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Safety is the watch word this issue and I have some very important information on flying your KR from Ron Sorrell and Eugene Muszynski. Ron's KR-2 has been flying for about a year now and the guys have discovered a couple of potentially disastrous problems. These may be applicable to your KR so...listen up! Lets fly safely!

A vented fuel cap on the main fuselage tank is pretty much standard practice with most KR builders. Normally, this is fine. The problems begin when attempts to lower the vent or fair it in to offer less wind resistance are made.

The vents stick up for a reason...to get the end of the vent into a static or high pressure area of air. Shortening the vent, or especially fairing it in, can actually cause the vent to be a low pressure area. This is not conducive to good fuel flow and can cause the engine to starve for fuel with a half tank or more of fuel on board. The weight of the fuel might overcome a low pressure situation for a while but as the fuel is used up you are creating more low pressure area in your tank and less fuel weight to overcome it. Lets all take a tip from Ron and Eugene and do ours the safe way.

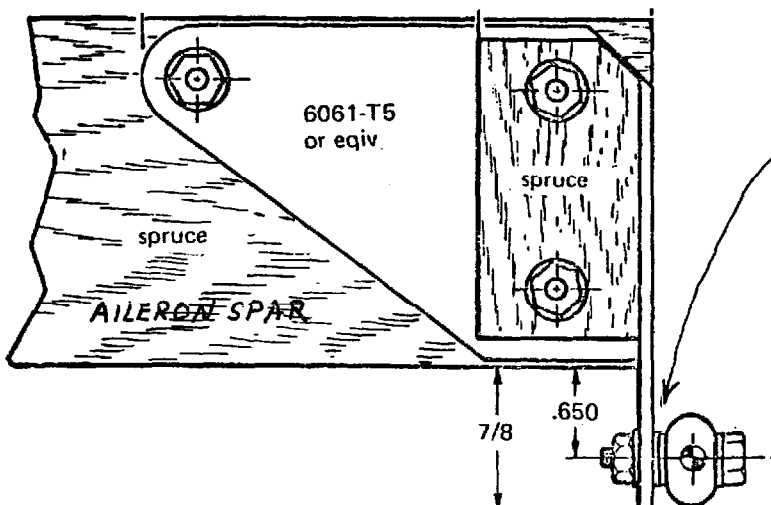
I'll let Eugene tell us in his own words the other problem he discovered. Here is his letter.....

"I am suggesting you publish this info A.S.A.P. as a bulletin. I found (on an annual inspection of a KR-2) that the aileron push rod was bending during deflection of the aileron....and would you believe the rod snapped during the inspection!

The rod was observed from the rear as aileron travel was being checked. The unibal body was found to bind against the aileron horn and the push rod was forced to bow each time the aileron was deflected.

Flying time on the KR-2 I inspected was 60 hours when the push rod snapped. Ron Sorrell observed a KR-1 with less than 1 hour flight time to be binding for 1/2 of the aileron travel!

Have the KR builders check both ends of the push rods through out the aileron travel and make bushings to move the unibal out from the bellcrank and out from the aileron horn. Washers won't do it, the diameter is too big.....Eugene T. Muszynski, 6680 Daly Rd., Cincinnati, OH 45224"



Place 1/4 O.D. x 1/8 long bushing between unibal and aileron horn, unibal body binds against aileron horn on some installations and pushrod bends and breaks. If required, do same at other end.

I heard a report of a KR-2 crash a couple of months ago. Cause has been determined to have been inflight separation of the ailerons due to flutter. After the ailerons separated they flew back and knocked off a large portion of the elevator and rudder. The flutter occurred because the ailerons had not been balanced.

There are two things that can cause flutter that are easily remedied in our KR's. One is always balance your ailerons. Two, NEVER allow your control cables to become slack through wear or stretch. I don't mean they should be tight enough to hum but they SHOULD NOT SAG!

Ken Rand always said the elevator and rudder did not need to be balanced because they would not flutter up to the 200 mph red line. This may be true in most instances but there are known instances of elevator flutter as low as 140 mph I.A.S. No damage occurred but the possibility is there. Unbalanced ailerons can flutter at speeds as low as 120 I.A.S.

The pilot of the KR-2 that crashed survived the accident and has since recovered from his injuries. His aircraft was totally destroyed. I don't like to read or write about accidents, I especially hate to write about accidents that could have been so easily avoided. Do me and yourself a favor...check your controls carefully, for free unbinding travel, make sure your ailerons are at least partially balanced and check the tension on all the cables. Lets be safe.....not sorry.

Bill Defreze has another slant on safety. One that many of us have not considered. We should!!

"Ernie, I guess by now you have heard that I brought Brad up to fly my "Baby" last weekend. We put 6½ hrs on her and other than a little more tuning on the carb, she seems to handle and fly pretty well, but I think I'll let Brad write a flight report. If you want to print the following statements from the "Reverend Billy"...I think it might be a lot of help.

When building our dream machine, we don't think twice about the money we spend on parts and props and engines and radios and instruments and oh, that beautiful final paint job. We now have a gorgeous piece of achievement sitting in our driveway just itching to reward our efforts of the last 1, 2 or 3 or 5 years. BUT it is still not complete. There is one more "part" to get!! A major part of the whole project! Lets go back to when we learned to fly. Some of us were taught in 150s, we got our ticket, after a few hours the 150s were too tame so we go get an instructor, check out a 172 Cherokee, Mooney, Bonanza or so on. What makes the KR any different?? I put a lot of time into building me a plane that I can enjoy and have some fun inexpensively. So lets go buy that other "part" and get someone who knows how KR's are supposed to fly. Up to my plane, Brad Hummel had flown eight different KR's and he is still here to talk about it. So, I called Brad in So. Cal and we talked. I was ready!! Oh, yeah?? Saturday morning, Brad started his inspection. Needless to say we never got to the airport til 2:30 that afternoon. Brad made the first flight at 7:59 pm. He came back 28 minutes later, we needed a little more tuning on the carb. 8:30 am Sunday...more tuning and more fixes! Is it ever going to be right? This guy is sure picky! But patience will out....around noon, the world started to look rosier. He took off and was gone for 2 hours. When he came back, he had power on and power off stall figures, had control comments, had top speed numbers, had slow flight numbers and several other comments that helped me to "understand" my baby when she talks to me. The sky was blue, the winds gusty to 25-30, he turned to me and said, "You get in the right seat and we'll go for a ride".....ME? Get in that plywood and foam and glass thing-a-ma-jug?? (Well...you built it, don't you trust it?) You bet your backside, I trust it. Let me in!!!

Going down the runway, I said to myself, Thank you, Lord, for letting me accomplish such a feat. Then she lifted off. Never being in the plane when she was flying before, was a experience I know I will never have again.

The high winds and gusts and a big bird to catch 50 miles away, by mutual agreement, we will try another day to check me out. If it takes me three or four or more hours to feel totally comfortable in my KR, I don't care what it costs, I'm doing it MY way and as you have heard me say before....KNOWLEDGE IS POWER.

(cont. next page)

So think about that one more "part" for my airplane, one each KR instructor...Brad or Dan or whoever has the experience to help put you and your ship in the air safe and in one piece. Drop the "proud one" attitude, or "I am the best"... "I built it, I'll fly it", and let someone show you how to enjoy your dream that you have worked so hard and long on. Don't be afraid of what people will think...thoughts can't hurt you. I love everyone of you KR builders out there and I want to meet and visit with all of you. Can't you just see a squadron of these little dolls all swarming into Oshkosh like a flock of P-51s there to take control of the whole airshow and show them who the boss of the air is in these United States of America....line up the wierd looking planes and strafe them to smithereens....sorry, I guess I let my imagination carry me away.

But, lets have some fun anyway. If we don't dream...what is there left in life?"

Sincerely & from the heart,
"Reverend Billy" Defreze

INSTALLATION MANUAL FOR THE RAND TURBOCHARGER SYSTEM FOR THE VW ENGINE

IV. INSTRUMENTATION

by DAN DIEHL

About the only three instruments required that are not on a non-turbo'd engine are exhaust gas temperature, manifold pressure gauge, and cylinder head temperature. The manifold pressure gauge should have a range of about 20" to 35" or 40". Turbo boost gauges will not work as they are non compensating for altitude. They work fine on a boat or car but are useless on an aircraft. The hook-up for this instrument should be in the large tube between the turbo and the 4 way split to each cylinder.

The E.G.T. is used for careful monitoring of the exhaust temp and should be watched while long climb outs and high power settings are being made. Naturally the E.G.T. helps in obtaining proper mixture settings. The sender location has been discussed earlier but the most effective location is between the 4 pipe union and the turbo.

The cylinder head temperature is important to avoid excessive head temps that lead to detonation and warpage of the head itself. The standard hook-up is for the thermocouple sending unit to be installed under the #3 cylinder spark plug (right rear). This is the hottest running cylinder and can be used as an indicator of excessive heat.

One other thing that is nice is a primer. While starting the engine has to pull the fuel air mixture a long way up the intake tube, through the turbo, and from the turbo to the split cylinders. The primer discharge nozzle is placed in the center of the four way split in the intake system. From here it can vaporize and each cylinder draws from this area. One squirt is all that is needed to get the engine started.

V. OPERATION AND LIMITATIONS

The Rajay turbo charger is a very simple to operate and a very low maintenance piece of equipment. However, there are several things to keep in mind while operating a turbocharged VW engine.

The first phase of operation is engine start up. This is easily accomplished with the use of the primer and electric start. The important thing is to remember here is that the oil is thick when it is cold. So one should not exceed a fast idle for at least one minute. Use only that RPM which is required for taxiing until 140° oil temp is reached. At this point we are doing the run up. I prefer to start my take off roll while the oil is at 140° so, as high power and climb increase the oil temp, it gives me a longer time before near redline temperatures are reached.

The second phase is to carefully monitor manifold pressure. This system is not equipped with a wastegate. The natural tendency to firewall the throttle for take-off must be avoided. A full throttle setting would result in a manifold pressure of around 70" to 80" and would destroy the engine in seconds. For take-off I recommend 32"-34" m.p. This will give a good climb rate and short ground roll. In an emergency where obstacle clearance is needed 40" will give you a boost. A short burst at 40" of about 5 seconds will not severely harm the engine. As altitude is gained during climb out I would recommend a m.p. of 30" keeping an eye on cylinder head temperature. If it

V. OPERATION AND LIMITATIONS (cont.)

reaches 450° you better pull back on the power and/or lower the nose to get more speed. As altitude is gained you will find that you will have to occasionally increase the throttle to maintain your desired m.p. Once the cruise altitude is reached, a m.p. of 27" will give good speed and relieve the engine of undue stress. Also, something to remember is that on descent you will have to keep coming back on the throttle or else m.p. will slowly climb. During climb out and cruise, oil temp should not exceed 250°. Normal cruise should range between 180° and 205°. Cylinder head temp should not exceed 450°, normal cruise between 350° and 410°. Exhaust temp should not exceed 1450° and normal cruise between 1150° and 1300°.

The third phase of operation is shut down. To insure proper lubrication of the turbo always let the engine idle for at least one minute. This will let the turbo cool and more importantly, let the turbine slow down. During operation the turbine may reach speeds of 80,000 RPM. You can imagine what would happen to the bearings in the turbo if the oil supply were suddenly cut off.

As mentioned earlier, the oil should be changed and the valves adjusted each 25 hours of operation. The oil I use in my own engine is 40 wt. White Can Aeroshell. The new Phillips oils have even a more promising use as break down of lubricity does not occur until a higher temperature. I recommend a 50 wt. oil be used in very hot areas and cold winter should require a 30 wt. If properly maintained, these turbos should last at least 2,000 hours before requiring an overhaul.

This is the last of Dan Diehl's manual on turbocharging a VW aircraft engine. Other installments were in Issues 57 thru 60 with a list of parts and sources in Issue #58. DO NOT try to short cut the steps outlined in the article. They are flight tested and proven for hundreds of hours in Dan's KR-2 N4DD.

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