THE CANARD PUSHER

No. 66

Jan. 1991

Published quarterly (Jan., April, July, Oct.) by

RUTAN AIRCRAFT FACTORY, INC.
Building 13 - Airport
Mojave, CA 93501
805-824-2645

U.S. & Canadian subscriptions $14.00
Overseas (Airmail) $16.00
Back issues $ 3.50
Overseas $ 4.00

If you are building a RAF design, you must have the following newsletters:
VariViggen (1st Edition), newsletters 1 to 66.
VariViggen (2nd Edition), newsletter 18 to 66.
VariEze (1st Edition), newsletters 10 thru 66.
VariEze (2nd Edition), newsletters 16 thru 66.
Long-EZ, newsletters 24 through 66.
Solitaire, newsletters 37 through 66
Defiant, newsletters 41 through 66.

A current subscription for future issues is mandatory for builders -- as this is the only formal means to distribute mandatory changes. Reproduction and redistribution of this newsletter is approved and encouraged.

PLEASE NOTE: BUILDER SUPPORT IS ON TUESDAY ONLY FROM 8:00 TO 5:00 When you call on Tuesdays for builder assistance, please give your name, serial number, and nature of the problem. If you are not in an emergency situation, we ask that you write to Mike. However, if you require immediate assistance, Mike will make every attempt to return your call between 3:30pm and 5:00pm (our time).

When writing to RAF, send along a self addressed, stamped envelope if you have builder's questions to be answered. Please put your name and address on the back of any photos you send.

THE AVIATION COMPOSITES VERSUS RAF/SCALED LAWSUIT.

It has been almost two years since we were sued by Aviation Composites (a British company). We have had many letters of support and concern from you, the builders and flyers of RAF designed planes. We appreciate your support and are pleased to announce that on January 28, 1991 a jury in federal court in Fresno, CA returned a unanimous verdict in favor of RAF and Scaled on all counts. The federal judge absolved Burt and Dick of any blame and disallowed Aviation Composites claim for punitive damages before he ever gave the case to the jury! The judge also directed Aviation Composites to pay Scaled the unpaid balance of their account amounting to over $60,000.00.

All in all, from our standpoint, a satisfactory result. Unfortunately, an unbelievable amount of Burt's time, and several others at Scaled, was spent preparing for and during this trial.

RAF has felt from the beginning that this lawsuit was improper and without justification. Evidence presented at the trial clearly demonstrated that flight testing conducted by the law firm of Ervin, Cohen and Jessup of Beverly Hills, CA, under the technical direction of Ivan Shaw for Aviation Composites, produced results that confirmed RAF's innocence. These test results showed that RAF had performed the requirements of its contract with Group Lotus and had accurately presented the test results in the formal test report.

This lawsuit should never have been filed. RAF is investigating the potential for recovering defense attorney fees from Aviation Composites and the law firm.

Again, thank you, all of those who wrote and called during this tough and worrisome time.

RUSTY FOSTER - DECEMBER 1990

Rusty, a dear friend and a gentle gentleman, passed away shortly after Christmas after a short battle with cancer.

Rusty will long be remembered by EZ builders for his excellent modular designs. His side mounted electrical panels and his wiring were works of art. We will surely miss this versatile and knowledgeable man.

FLY-INS

KANSAS CITY GIG
"GRAZIN' IN THE GRASS"
A NATIONAL CANARD FLY-IN
JUNE 14-15-16, 1991

Put on by the Central States Association, this fun event will be held at the Johnson County Industrial Airport (IXD). Please write to Terry Yake, 8904 West 116th Terrace, Overland Park, KS 66210 for details. Mark your calendar, pickle-fork flyers, this will be a memorable event and is not to be missed.

1991 EZTER FLY-IN
TIFFT'S "BEND IN THE CREEK RANCH"
MARCH 29, 30, 31

Well, no doubt about it, the Hansen's annual Sedona Ezter Fly-In is going to be a hard act to follow. Since the Hansen's are unable to do the fly-in in '91, we'd like to carry on the tradition and have the get-together here at our new abode in Oregon. Cottage Grove is located just 20 miles south of Eugene. Nice airport and an FBO that is a real "nutcase" so he fits right in with our crowd. Since this is our first year here, we aren't sure about the weather, but are told it should be pretty nice by that time of the year. And after all, I do remember snow in Sedona one year. So we'll just "play it by ear" and plan on bright sunny days. We would appreciate having some idea of how many happy Ezers to expect so please let us know if you are planning to attend. We will be able to provide bedrooms for several couples and can accommodate others if you would like to camp on some nice soft grass or throw a sleeping bag on the carpet. For those that prefer to motel it, we'll make up a list of local places to stay. We'll plan the usual agenda, dinner out for those that fly-in Friday, buffet lunch at the hangar on Saturday to greet those arriving, and dinner at our house Saturday night. Breakfast on Sunday at one of the local restaurants before departures. Can't promise anything as exciting as a session with the foot doctor (those that attended the Hansen's '90 fly-in will understand), but we'll think of something to do. Drop us a note or give us a call for more info or details. We look forward to sharing our new surroundings with our EZ friends. We think you'll like it.

Bruce & Bonnie Tifft
75872 Mosby Creek Road
Cottage Grove, OR 97424
503-942-7068

REVALIDATE YOUR LICENSE TO BUILD

As you know, in CP65, page 2, RAF requested all builders and flyers who were licensed by RAF to fill in a form and send it to us. This process is to revalidate your license to build. New builder fabrication starts were not allowed after 1 Jan. 1991. Please understand that RAF has extended builder support to those who purchased plans for a period far in excess of what any other company in this business has ever done.

We have received a total of 446 responses, 333 from Long-EZ, 79 from VariEze, 27 Defiant, 4 Solitaire and 3 VariViggen builders. This response is less that what we expected, ie, we believe there are more of you out there who desire to be properly licensed. Thus, we are extending the registration deadline to 3 months, to give those of you who failed to respond more time to do so.

Important - Register your building project and show proof that construction is underway by April 1, 1991 (see CP65). If you do not do this by April 1, you are not licensed to build a RAF design.

RAF cannot promise builder support for any project started after April. We do not consider it safe for anyone to build and fly any homebuilt without adequate support. Your are not protected by the AD (airworthiness directives) system like you are on a certificated, manufactured aircraft. We cannot validate licenses for any unsafe practice. Since we will have to drop support sometime over the next few years, the April '91 cutoff for builder starts is critical. While we can't predict the future extent of builder support, plan to complete your project by April

'93. Those who respond by filling in the form and returning it to RAF will be considered by RAF to be legitimate and will be assigned new serial numbers. This will allow RAF to continue to provide quality support to those who deserve it.

ALERT! POSSIBLE CORROSION IN ELEVATOR TORQUE TUBES IN EZS.

We have one report from a VariEze builder/flyer who lives and hangars his EZ in Ohio. He noticed small bumps rising up on the top of each elevator along the aluminum torque tube. He could depress these bumps a little with his finger. He has removed each elevator and cut the glass and foam away along the top of each elevator, exposing the aluminum torque tubes. He reports that he has found "severe corrosion pits where each bump was located." We have not seen this corrosion yet - he is sending us a sample of the affected tube. We will report further in the next CP. He says that this corrosion occurs only under the foam and glass. These is no corrosion at all on the exposed ends of the elevator torque tubes.

Pitch control is absolutely critical to safe flight. For this reason, any report such as this must be taken seriously. All EZ, Defiant and Solitaire flyers should inspect the leading edges, the tops and the bottoms of both elevators for bumps such as we have described here, before next flight. If any evidence of bumps or corrosion is found, ground the airplane and remove foam and glass locally. Inspect the aluminium tubing under a bright light. Please report any problems found to RAF as soon as possible.

Any builders who have not yet built the elevators should treat the aluminum tubing with Alodine before starting on the foam and glass elevators. Do not omit this step! Remember, the corrosion, if it exists, is not visible on the exposed part of the tubing. It is under the foam and glass and cannot be seen without removing the foam and glass. Do not remove foam and glass without evidence of bumps or swellings that may or may not be soft. Do let RAF know of any evidence of corrosion.

The above report came out of Ohio where it is hot and humid in summer and cold and damp in winter. Anyone who lives where there is much humidity and/or near the coast should be especially concerned and should check the area called out before each flight.

We have checked all of the EZs at Mojave with no sign of any problems but that probably was to be expected, this being a desert with only a few inches of rainfall in a good year.

CAUTION

Check that what you order is what you get! Plastic fuel lines must be checked - often.

"Just re-read an article in the *Canard Pusher* about fuel lines in VariEzes. These "original call-out" urethane, flexible fuel lines have been reported to deteriorate over time and should be carefully inspected and replaced periodically. Unless the material for these fuel lines is the correct material, deterioration can be very rapid. Visually examining plastic tubing when it arrives from the supplier may not tell the builder/flyer that it is, in fact, the correct material. Even when the correct material is used, deterioration can occur and be invisible to all but an extremely thorough examination. Here is my experience:

Recently, I brought my VariEze home on a trailer and had it in the carport, nose down. It had been sitting there for quite some time awaiting my attention. When I finally got around to it and opened the canopy, I smelled fuel but could find no sign of liquid fuel. Later, I was checking fuel lines under the rear seat by squeezing them with my fingers to determine hardness or brittleness when the header tank fuel line fell off in my hand! This was the source of the fuel smell. With the nose down, fuel had slowly leaked behind the rear seat bulkhead and into the rear cockpit. All of the other fuel lines were discolored to a dark brown but still felt pliable. In removing them from the fitting, to my horror, they easily split and crumbled.

I had always assumed that deterioration would occur in low spots in the fuel lines where water may collect. These failures, however, were up high at the aluminum fittings. They had been installed in July of 1983 and flown for a total of 750 hours, so they were seven year old. I have used auto fuel, regular, when at home and 100LL

Avgas when traveling. Lately, regular auto fuel is no longer available locally so I have been using auto unleaded (no alcohol). I have, on occasions, used Marvel Mystery oil as a fuel additive and, many years ago, I used TCP.

I believe that VariEze fuel lines should be changed at least every three years and great care should be taken to order the correct material. Also, make sure you receive the correct material. As a further safeguard, cut a few small pieces of the new fuel line and submerge some in a bottle of gasoline and some in a bottle of acetone. I check these samples from time to time for any obvious signs of deterioration.

Byron McKean"

Editors comment: Thanks for your report, Byron. We agree wholeheartedly with the suggestion to change plastic fuel lines at least every three years. Also, we have found that buying polyurethane-type tubing from a supplier like McMaster Carr (locations in Chicago, Los Angeles and New Brunswick, NJ) will get you a receipt that spells out part numbers. For example, according to McMaster Carr's catalog, Tygon tubing comes in at least two material types, one called out for fuel and lubricants, another for food and beverage! Each material has its own part number. Tygothane, the material originally called out in the VariEze plans, is recommended for fuels and lubricants. Using McMaster Carr, at least you have the verification of the part number on the receipt. We highly recommend this company as a source of an unbelievable variety of materials, tools, etc. Their catalog is an awesome tome!

CONTROLS CHECK BEFORE TAKE-OFF

An EZ pilot here at Mojave recently had an experience well worth relating and bears serious thinking about. He had had his canard off for routine inspection and maintenance and when he replaced it, he inadvertantly bolted the pitch control pushrod to the VECS12 arms incorrectly (due to a builder modification). This limited the nose down pitch authority but this fact was not discovered in preflight. In flight, this pilot discovered that at full forward stick, his elevator was essentially even with the canard tip! Reducing power enabled him to descend and he was able to land without incident. What this tells us is to not only <u>feel</u> the forward, aft and left/right stops when checking controls prior to take-off, but to <u>look</u> at the control surface you are moving and verify that it is, indeed, traveling to what you know is the correct direction as well as limit. There is no substitute for a complete, full travel check of flight controls before take-off.

CAUTION

"Be careful about flying your EZ in a relaxed manner with your feet forward of the rudder pedals. On one flight, my shoe lace loop got caught over one rudder pedal and it took me 90 miles to work it loose. I now have on my checklist to stuff the loops in my shoes before I get into my seat.

Ray Mucha"

CYLINDER HEAD AND OIL TEMPERATURE CONTROL IN EZ'S

The problem is that the two rear cylinders run too cool and the forward two run too hot. After trying virtually every suggestion in the CP, and some others, with little success, Bill and Terry decided to do some serious testing and analysis of the problem. Using an airspeed indicator as a pressure gage (remember, an airspeed is simply an accurate pressure gage with the face marked in MPH or knots instead of PSI), six 1/8" ID clear plastic hoses were run from the cockpit aft through the firewall to various positions in the cowling. These hoses were numbered and tagged on each end and the cowling ends were reinforced with 1" lengths of 1/8" OD brass tubing and securely lashed to various supports as available. The six locations tested were the top and bottom of the left two cylinders (4 places), just inside the NACA cooling inlet (5th place), and right on top of the per the plans installed oil cooler (6th place).

It really takes two people to conduct this flight test. Data was taken at a range of airspeeds and altitudes with OAT, CHT on each cylinder, oil temperature and engine RPM recorded for each set of pressure (MPH) readings. These data were then

plotted up on graph paper as a function of altitude on one graph and airspeed on another. Careful examination of the numbers and graphs revealed that under all conditions tested, the rear cylinder, bottom side, consistently had the highest pressure while the rear cylinder, top side, had the lowest pressure.

Assuming all cylinders are externally essentially identical, with new identical baffling at the time of the test, then each cylinder has the same inherent resistance to air flowing through the fins. The pressure difference, bottom to top, across the forward cylinders, was much lower than the pressure difference across the rear cylinders. This results in much lower cooling air flow though the forward cylinders than the rear cylinders and, therefore, higher cylinder head temperature.

Almost all of the cooling air was going through the rear two cylinders. Basically, what happens is that the cooling air rushes in through the inlet, follows the bottom of the cowling as it swoops upward at the back till it hits the vertical rear baffle where this high velocity air is abruptly slowed down, raising its pressure. On the top side of the two rear cylinders, the lowest pressure exists due to proximity to the cowling outlet and the scavengering action of the prop. There is high pressure under the rear cylinders, low pressure on top and, presto, most of the cooling air flows through and around the rear two cylinders leaving the forward cylinders with less cooling air and much higher temperatures.

Obviously, the way to improve the cooling of the forward two cylinders was to increase the resistance to cooling air flow at the two rear cylinders. This was accomplished with some trial and error by installing temporary baffles forward of the vertical rear baffles under the two rear cylinders and cylinder heads to cover all but about 2" of the fin area of those two cylinders. With these temporary baffles wired in place, another flight test was conducted and instantly the CHT's were much closer to being even. One more iteration of even more restrictive, under-cylinder baffles permanently solved the cylinder head problem.

The oil temperature problem, however, still existed on this 0-320 powered Long-EZ. Many ideas were tried. Some helped a little but nothing cured the problem until a second oil cooler was added on the right side. A "brute force" method to be sure, but one that worked incredibly well, although not too elegantly.

We would like to thank Bill Freeman and Terry Yake (both Long-EZ builders/flyers) for the above information and we can verify how well this method works on CHT problems based on personal experience. With a little "cut and try", all four cylinders can be within a couple of degrees of each other in level flight. Some differences still exist while in a steep climb but small compared to what we saw before. Obviously, it is essential to have a 4 cylinder CHT gauge installed in order to safely conduct these tests. Also, very important: keep in mind that, depending on the condition of the engine, indeed of each individual cylinder, you may have slightly different baffling requirements for your engine, or even each cylinder, than someone else has. Approach this test methodically and you will have excellent results.

ED: BURT WANTED TO SHARE THIS LETTER WITH ALL EZ OPERATORS.

To: James Vliet
From: Burt Rutan
Subject: Your request for my comment re: Suitability of the Long-EZ for pylon racing.

First of all, please understand that I do not build Long-EZs. Each one is manufactured by a separate individual or group and he is responsible for determining what are the safe uses for his product. Each Long-EZ is different since there are no conformal drawing requirements and no FAA conformal checks. I do have extensive experience in testing and operating my own Long-EZ. I do report the results of these tests, and operational experiences of others, via the owners manual and newsletters. This information is helpful to Long-EZ builders in deciding how to limit his operation, however, each builder/flyer has a different experience base and capability, thus each must decide for himself how to operate his own machine.

The information I provide shows operational limitations I have found to be safe for the Long-EZ using the Lycoming 0-235 or Continental 0-200 engines for gross weights up to 1425 lbs., speeds to 190 knots calibrated, and maneuver G's to 5.0. I have not operated the Long-EZ in pylon racing and thus, cannot recommend it per se. I do have a few reservations though, as listed in the following:

1. The forward-downward visibility and sideward-downward visibility is somewhat limited which could result in a mid-air collision when turning inside another pylon racer from behind or from one side. If I had designed the aircraft for pylon racing, I would have provided a more extended field of view.

2. Racing, by its nature, results in propulsion operation at the limits of capability, resulting in a significantly higher failure rate. This occurs when close to the ground. Thus, it is anticipated that engine-out landings will frequently occur. While the Long-EZ is a relatively good glider, its stall speed (56 to 65 knots depending on homebuilder variances) is relatively fast and thus, engine-out landings, particularly off-runway, will be hazardous.

3. Those who normally operate their Long-EZs as intended, ie, non-aerobatic, cross-country, efficient transportation, may be encouraged to operate beyond their capabilities after viewing a Long-EZ pylon race.

I am sure that with due consideration of all safety issues, the Long-EZ could be raced with a safety level similar to Formula One, however, that operation is considerably more hazardous then cross-country transportation and all involved must consider the hazards and requirements to fly with professional skills and attitudes.

Best wishes, Burt Rutan

ROCKER COVER OIL LEAKS?

Burt's Catbird, N187RA, had moderate oil leaks at all four rocker covers. This is an TIO-360, 210 hp, angle valve Lycoming. We removed the rocker covers and the standard cork gaskets had flattened down to nothing at each attach screw and all were leaking badly.

A call to Doug Price of REAL GASKETS initially caused a bit of confusion as to exactly what gaskets were required. Apparently this engine is an oddball, updraft cooled with inlets on the bottom and exhausts on top. Turned out Doug had the gaskets in stock. He shipped them out UPS Red Label and we had them the next morning here in Mojave, in time to install them during lunch hour.

The rocker covers, themselves, were carefully scraped clean then polished with a Scotch Brite. The cork gaskets were peeled and scraped off the tops of each cylinder using a worn out wood chisel. This surface was then also polished with a Scotch Brite.

Now, and this is the critical part, we cleaned both surfaces with paper towel saturated in Acetone. (MEK would also be good). It is extremely important that all traces of oil are removed from the surfaces that these silicone gaskets will seat on, otherwise the silicone will extrude out from between the rocker cover and cylinder head. We used several fresh pieces of paper towel until there was no trace of oil. The screws were also cleaned in Acetone then each screw was treated with one drop of removable Locktite (Blue). The gaskets and rocker covers were installed and the screws were tightened with a large screw driver and a firm hand. (Don't know the exact torque, but the screws were tight). There should be no reason to have to keep tightening these screws each time you check in your cowl. If there are no oil leaks, leave these screws alone! Voila! No more leaks. Burt's Defiant has "Real" rocker cover gaskets, as does Mike and Sally's Long-EZ, and there has never been a drop of oil leaking from these rocker covers in over four years.

FOR SALE

Sport Flite Exhaust with carb heat muff, 175 hours - $100.00

Original carb heat valve from Aircraft Spruce - never used - $30.00.

Contact: Dan Worlz
818-366-8803

Nose gear crank ratchet.

We cannot say enough about this truly clever device. Once you fly it, you will wonder how you ever did without it. It locks the gear in the up and locked position while in flight, and at the flip of a tiny lever, allows you to crank the gear down where the ratchet locks the gear into the down and locked, over-center position - no more chance of the nose gear vibrating out of the over-center position and stripping the worm gear. This gadget is simple, incredibly effective and easy to install

Contact: Curt Smith
5114 Canaan Center Rd.
Wooster, OH 44691
216-345-7721
Send a check for $34.95 to cover cost and shipping.

Center of gravity computer program.

Works on any IBM compatible - a neat, simple, "VariEze"-to-use program which instantly calculates your CG on a VariEze or Long-EZ and gives you a printout of the data. Jim has recently improved the program making it more user friendly. Send $5.00 and specify 5-1/4" floppy or 3-1/2" disc.

Contact: James H. Langley
245 E. Kimberly Street
Republic, MO 65738
417-732-1143

Heavy Duty Nose Gear Strut Spring

If your shock strut does not stay all the way up with you in the pilot seat, you may want to consider one of these springs designed and tested by Nat Puffer, designer of the Cozy. We are told by the people at Danley Die Set that the springs are still available and they do sell to individuals but need cash or credit card when an order is placed. Ask for Catalog #9-2416-36

Contact: Danley Die Set
3019 South Tanager
Los Angeles, CA 90040
800-243-2659

WANTED

Used Saf-T-Poxy Ration Pump.

Contact: Ron Ulbrich
2539 Camino Cabestro
Santa Fe, NM 87505
505-471-8148 (H)
505-471-3232 Ext. 230 (W)

AUTO FUSE USERS

Many builders/flyers are now using the small ATO or ATC auto fuses instead of the expensive, bulky aviation-type circuit breakers. Mike has used these for nearly five years in his Long-Ez with excellent service results. The only drawback is the fact that you have to remove a fuse to check it.

Well, that problem has just been fixed! EZ builder, Jack Mulqueen has sent us a stack of information on a direct replacement for ATO and ATC auto fuses which is a tiny resetable circuit breaker! The company is Snap Action, Inc. They currently have a $100.00 minimum order. The VB3-M circuit breakers cost $4.00 each in quantities of less than 100 and $3.05 each in 100 or more. They have a phone (201-654-4380) for information. The model we believe will work well is Snap Action Model VB3-M, a manual, resetable, push-in-type circuit breaker that is only a little bigger than the standard ATO auto fuse. Snap Action is also coming out with an even smaller model, the Mini Model "T". Not available yet but reportedly will be soon. Stay tuned.

SHOPPING

TSO'd, Silicon Rocker Cover Gaskets - to fit all models of Lycoming and Continental engines.
Contact: Doug Price
Real Gasket Corp.
PO Box 1366
Laurel, MS 39441-1366
800-635-REAL
601-649-0702

Canard Pusher Digest - Stet Elliott's *Canard Pusher Digest for the Long-EZ* is still available. The Canard Pusher Digest is basically a recompilation of information from CP24-CP65 into chapters that correspond to chapters of the Long-EZ plans. (For a complete description of the Digest, See CP57). Not that the Digest is for builders and flyers of the Long-EZ only! The Digest does not support other RAF designs.

Quarterly updates to the Digest are also available. These updates provide additional information from newly published CPs to bring the Digest current.

CP Digest for the Long-EZ. $67.00
Overseas orders add $20.00 for airmail, otherwise, it will be sent via surface vessel.
Annual Update subscription. $25.00
(4 updates)

Overseas orders add $5.00 for postage
Send payment to Stet's new address below:

Stet Elliott
5322 W. Melric Dr.
Santa Ana, CA 92704
714-839-4156

VariEze Index from CP10 through CP64 lists all plans changes as well as all suggestions, problems, etc. For any VariEze builder, this is a must. Bill sells it a couple of different ways. You can buy just the printed book for $20.00 or you can get the book plus a 5-1/4" IBM compatible floppy disc with a delimited ASCII listing of the data base (or optional PFS professional file data file). Specify which you would want, for $24.00. This index will be updated annually.
Contact: Bill Greer
222 McLennan Dr.
Fayetteville, NY 13066
315-637-3795

CHECK YOUR BELHORN PLANS

Some of the flush rudder belhorn plans shipped from RAF did not contain page A5. Please check your set of plans and notify us so we may send you the required page of drawings. We apologize for this error. (Joan did it).

RAF RECOMMENDED SUPPLIERS

Aircraft Spruce
PO Box 424
Fullerton, CA 92632
714-870-7551

Wicks Aircraft
410 Pine Street
Highland, IL 62249
618-654-7447

FeatherLite
PO Box 781
Boonville, CA 95415
707-895-2718

Brock Mfg.
11852 Western Ave.
Stanton, CA 90680
714-898-4366

These suppliers are still the only authorized RAF dealers for all your various aircraft materials and components.

PROPS FOR EZ'S AND DEFIANTS

RAF recommends the following prop manufacturers:

Bruce Tifft
B&T Props
75872 Mosby Creek Rd.
Cottage Grove, OR 97424
503-942-7068

Ted Hendrickson
PO Box 824
Concrete, WA 98237
206-853-8947

WANTED

I am using a high tension hot wire designed by Tom Berkley who also supplied some components including the wire. The last known address I have for him is: A Berkley Design
PO Box 6184
Tehachapi, CA 93561
805-822-5065
I have sent him money for replacement wire, follow-up letters and phone calls. Tom does not seem to exist anymore. Does anyone out there know his whereabouts? Can anyone supply .041 diameter 17-7PH spring temper wire or its equivalent? I have been unable to find anything like it and all substitutes I have tried have failed - Help!

Contact: Randy Blanchard
2307 98th Ave., SW
Calgary, Alberta T2V 4S7
Canada

ED: RAF has received a number of requests similar to the one above. Anyone knowing of Tom's whereabouts or of a supply of the wire, please let RAF know.

NEW ELECTRONIC INSTRUMENT

RAF has received several enthusiastic reports on the Rocky Mountain Instruments Micro Encoder featured in Avionics Review, Jan. 1991. While we have not tested one ourselves, at least one EZ builder/flyer whom we trust is very excited about this instrument. Scaled Composites has ordered one. One of the engineers at Scaled will be putting the kit together and it will be installed in ARES. If it works well, it may be used in other Scaled test aircraft. Mike Melvill and Doug Shane will be flying the unit in ARES and we will publish a report about the Micro Encoder in the next CP.

It is a 3.2"x3.2"x7.5" box that fits into a standard 3-1/8" instrument hole and gives airspeed, altitude, rate-of-climb, outside air temperature and will connect to any transponder and altitude encoder. It also gives true airspeed, true air temperature and density altitude at the touch of a button. Many user-programable features, like Vne, Vno, max. gear extend, max. flap extend, stall speed warning. Also, selectable rate-of-climb from 1000 to 6000 feet per minute with trend indicators on airspeed and rate-of-climb. Sounds almost too good to be true! Stay tuned.

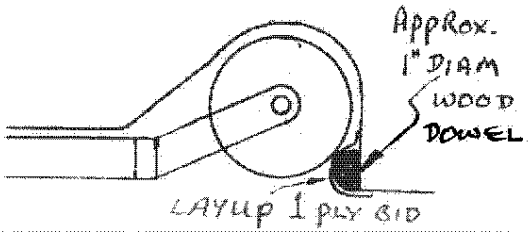
PLANS CHANGES AND OTHER IMPORTANT MAINTENANCE INFORMATION

VARIVIGGEN ---------- NO CHANGES
VARIEZE --------- MANDATORY INSPECTION OF
LONG-EZ ---------ELEVATOR LEADING EDGES -
DEFIANT ----------SEE ARTICLE ON PAGE 2
SOLITAIRE---------THIS CP

Since RAF is no longer active in the development of homebuilts, we are not likely to discover many new errors or omissions in the plans. For this reason, we need your help. Please submit any significant plans changes that you may come across as you go through the building process.

A NEAT IDEA FROM KEN CLUNIS

This is my fix to keep the nose wheel from vibrating down inadvertently in flight. It also serves as a tire pressure gauge! The tire must roll over the 1/2 round, and the amount of force is proportional to the tire pressure. It works and is easy to make and install.



THROTTLE/CARB PROBLEMS ON A VARIEZE

"Dear RAF,

Enclosed is requested survey information on our VariEze, N222HK, SN 222. We are the original builders and continue to maintain and fly this thoroughly enjoyable aircraft. During our eight years of such, 222HK has proved to be remarkably free of serious problems. It has flown five times Utica, NY to Oshkosh. There are a couple of things I would like to relate, however.

The most sever problem which I can recall was with the throttle carburetor control. Very small diameter portals built into the carb (Marvel Shebler mounted on a Continental 0-200) became clogged to such an extent that they created hydraulic back pressure on the primer piston. The result was very sluggish response of the actuator arm on the carburetor with the following consequences: Failure to provide adequate prime on opening the throttle, this made for hard starting. Failure of the two springs to quickly

move the throttle arm to full open on demand, - a serious problem in the event of a go around. Failure of the cable to push the throttle arm to full open.

During servicing the aircraft, I noticed when opening the throttle using the control handle the cable actually buckled up and the arm did not move. Probably with the engine running vibration caused the arm to move slowly and would only be noticed in the event a sudden surge of power was demanded. I believe the change was a slow process and very subtle indeed.

Disassembly of the carburetor revealed the clogged portal and the fact that the fuel injection piston could not force a stream of fuel into the carburetor during prime. I do not know what material caused the clogging, perhaps a small residue of epoxy.

Whenever the cowl is removed, a simple check can be made to insure that the carburetor arm responds quickly when the throttle handle is advanced. It may take two people to do this.

A second issue involves small particle fuel contamination which has been virtually eliminated in 222HK by installation of an in-line auto fuel filter. We didn't like the heavy gascolator so installed three low point quick drains and the filter. The filter is a glass enclosed cylinder about 1 inch dia. x 4 inches long and easy to service. The clear glass allows visual inspection whenever the cowl is removed. We have found particulates such as Teflon, fiberglass and other unknowns in spite of thoroughly cleaning all tanks before placing in service.

As original builders, we greatly appreciate the tremendous job you have undertaken in keeping us informed. We have built two more aircraft, a Kitfox Model I and a Zenair STOL 701. Neither of these can compare with the service we have received from you. Please accept our heartfelt thanks and keep it going as long as possible.

Sincerely,
Charles M. Hewison"

EDITOR"S NOTE: We certainly appreciate Charles' experiences, but instead of the in-line auto fuel filter we would recommend a Kinsler in-line fuel filter. These are available from:

Kinsler Fuel Injection
313-362-1145

The filter assembly, part #9020, costs $85.00 and extra filters, part #9023, costs $8.00 each.

These are quality parts, machined from solid aluminum and have Dash 6 (3/8") AN flared fittings machined on to each end. The internal paper filter is replaceable (Kinsler part #9023) and can be cut apart to look for particulates at each annual. These filters are made for fuel injected ingines and work very well. Mike and Sally, Doug Shane and Dick Rutan are all currently using this in-line fuel filter.

P-LEAD TO MAGNETO INCIDENT

"Dear RAF,

I took a trip last August in Norse Nomad, my Long-EZ, which has over 400 hours to date.

I had an uneventful flight to McKinney, TX from my home in Carbondale, IL to visit with my son's family. On the way home via Texarkana and Little Rock, I suddenly experienced a noticeable drop in rpm. Since I had put in 20 gallons of 100LL before departing, I suspected water in the fuel. I did a 180° turn and made it to an airport with the engine running rough and surging between 2400 and 2600 rpm's.

I removed the gascolator and found a half teaspoon of sand and sediment but no water. A quick test flight revealed that I had not found the problem. I decided to leave the Long-EZ, fly home commercially and return with a trailer. To make a long story short, when I got my Norse Nomad home, I started the engine and got a bad mag check on the right mag. The mags had checked perfectly on the previous two flights, but not now.

The culprit was a break in the shielded P-lead from the mag to the starter switch. where the wire made a 90° turn close to the switch. A single strand had cut the insulation and grounded the center electrode!

Knowing what I know now, I would have simply removed the P-lead from the mag and flown home.

This would have left me with a "hot" mag but it would have been much better than the 650 mile trailer trip! Also, I did not check the mags in the air when I had the problem. That check probably would have revealed the problem. A sudden loss of about 10% of your rpm is, in most instances, a magneto problem. Another clue was that the cylinder head temperature on my number 4 cylinder was unusually low. This plug runs off my right mag.

Hopefully, this experience may help other EZ flyers who may run into similar problems. Remember, any sudden drop in rpm, check the mags, if possible, check individual cylinder head temperatures, land and disconnect the P-leads. Watch out no one touchs the prop with the mags hot. This may get you home where you can affect proper repairs. Keep in mind that P-leads can shut you down if grounded! These wires should be shielded and installed very carefully to minimize any chance of accidental grounding.

Greeting to all at RAF,
Jake Bach"

VORTEX GENERATORS ON CANARDS.

Since Magna Liset of Oakey, Australia reported on his epoch trip across Australia, we have had numerous requests for information on his modification (vortex generators).

Magna has been good enough to send us a sketch of what he did. Essentially, he glued tiny vortex generators (aluminum angles) to the top skin, forward of the elevators, approximately 40 of them on each side, at specific angles and positions This reportedly completely eliminated the annoying pitch trim changes he used to experience every time he flew into, or out of, rain or visible moisture. This was also done on the Voyager prior to world flight for the same reason.

The Roncz 1145MS canard will also achieve the same result but for anyone who might be interested in Magna's information, we can send a copy if you send a SASE with your request to RAF.

C BAYARD DU PONT'S DEFIANT

(RESEARCH NOT TESTED BY RAF)

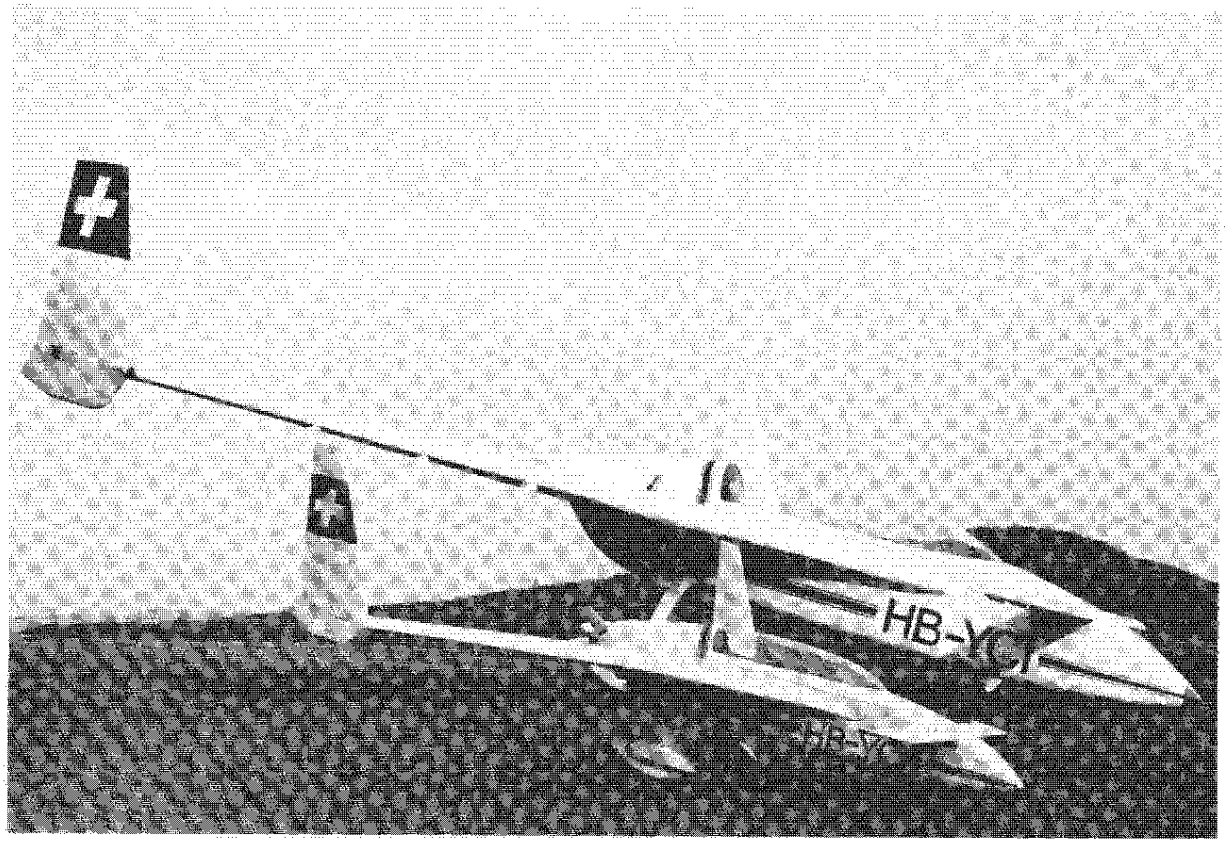
Many CP readers will remember that Bayard had planned on installing Javelin Ford engines in his Defiant. Well, on August 28, 1990, Bayard made a successful first flight on his Defiant with Javelin Ford engines swinging 71" diameter by 82" pitch Sensenich wood props. Static prop rpm is 2200 hp. The Fords turn the props at essentially the same rpm as the Lycoming would, suggesting, obviously, that the Javelin Fords probably put out around 180 hp. However, the Ford engine weighs over 100 lbs. per installation more than a 180 hp. 0-360 Lycoming. That weight does include radiators and coolant.

Bayard reports that the engines run very smoothly and appear to cool OK. So far, he only has a couple of hours on his Defiant. He says the airplane flies well and his ground crew says that it sounds just like a P-38 Lightning!

Unfortunately, on the third flight, the front engine threw a rod totally destroying the engine. The resulting single engine approach and landing in the Defiant were no problem. Bayard had completely overhauled the rear engine but did not do the front engine. He feels that a nut came loose on one of the connecting rod bolts causing the problem. He has since obtained a replacement engine and is in the process of overhauling it. He is looking forward to flying his Defiant again soon and we look forward to a report on performance and perhaps a rundown of what the costs have been to get the Javelin Fords up and running in the Defiant. How about it, Bayard, a comparison of what the Fords cost compared to a pair of overhauled 0-360 Lycomings?

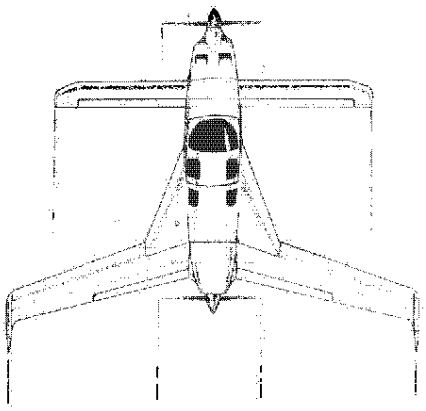
Congratulation, Bayard, on getting your Defiant in the air. As a flying testbed for an experimental engine, the Defiant probably is as reasonable a choice as you could have made.

ED: Note: Had this experiment been conducted in a single engine EZ, it would have almost certainly resulted in a serious accident.



Peter Froidevaux from Switzerland sends in this picture of his beautiful Long-EZ and it's "smaller brother". The model has a 2.6 meter wingspan and is a prize winner in scaled competition.

Rutan Aircraft Factory
Building 13, Mojave Airport
Mojave, CA 93501



TO:

January '91

The line which appears above your name lets you know through which Canard Pusher you are paid. If your label says **LAST ISSUE CP 66** then this is your last issue, and you need to renew.

CP 66