGHT INFRINGEMENT AND SUBJECT
TO AGGRESSIVE LEGAL ACTION.

Stability of the KR-2

In Australia we are allowed build aircraft under a set of regulations that are almost as strict as applied to a commercial aircraft. The aircraft we build have to be built according to the published and approved plans. Any deviation from these plans has to be formally approved by the civil aviation authority here or its representative. As a result, the 13 KR-2's flying in Australia were all built fairly closely to the plans. Once built, the aircraft must also meet certain performance restrictions.

One of these performance restrictions relates to stability. The aircraft must be demonstrated to be pitch stable in order to be given approval to fly. The requirement for stability is specified in FAR 23 (Ref. 8.1) which states "... the airplane must be safely controllable and maneuverable during - (1) take off; (2) climb; (3) level flight; (4) dive; (5) landing (power on and off)..". Part 23 also states that "... the airplane must be longitudinally, directionally and laterally stable".

While Experimental aircraft are to some extent exempt from the rigors of FAR 23 and other design standards in the USA, it would seem prudent to build your aircraft so that it is stable, both dynamically and statically. I can't imagine that anyone would deliberately set out to build an aircraft that was unstable.

When the first Australian KR-2 was built about 15 years ago, the Australian civil aviation authority conducted a flight test of the aircraft and found that the aircraft was unstable with the CofG much further aft than 12" aft of datum. The test aircraft would have been built very closely to the plans as at that stage there were few approved modifications for the KR-2.

As a result of the flight test, the civil aviation authority placed an aft CofG restriction of 12" on the KR-2. That 50% reduction of the allowed CofG envelope was a major change and suggests that there must have been serious problems with the stability. The implications for Australian builders is significant as anyone who has done a weight and balance calculation on a plans built KR-2 will know that this makes the KR-2 a 1-1/2 seater instead of a 2 seater.

The KR-2 isn't the only aircraft to receive this harsh ruling. The earlier Lancair's apparently also had a CofG restriction placed on them by the Australian civil aviation authority and are

apparently still limited to only one person on board. In the case of the Lancair, excellent factory support is provided and no doubt that a solution will be provided in due course.

Is there a Stability Problem?

There are two ways to look at the problem, theoretically using a simulation model or practically by a flight test. The best and easiest way is to conduct a flight test of a plans built KR-2. It would be nice to do the test on Ken Rand's prototype, however we will have to settle on a derivative and hope that it is fairly representative.

I would like to do the flight test myself, however unfortunately my KR-2 project is on hold until I determine what modifications are necessary if any to make the KR-2 a legal two seat aircraft in Australia.

If anyone has a KR-2 that is built closely to the plans from the external/aerodynamic point of view and would be interested in conducting a flight test, I will gladly supply the test procedures that they should follow. The flight test results I'm sure will be interesting reading for those owners of the over 600 KR-2's on the FAA register who are concerned about the safety of their aircraft.

The flight test is a non trivial exercise and involves loading your aircraft with increasing aft CofG until you find the point of neutral stability or until you reach the aft limit of the CofG envelope.

A simulation model is somewhat more difficult to prepare and less accurate than a flight test. I have a simple spreadsheet model of the KR-2's stability and would be very interested to hear from anyone else who has done any modeling of the KR-2's stability. My model tends to agree that the CofG should be kept forward of

WANTED

KR-2 in good condition.

Mathieu North
Seyon 2
2001 Neuchatel
Switzerland

Fax 011 41 32 724 10 47
Tel 011 41 32 725 11 12

the 12" aft position for stability, however I am not that sure yet of the accuracy of the model.

The Tail Volume

There were some very interesting articles on aircraft design by John Roncz published in Sport Aviation in the early 1990s. In these articles John mentions a parameter called the tail volume V_{ht} which gives a measure of the likely stability of an aircraft compared with other aircraft. V_{ht} is calculated as follows:

$$V_{ht} = \text{area of HT} \times \text{lever arm of HT} / (\text{wing area} \times \text{MAC})$$

where HT stands for horizontal tail (elevator and stabilizer), MAC stands for the Mean Aerodynamic Chord.

The MAC is calculated as follows:

$$\text{MAC} = 2/3 \times \text{root chord} \times (1 + L + L^2)/(1 + L)$$

where L is tip chord divided by the root chord. For the KR-2 the values of V_{ht} and MAC are as follows:

$$\text{MAC} = 2/3 \times 4' \times (1 + 3/4 + (3/4)^2)/(1 + 3/4) = 42.3"$$

$$V_{ht} = 9.3\text{sqft} \times 7.3\text{ft} / (72.3\text{sqft} \times 3.52\text{ft}) = .268$$

The KR-2 plans state the MAC is 45.1 inches which is a little different from my calculated value. I will use my value as the plans do not state how the stated value was calculated. The effect on the calculated tail volume will be quite small.

According to John, the value of V_{ht} varies from aircraft to aircraft some of which are given below:

Aircraft	V _{ht}
F86 Fighter	.203
KR-2	.268
KR-2S	.31
Most light aircraft	.37 to .48
PL-1	.43

The greater the vertical tail volume the more stable the aircraft will be. The F86 fighter was designed for high maneuverability and hence the low value of tail volume. The KR-2 with a tail volume of .268 would seem to be in the low stability region as well. The KR-2S has a 14"

longer fuselage and as a result has a greater tail volume, however it is still a lot smaller than the average light aircraft. The tail volume I calculated for the KR-2S is an estimate using the KR-2 wing area and MAC. The actual tail volume for the KR-2S is likely to be about that value (has anyone calculated the value?).

The tail volume for the KR-2 will vary depending on the length of the rear fuselage, area of wing and horizontal tail surfaces. I used values taken from the KR-2 plans and measurements of the drawings.

Although the tail volume is not the only measure of whether a particular aircraft will be stable, it gives an indication of potential stability problems compared with other aircraft and tends to support the stand taken by the Australian authorities regarding the stability of the KR-2 with an aft CofG.

The most significant and easily adjusted stability parameter is the static margin, the distance of the CofG from the neutral point. Determining the neutral point theoretically is difficult, but the articles by John Roncz give a procedure for estimating the neutral point's position for the power on and power off cases. The bottom line is you need to know where the neutral point (point of neutral stability) is and keep the CofG forward of this point. The best way to do this is by a flight test.

Directional Stability

A measure of directional stability can be determined by comparing vertical tail volumes of the KR-2 with other aircraft.

The vertical tail volume V_{vt} can be calculated and is compared with other aircraft below.

$$V_{vt} = \text{Area of VT} \times \text{Lever arm of Vt} / (\text{wing area} \times \text{wing span})$$
$$= 5.38\text{sq ft} \times 11'11" / (72.3\text{sq ft} \times 20'8") = .03$$

Aircraft	V _{vt}
Mig21	0.080
KR-2	0.03
Piper Cub	0.022

It appears that the vertical tail volume is consistent with other similar aircraft so the KR-2 should be directionally stable.

How to Fix the Problem Assuming it Exists

Identifying the problem is the first step in deciding how to fix it. Assuming that there is a stability problem with the CofG aft of 12", then it is clear that we should always keep the zero fuel CofG forward of 12" aft of datum. Why the zero fuel, well the last thing you want when the fuel runs out and the noise stops is an unstable aircraft.

However if you want keep the loaded zero fuel CofG forward of 12" aft, then the CofG of the empty aircraft will have to move forward assuming you can't move the payload forward. It would be easiest to move the payload/occupants forward, however in most cases the seat is fixed and there isn't much legroom or head clearance to put too many cushions behind you.

If you move the empty CofG far enough forward by say moving the engine forward, then you will have the empty CofG forward of the main wheels of the tail dragger configuration making it a nose dragger when the occupants dismount. Easily fixed, convert it to a tricycle gear. However then when you fill up that header tank with fuel and leave it ready for the next flight, the weight on the nosewheel will be greater than Dan Diehl says it was designed for.

So I hope that the flight test will show that the KR-2 is stable with the CofG aft of the 12" aft limit set by the Australian authorities.

Designer's Considerations

There are a few questions that I would like to ask Stewart Robinson about the KR-2 and hope that he will respond through the KR-Newsletter so that all builders can understand a little more about the important issue of stability of their KR-2s.

1. Were Stewart and Ken aware of the pitch stability issues when they designed the KR-2? If so why did they choose such a small tail volume?
2. Did the Taylor Monoplane, that I understand was the basis of the KR-2, have a stability problem? What was the CofG range for the Taylor Monoplane?
3. Did Ken or Stewart do any flight tests to verify the KR-2 was stable throughout the CofG range, in particular the aft CofG

region of the envelope at maximum all up weight. If so would Stewart please provide details of the tests that were done to verify the allowed CofG range is in the stable region. What was the static margin at the aft CofG limit at maximum all up weight?

4. Does Stewart have any design or test flight report documents that he could supply to the Australian builders for submission to the local civil aviation authority to convince them that the KR-2 is stable throughout the CofG range stated in the plans and that the CofG restriction is unreasonable?

I hope that the issue can be resolved so that I can get on with building my KR-2 according to plans. I don't want to redesign it, I just want to build a "true blue" legal safe two seater and complete the dream machine I thought I was building when I bought the plans.

KR on the Internet

If anyone knows of a discussion group on the Internet would they please let me know where to find it. I have the telephone numbers for various bulletin boards, however the cost of international calls places them out of reach. Not so with the Internet of course.

References

"Aerodynamics, Aeronautics, and Flight Mechanics", B.W. McCormick, Pennsylvania State University

"Airplane Performance Stability and Control", C.D. Perkins and R.E. Hage, John Wiley & Sons

"The Design of the Aeroplane", D. Stinton, Van Nostrand Reinhold Company

"Designing your Homebuilt" (series of articles in Sport Aviation), J. G. Roncz

"A Critical Analysis of the KR-2", N.D. Bingham, Sport Aviation, January 1988

William Ginn

52 Karilla Avenue
Lane Cove
N.S.W. 2066
Australia

Tel/Fax 62-2-94188895
Email ginnwj@ibm.com

EDITOR'S NOTE:

The previous article was included in an effort to exchange unbiased information that is the object of the KR Newsletter. Please read on for Monte Miller's opinion on the subject addressed in William Ginn's article.

COMMENTS REGARDING WILLIAM GINN'S ARTICLE STARTING ON PAGE 12

The KR-2 is a design approaching twenty-five years old and is basically unchanged, save for the stretch version now marketed as the KR-2S. The single place and later two place versions were developed by two relatively young, radio-controlled model builders who happened to be employed in the aerospace industry during one of its cyclic peaks.

The KR, first flown as an open cockpit, single seater, was developed in an era of homebuilding prior to computer modeling, exotic CAD-CAM and internet chit chat. What looked about right to these two guys - eyeball engineering with some design adaptations from earlier VW powered homebuilts - was what got built. Not to mention being in the vanguard of composite construction prior to Rutan and company.

The KR was conceived as a simple, lightweight, economical air recreational vehicle. It is a slick, minimally equipped aircraft with dazzling performance if built per the plans. Emphasis plans.

Cost to construct is one of the key attractions for the KR series. Were it not for the option of buying and building components as you can afford them, most KR builders would never even start. What would happen to the cost of plans and RR parts if Rand-Robinson were to contract for all the design and flight studies deemed necessary by a few self-taught aero whiz boys? Foreigners, too. Whom do you think would ultimately pay for this work? If the KR pricing moves into the realm of smaller Lancairs or Van's RV series, the entire business would most probably fail. The majority of builders will refuse to support escalating costs for what should be an economical project. Trickle down economics. Trickle on me.

Factory demonstrator? I don't believe that Jeanette Rand or her daughter are rated pilots nor do I believe they wish to be in the flight demo business. Who will bear the cost of their liability insurance? The current and future builders of KR aircraft, that's who.

What R-R does continue to do is provide plans and components, at reasonable cost, for an aircraft design that could very well have died along with Ken Rand these many years ago. KR builders and fans owe a great deal of gratitude to R-R, et al, and should count their blessings rather than suggest ways that Rand could invest thousands of dollars to reinvent the wheel and satisfy a foreign government.

The *Australian Problem* is, probably, just that. What aircraft did their CAA test/measure? Has anyone ever seen the weight & balance paperwork on the test aircraft? Was it plans built? What was the quality of workmanship? Was it in rig? These unknowns are enough to make anyone skeptical of the validity of the entire test and ruling.

I personally doubt that there is a KR owner/pilot that would enjoy test loading and flying his aircraft with an increasingly aft CG until such time as the aircraft departed controlled flight. All to prove or disprove some computer hacker's theories? I'll pass! My life is worth more than some random bytes of info.

I recall the weight and balance info for 684LM was published in the Newsletter. I fly with two people and a dab of luggage behind the seat. No aft CG problems because I built per the plans. No stability problems in pitch, just a solid pilot's aircraft.

When I raced motorcycles, we had a saying, "I don't care how th\$% do it in California", H,ow's about we change just *one* word?

MONTE MILLER N684LM
1900 PARKSIDE DRIVE
DENTON, TX 76201
817-566-5871

IT'S TIME FOR A CHANGE...

The KR Newsletter began in 1975 and was published for the next seven years by Butch Koppe. In 1982, John Forrester was it's publisher for the next six years. In October, 1988, I became it's publisher. It's been nine years and it's time for a change.

Beginning with the next Newsletter, I'm proud to announce that Monte Miller will be the new publisher of the KR Newsletter. As you know, Monte has been an integral part of the success of this newsletter for many years. He's contributed countless articles and has always been willing to help anyone in need of information. I know he will do a wonderful job.

Judy and I want to thank all of you for your help and friendship over the years, we will never forget you.

Your participation in this newsletter is critical to it's success. I hope you will contact Monte with your congratulations and contributions.

Contact Monte Miller at:
1900 Parkside Dr.
Denton, TX 76201
817-566-5871

SAFE FLYING AND GOD BLESS YOU ALL !

Butch *Judy*

KR NEWSLETTER
1900 PARKSIDE DRIVE
DENTON, TEXAS 76201
ISSUE NO. 236-237 JANUARY-FEBRUARY 1997

FIRST CLASS
U.S. POSTAGE
PAID
PERMIT NO. 334
LAKEVILLE, MN

