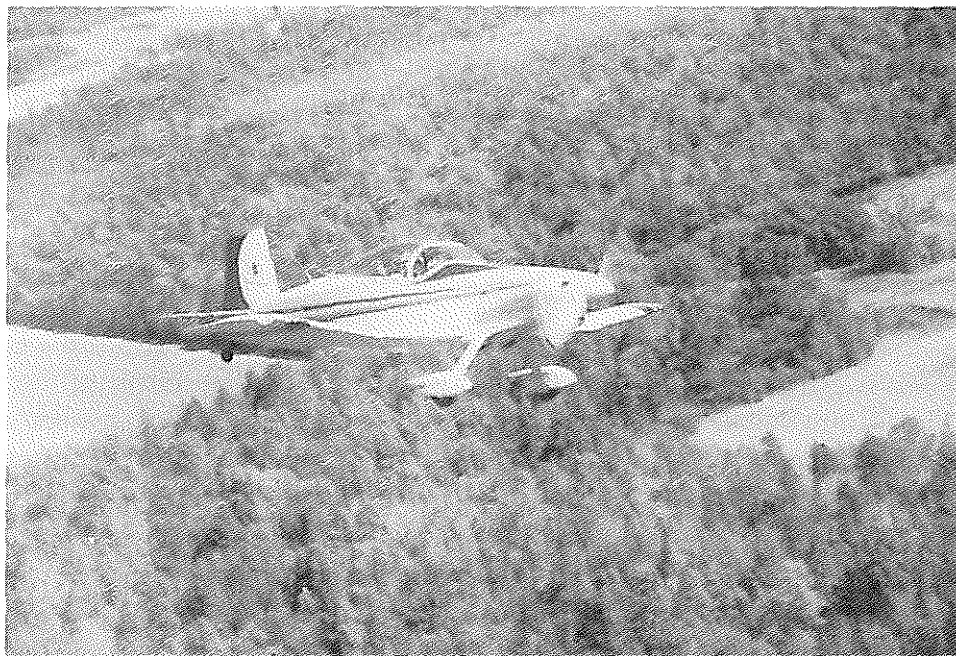


T-18 NEWSLETTER

ISSUE NUMBER 82



Jim Paine with his passenger Lee Skillman at Kentucky Dam Fall 91

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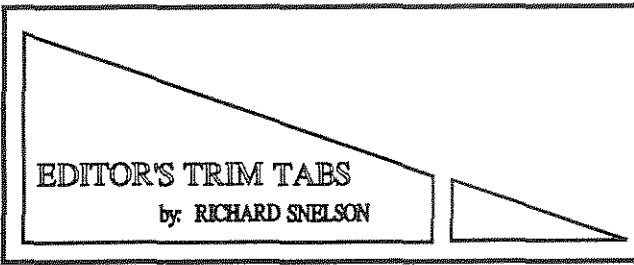
KENTUCKY DAM FALL 1991

DID YOU SHAKE YOUR TAIL TODAY by Walt Griffin

CRANKCASE BREATHER by John Evens

BUILDING TIPS AND TECHNICAL TIPS

NOTICE: (STANDARD DISCLAIMER) As always, in the past, present, and future newsletters, we would like to make you aware that this newsletter is only presented as a clearing house for ideas and opinions, or personal experiences and that anyone using these ideas, opinions, or experiences, do so at their own discretion and risk. Therefore, no responsibility or liability is expressed or implied and is without recourse against anyone.



To our members:

I hope that after reading this newsletter you will agree that it contains some fine articles. That is certainly my conclusion! Thanks! to the folks that sent them, for putting together some good material. As your editor, I have always felt that the real success of this newsletter and the T-18 Mutual Aid Society rested in it's membership and their willingness to write and tell about their building and flying experiences. Keep up the good work! Yes, we are succeeding!

The last issue, Number 81 contained an index for all the old newsletters and a Membership List. I've had a number of phone calls from all over the country about how much everyone liked both of these items. One call explained that the member had no idea that there were five other T-18ers around the state. Great! That's exactly why I put the list out. If you have any corrections please include them on the enclosed renewal form so they will be included in the next update.

I need your help with the renewals! Last year I spent a good deal of postage with second and third follow ups to get everyone signed up. Please renew now so I have the total number of members and can plan the printing and mailing arrangements. I would much rather use that postage money on better quality printing like we had for the last issue, Number 81. If you noticed the publication was in a book format and the whole piece was typeset, which makes for much better quality of print and photos. The cover photo was shot with the typeset camera and really looked good compared to some of the last newsletters which were printed on a zerox. There is no change in the dues, still \$25 dollars

per year. . By working altogether we can preserve our fine airplane and the knowledge it takes to fly and maintain it.

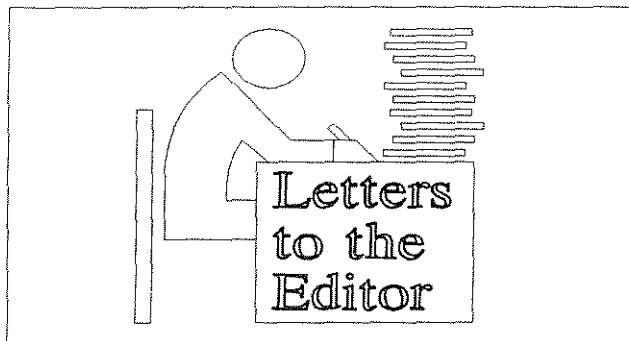
May 8, and 9 are the dates for the spring get-together at Western Hills Guest Ranch in Wagoner, Oklahoma . Be sure to read Gary Greens letter about that meeting, (in this newsletter). We all thank Gary for helping with the arrangements there.

I didn't write a specific article on the Fall 91 trip to Kentucky Dam because we're short on space for this letter. I did include a list of attendees, in this letter, and I wish to thank Jim and Judy Paine for their help in arranging that meet.

A quick status report on my ship, N295RS. I'm now installing a Terra Nav/Com with glideslope, Terra Transponder, and a Escort II for my second radio. Plans call for a Flybuddy later.. I called the airport last week and reserved a hanger for March 92 and will be working like the dickens to make that date for the first flight!! Still have a lot of finish work and detailing to complete.. and it may not be painted. But it's going flying by-gosh! I've bugged several of my T-18 buddies to death with questions, and still wind up having to do some things over by not completely thinking things through. My thanks! to those guys, they know who I mean.

Richard O. Snelson
Route 3, Box 295
Clinton, IL 61727
Phone (217) 935-4215

**For Sale: Thorp T-18 Metal Cowling \$2500
Set of wing tips \$120, wheel pants \$110,
attach brackets \$20, upper gear cuffs \$35,
Call or write to Lee Skillman
7676 Windcrest Dr, Mobile, AL
Phone (205) 633-3535**



Dear Richard:

If you recall, I had a minor problem with the starter drive being chewed up when I was at Kentucky Dam. Well after much head scratching and replacement of the starter solenoid, it was the ignition switch. The switch had an intermittent short and would try to start the engine in flight consequently chewing up starter drives. Since replacement, no more problems have occurred. The airplane is flying well, I have attended most of the fly-ins around the West Coast this summer and have really enjoyed them. The airplane won "Best Thorp T-18" at Merced. I am proud.

By the way, I have been using Auto gas for the 140 hours I've put on the airplane this year and have had absolutely no problems. I routinely fly as high as 17500 on long trips. I use Major brand 92 octane super unleaded and from Oct. 1st to March 15th they require Oxygenated additives for the air pollutions. The brand I use has MTBE added. Again no problems, It just smells bad. I haven't had to clean the plugs at all so far, which wasn't the case with 100LL. I had to clean them every 20 hours or so with that. I have 91/96 engine. The \$1.00 per gallon savings adds up over a long period. Well take care, get that airplane flying soon. Harold F. "Tommy" Thompson, 3133 Valleywood Rd. Henderson, NV. 89014

Rich, Going to Oshkosh this year (my 19th consecutive trip in my T-18 my Sensenich wood prop worked slightly loose. It had 84 hours on it since being torqued April 1. Sensenich was very good to recondition the prop free of charge. However I feel the 100 hours between torques,

as recommended by Sensenich, should be 50 hours. Sensenich was going to issue a statement on this but has not done so yet so, you might want to comment on this in your newsletter. Could you advise me on which wood prop you would buy for the 0-360 180hp? I'm considering another wood prop so that the down time can be eliminated in case I damage my prop. Several people have mentioned the Pacesetter. I'm not opposed to the Sensenich. Thanks! Gayle LeCount N5GL #719 serial.

Editors Note: You might like to write for Sensenich Bulletin #212 on Wooden Props. It's shows a W68LY68 for the 0-360 series. It's also states a Special Flanged Adapter is required for fixed pitch wooden propeller on engines of that peak torque.

Richard, Here's the \$25 for the newsletter, which will be immeasurable help in finishing this aircraft up. I still have quite a bit to finish and the information is vital so I don't have to redo some of the work and get it correct the second time.

The A/C I purchased is build from Plan 732 and has a N-number N174P, with a 150 hp Lyc. The individual who started working on it was stationed in Japan at the time and did all of the work there and when he returned here in 1972 brought it back and it remained in a barn until he (Al Pitts) sold it in 89. The two Guys who purchase it didn't do anything on it and so sold it to me in July 91. There was some info on this A/C published in Newsletter #34. Fortunately all of the modifications were made on the fuselage and the Horizontal Tail and the landing gear is extended which I understand makes it somewhat less prone to ground loop.

While I did purchase an aircraft which has most of the hard work done I still have to finish quite a bit as you can see by the photo. Hopefully will get this finished some time soon and may get a chance to meet you in person one day. Regards Paul MacMichael 4222 Juniper Dr, Tacoma, WA



N10TK FLIGHT MANUAL:

I am surprised at the demand for T-18 flight manuals, and by the LACK of information some recent T-18 buyers have on their airplanes! The note on manual pricing in the last newsletter was misleading, I am printing, binding, and shipping the manuals for \$13.00, with an additional \$2.00 charge to include a computer disk. The disks are IBM compatible with a Wordstar Professional file and an ASCII file which should be readable to any IBM based word processor. Anyone who received an early disk without the ASCII file should let me know if they need it.

STALL STRIP EXPERIMENTS:

I have been experimenting with stall strips on my T-18 and am amazed with the results. John Thorp recommended strips made from 1/2" X 1/2" aluminum extrusion 8" long. John mounted them half way out on the wing center section leading edge. I tried these and was amazed at the overwhelming pre-stall buffet and the complete elimination of any stall break!

I experimented with different stall strip sizes and locations to develop the smallest possible set which yields a gentle stall at any C.G. without noticeably increasing minimum controllable airspeed. The resulting strips are 5-1/2" long and 3/8" by 3/8" in cross section. The strips are located mid span on my center section (non-folding wing) and 3/16" above the wing chord line. Positioning tolerance is not critical, vertical movement of 1/8" or more is required to produce noticeable change in stall behavior. Balsa wood and Duct tape were used for the test

strips.

The strips stall before the rest of the wing, resulting in partial loss of lift which drops the nose. The span-wise location of the strips is ahead of the horizontal tail. When the stall strips trigger a local stall, the horizontal tail is flying in the resulting turbulent wake. The turbulence results in very strong stick shake to provide warning of impending stall, and the interruption of smooth wing downwash on the tail reduces tail download and lowers the nose. Pulling back harder on the stick drives the stall strips deeper into stall further increasing buffet and increasing the pitch down (recovery) tendency.

The stall strip effects are C.G. dependent. I have tuned mine to yield fairly gentle behavior at aft C.G., which yields VERY gentle behavior at forward C.G.. At forward C.G., power off and flaps up, the aircraft will decelerate to heavy buffet at 65, slow to 63 as the stick is pulled aft, then drop the nose slightly and ACCELERATE to 75 mph as the stick hits the aft stop. With full aft stick the aircraft buffets and descends at 75 mph and 1200 fpm in full control. Flying 45 Degree banks and abrupt maneuvering are no problem and easing the stick forward one inch results in instant recovery to a normal 75 mph glide at 800 rpm.

All other stalls are more "normal" and very gentle. The following are excerpts from a portion of the pilot card I flew to test each stall strip configuration:

SOLO (Forward C.G.)

FULL POWER, CLEAN

Lots of buffet, nose bobs up and down with full aft stick, can be made to break right if controls are abused.

POWER OFF, CLEAN

Lots of buffet, can be maneuvered with full aft stick in a

1200 fpm descent. Crossed controls no problem.

POWER OFF, FULL FLAP

Nose bobs up and down with full aft stick. No break occurs, all controls effective, crossed controls no problem.

POWER OFF, FULL FLAP, FULL PEDAL FORWARD SLIP

Buffet increases with aft stick, rudder overpowers the ailerons and the aircraft rolls gently towards wings level. Releasing back pressure yields instant recovery.

Partial power stalls are similar, all stall conditions were tested with at least one ball deflection right and left skidding flight.

AFT CG:

FULL POWER, CLEAN

LOTS of buffet, will break right if pilot persists and the stick is pulled full aft. Ample warning provided.

POWER OFF, CLEAN

LOTS of buffet, can be made to break if controls are abused at full aft stick.

POWER OFF, FULL FLAP

Buffets at 65, drops nose and enters steady descent at 75 mph and 1800 fpm. Can be maneuvered, but can be made to break with control abuse.

POWER OFF, FULL FLAP, FULL PEDAL FORWARD SLIP

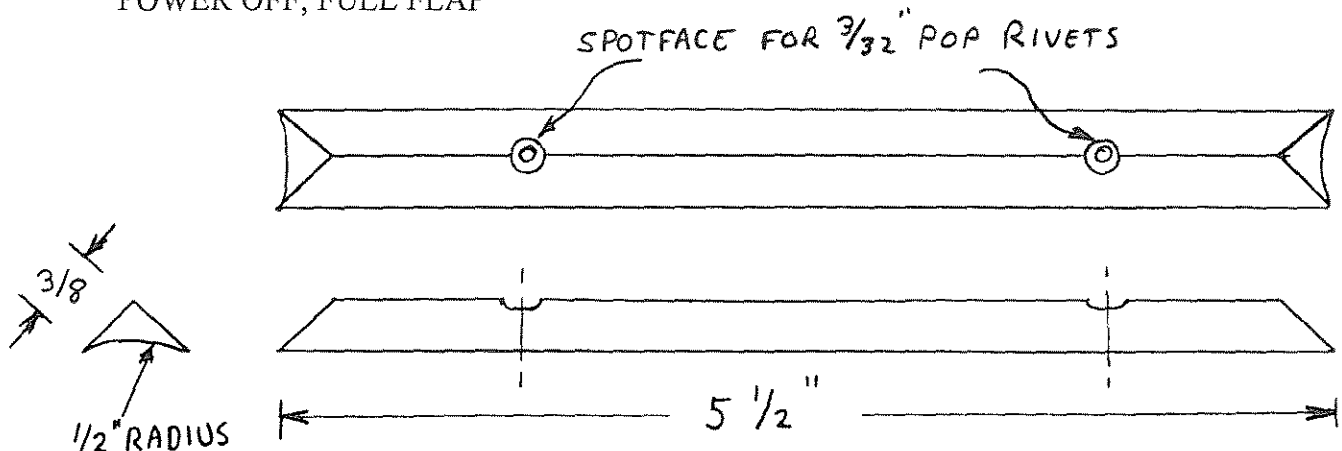
Buffet increases with aft stick, rudder overpowers the ailerons and the aircraft rolls gently towards wings level. Releasing back pressure yields instant recovery.

Intentional spins have not been flown in N10TK with or without the stall strips.

The stall strips produced very similar results when installed on Jim Borgs T-18 N80RG.

CONCLUSIONS:

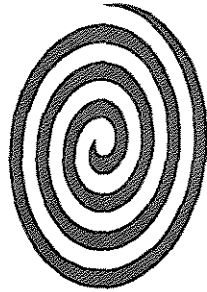
Three other pilots have stalled N10TK with and without the stall strips. The consensus is that without the strips, N10TK stalls sharper than any factory builds we had flown and provides very little buffet warning. WITH the stall strips, the stall is extremely benign with ample, strong warning. Configured with stall strips, there is virtually no chance that a pilot would unknowingly pull the aircraft all the way to a stall, and if the stall is actually reached, the stall is benign and does not constitute a hazard.



SPINNERS

& OTHER T-18 TIPS

by Bob Highley



What a great time we had at the 1991 Fall T-18 gathering at Kentucky Dam. My vote is that we do it there in the Fall next year over the same three day weekend.

Here are some of the "How I Did Its" I promised you at the Fall Happening.

SPINNER I have a Hartzell constant speed prop with one of Ken Brock's spinners. It was originally installed per his instructions but at about thirty-five hours it developed some cracks at the mounting screws that then started going around the circumference from screw to screw. The spinner had no wobble and the backplate seemed secure. I discovered later that my tach read 175-200 RPMs low and I had previously adjusted the prop stops to get proper take-off RPM. I suspect a combination of high RPM and the rather large blade cutout holes were too much for the spinner. (Yes Virginia, I did talk to the prop man and found that I had come close to prop overspeed but had not exceeded it.)

On to the fix. I cut about 5/8" off all the way around the spinner shell and punched new holes. With the cowling removed, you can position a "one-handed" center punch through the existing nut plates and make a mark. Then, using your Whitney punch, make stress-free holes for the screws. Next, I made gap fillers for the blade holes out of .63 alclad. These just slip between the spinner itself and the backplate. They have a couple of nutplates on each side and also catch the end holes at the cutout in the spinner. A 10/32 screw and nutplate centered on the backplate behind the blade completes the installation. (See drawing #1.)

Then, I decided that a front bulkhead was neces-

sary. Locating where the prop hub is inside the spinner is a MAJOR pain. I took some rough measurements of the inside of the spinner in the vicinity of the hub when installed and turned a male form block on my Shopsmith. A back-up block was also turned. I chucked up a round piece of .040 6061 T4 and began to learn the fine art of aluminum spinning. (My hat is truly off to Kenny Brock, now.) I found the trick here is to anneal the piece often as you go and the flange you are forming will lay right down. In this case, I used a welding torch set rich (black smoke) and played it on the piece while it was turning. Ultimate strength is not the object here, shape is. The formed piece now looked like a pie plate that just fit into the spinner at the location of the prop dome. The next part is the real trick to this whole thing. I got some heat formable ABS .190 plastic (Kydex) sheet and formed a sleeve with a flange that slips over the end of the prop dome. This involved a holding fixture and a male plug all made out of wood on the Shopsmith. This was then riveted to the pie plate. (See dwg #2.) The whole thing was then epoxied into the spinner with a stuff called PC-7. Available in hardware stores, this comes in what appears to be two 35MM film cans held together with a paper tube. I have used PC-7 all over the airplane to include holding the vent tube on my fiberglass gas tank. The spinner now has over 535 hours with no sign of problems.

ENGINE MOUNT After about 150 hours, I discovered a crack where the spools are welded to the ring tube on my dynafocal mount. I had modified the mount to clear the rear mounted carb on the O-360 A1G6 Lycoming. This undoubtedly put radial stress on the ring and the standard butt welds were just not up to the task. This was fixed by adopting a Mooney procedure called out in one of their AD notes. Sorry I don't have the number but it involved welding a fillet plate between the tube and the spool. (See dwg #3.) By the way, these cracks were caught on a preflight (cowl cheeks off) because I had painted the mount an off-white instead of the normal black. The crack had not progressed completely around the tube but was plainly

visible. I wholeheartedly recommend painting the motor mount a light color. This applies to the flight control weldments, too.

AILERONS I had a serendipitous occurrence with my ailerons that might help some other T-18er. From the outset my airplane flew virtually hands off. However, at 170 mph and above, roll control became very stiff. Other Thorps I had flown also exhibited this tendency. I discussed this with Lu Sunderland and he said that this was just a Thorp idiosyncrasy and since the airplane was originally designed for 150 mph cruise, this was to be expected. Well, I learned to live with it until I noticed that the ailerons flexed quite a bit during hard rolls. Since I really enjoy formation flying and other performance oriented maneuvers, I really needed to fix this. I never really liked my ailerons since they were the first parts I made and my quality control was a bit lacking. I made a new set with the following changes to the plans (yes, I accept full responsibility for my actions): upped the skin and stiffener thickness to .020; made the skins from one piece with a bent up trailing edge (see dwg #4); and installed a trim tab outboard on the right aileron. Now it really does fly hands off, with or without a passenger. The most pleasant part of this whole thing was that the airplane can now be flown with just fingertip pressure right up to redline. This is due to a "fatter trailing edge." I have since noticed "fat" edges on competition Pitts' and even the Super King Air has bulbs built into the ailerons. Making a few test strips and bending them on your particular brake will aide in determining where the bends will fall and thus what the dimensions for the skin should be.

Bill Williams has even made one piece flap skins in this manner. (Hint: The grain of the metal must go chord-wise. Also, buy more aluminum than you think you will need; mistakes are not only expensive but also time consuming if you have to reorder.)

WIRING Watch how you route your wiring, with particular attention to the proximity of the alternator lead and the instrument leads. I had a very short first flight due to a high cylinder head temp reading. It turned out to be caused by

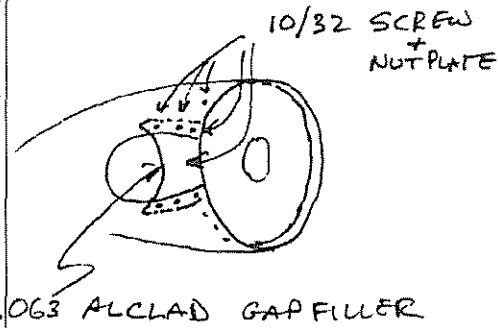
induced voltage between wires I had neatly bundled to go through the firewall. Keep the low voltage probes separate from other wires. Quick disconnects installed from the start will also save you time when disassembling for later inspections and modifications. Crimped-on terminals can be a source of corrosion induced open circuits, though. Do a thorough wiring job the first time or you will end up doing it again. Voice of experience here.

OTHER TIPS Temperfoam for the seats is worth the price. Round off (for hip comfort) and reinforce the tunnel in between the seats so it can be used as a step. (See dwg #5.) Reinforce the top of the deck behind the seatback with a transverse stiffener as this is the one place every passenger wants to steady himself when getting in an out of the plane. (See dwg #6.) I highly recommend the Sunderland style cutout of the deck over the baggage area - it allows inflight access and makes it whole lot easier to load and unload. Don't use "Herculon" for upholstery; it won't stand up in the sun. Be extremely careful with zinc chromate or for that matter any of the exotic products used for metal protection. Journals of industrial medicine have documented the effects of long term exposure since the World War Two era. The medical text pictures alone are enough to scare you off. That's all for now. I will try to send more as I remember how it was done. A final word: Stick with the project, it is worth every cut, burn, hour and dollar spent. Bob Highley

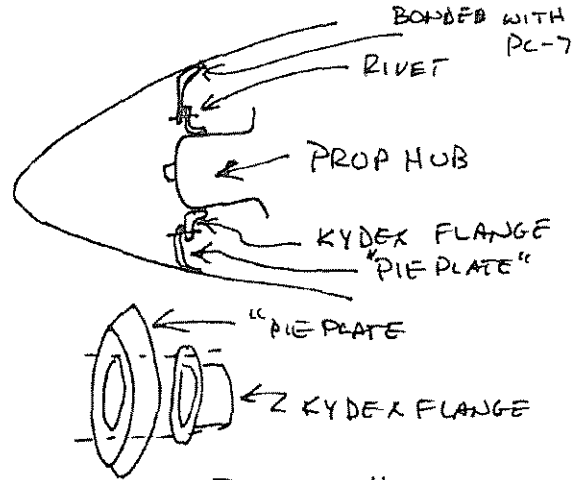
EDITOR'S NOTE Tools, Tools

If you didn't drop in and meet Bob Avery of Avery Tools while you were at Oshkosh, you really should give him a call and get his tool catalog. I'm now using a number of his tools in my shop and they are great. Each item is quality built. For example rivet set with all sides and corners polished and rounded. Extra care on everything. What a pleasure to find a business man that is concerned and willing to spend his time solving our tool and building problems. His phone is (817) 267-9407

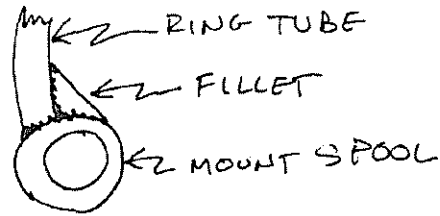
Bob Highley Drawings



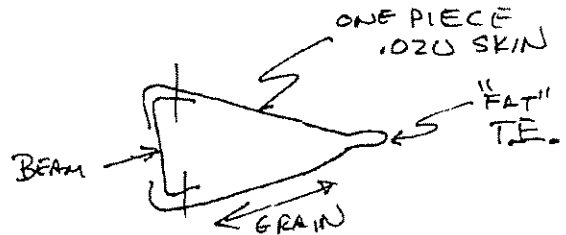
DWG #1



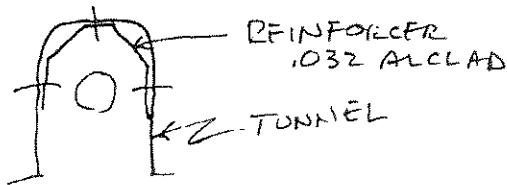
DWG #2



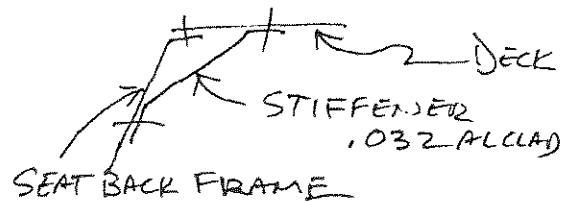
DWG #3



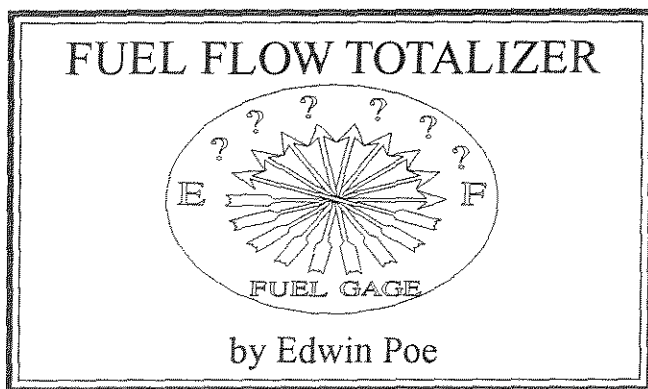
DWG #4



DWG #5



DWG #6



I was very unhappy with the fuel gauge on my T-18. It was the standard Stewart Warner gauge driven by a reostat attached to a float. The gauge doesn't read empty when the tank is empty or full when the tank is full. The scale is only about an inch long and marked at the quarter scale points. Even if the gauge and sender were perfect the peculiar shape of the tank would introduce a major non linearity. I tried several ideas involving an electronic amplifier between the reostat and the gauge which would allow me to calibrate the zero and full points and to adjust the gain in a non linear way to correspond to the tank shape. I didn't have much luck as the package got large and complicated. I still couldn't do anything about the low resolution gauge. The best idea was to use one of the commercially available fuel flow instruments. These give lots of information such a fuel used, fuel left, fuel flow rate, time left, baseball scores and several other things I really didn't need. And they were EXPENSIVE. I don't object to lots of information I just couldn't afford it. So I built my own and kept the cost down by only keeping track of the fuel used. My total cost was about \$200 most of which was for the fuel flow transducer. My totalizer uses the fuel flow transducer manufactured by FLOSCAN Instrument Company Inc. My panel indicator is a 12 volt 3 decade mechanical counter with a front reset. The advantage of a mechanical counter over an electronic counter is its intrinsic memory when power is turned off. The electronics package schematic is shown with component sizes. I am not a circuit engineer and

suspect that there is a better, cheaper, more reliable way to accomplish the objective. However this works and is in use in my T-18 and I like it.

THEORY OF OPERATION

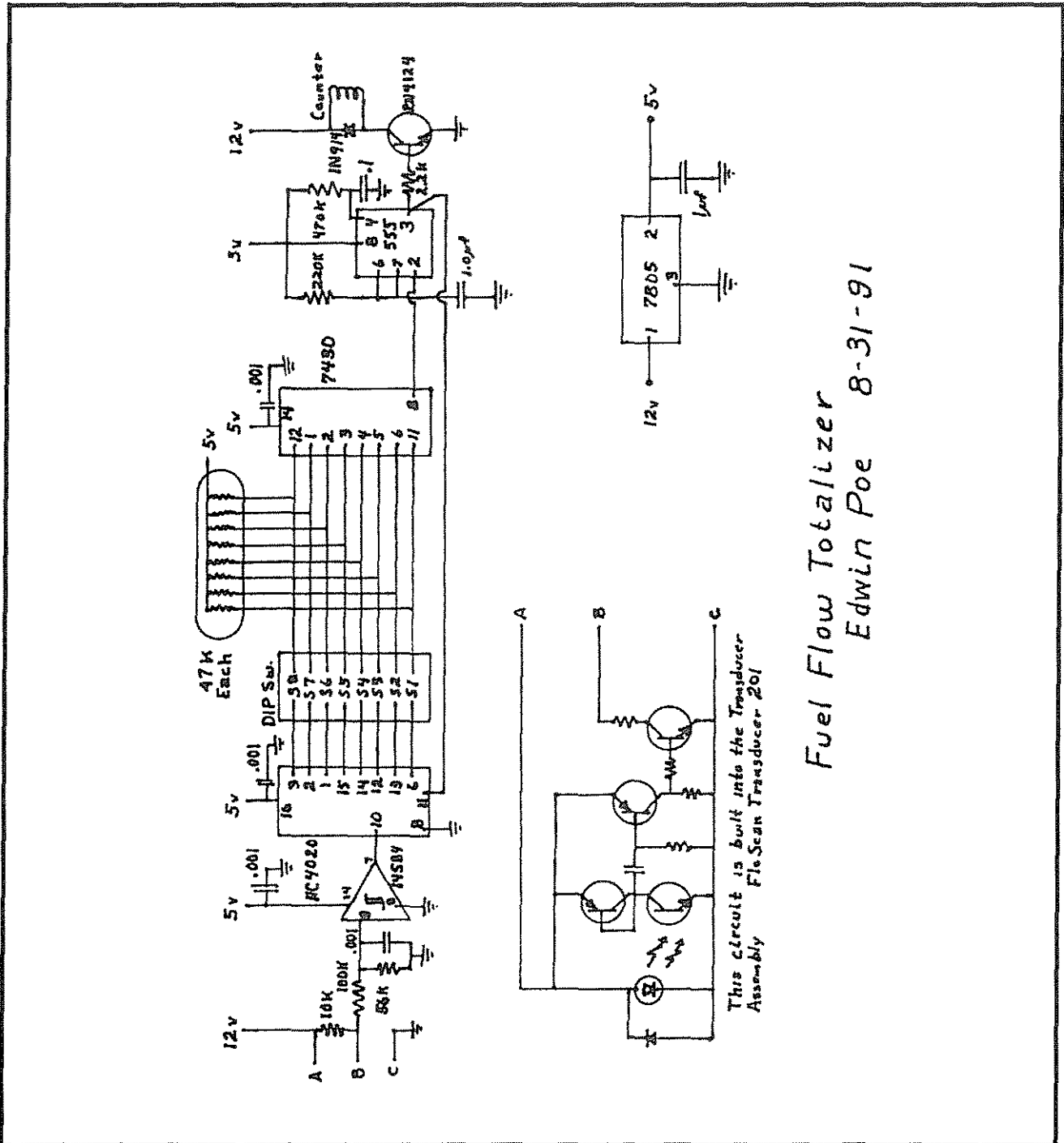
The fuel flow transducer is installed in the fuel line just before it enters the carb. As fuel passes through the transducer a number of pulses are generated proportional to the amount of fuel. This will vary but is in the neighborhood of 100,000 pulses per gallon. Due to the pressure drop across the transducer it would not be suitable for use in a gravity feed system. Since I want a panel indication for each tenth of a gallon all I have to do is count 10,000 pulses and trigger the counter. I don't want a fixed count counter since there is a need to calibrate the instrument to the exact output of the individual counter and installation. There is some signal shaping in the transducer itself giving a square wave output from 1v to 12v. This signal is sent via cable (I used shielded) to the electronics board where it is inverted and level adjusted by a schmidt trigger for input to a 14 stage binary counter. The 8 most significant digits are connected to a DIP switch. The output of the switch is connected to an 8 bit nand gate. I installed a 47K pull up resistor on each input to the nand gate. By setting the dip switch to the desired binary number the counter will keep at least one bit low until the exact count is reached. When the nand gate is satisfied an output is generated. (My counter is presently set to give one pulse out for each 9408 pulses in.) The output from the nand gate starts a 555 connected as a one shot. This serves as a pulse stretcher and provides an output to reset the counter to zero and a pulse to the transistor driver to set the counter. A voltage regulator is installed to generate 5v. The IC's were obtained from Digi-Key but should be available from any electronics dealer. (Radio Shack will not have most of the IC's.) The unit was built on a Radio Shack proto board 276-168 with room to spare. I found a 3 decade counter in a local junk store and have no idea how to get any more. However I did operate the unit with the Radio Shack counter 277-222 which works

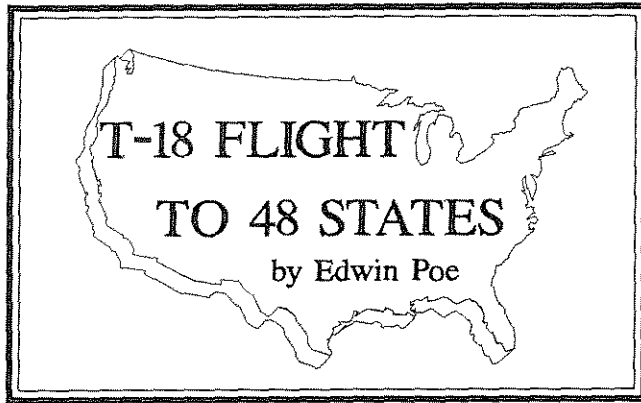
very well. The only thing is it has too many decades. I suppose you could modify the circuit and count each 1/100 gallon and amaze your friends or just paint over the decades not in use.

Operation

Each time I fill the tank I push the reset to set the counter to zero. The system is wired directly to the 12v bus so it cannot be turned off. As I

fly the counter counts off the fuel I have used. I know I have a 29.6 gallon tank and therefore can always tell how much fuel I have left. When first put into use the accuracy will be off. I reset the dip switch after each filling to correct the error. It takes a few tanks of gas to get the calibration correct but from then on the counter will generally agree with the gas truck counter within a few tenths of a gallon.





Diary of Thorp T-18 flight to 32 states by Bill Mixon and Edwin Poe. June 18, 1990 through June 27, 1990. This trip was part of a series of flights to accomplish a full stop landing in each of the lower 48 states.

*June 18, 1990 Deer Valley, AZ to New Braunfels TX
Flying time 6:00*

Loaded T-18 to approximately 1540 pounds with about 40 pounds in the baggage compartment and 10 pounds under the seats. This kept the aft CG just ahead of the neutral point when the fuel had been burned down to 8 gallons. Experience on the trip showed a significant reduction in pitch stability when slowing down to land after a long flight. (The pilot and copilot each weighed about 185 pounds.) Although the takeoff weight exceeded the design gross weight of 1500 pounds it was never necessary to land over gross. The few high altitude airports were no problem for the T-18. The first thing noticed as we prepared for the start of the trip was that the recently worked on intercomm would not work. It had been checked on installation by checking only the pilot position assuming that if it worked there then the copilot position would work too. Shortly after departure and transit of the PHX TCA it was apparent that the Alpha 200B Omni was very insensitive and would not be useful. The set had been working very well the last time I checked. (The VOR is seldom used in local flying in Arizona since the mountains combined with 75 mile visibility make visual navigation much easier.) Since the new Loran didn't work very well in the desert southwest this put us into the mode of navigation by highways with a sectional in the lap. Even so the

days flight to New Braunfels Texas with stops at Demming New Mexico and Fort Stockton Texas went very well and we arrived within minutes of the flight plan. Bill's brother met us at the airport and we spent a pleasant evening at his house. The Loran was working the gulf chain by the time we reached New Braunfels.

*June 19, New Braunfels TX to Griffin GA.
Flying time 7:27*

Early departure from New Braunfels caused us to fly directly into the sun on a very hazy day. To get above the haze would result in almost total loss of visual contact with the ground so we stayed low. Even so the horizon over the nose was lost in the haze. It was actually easier to fly on partial panel (I don't have an artificial horizon installed) even though we probably had 5 miles visibility. Somewhere along this leg the frequency display on the Apollo 706 communications radio decided to quit. The radio worked OK but you had to remember which frequency you had keyed in. We stopped at Chennault airport (near Lake Charles La) which sports a control tower even though I never saw another plane land or take off while we were there. From Chennault it was a bouncy one hour and forty minutes to Picayune Mississippi. The weather remained hazy, and at low altitudes the turbulence was moderate but continuous. The Loran was boss and we went where it told us and it never let us down. Most of the trip was flown at 1000 to 3000 AGL due to either the short hops or the overcast and haze. The turbulence at these altitudes was enough to cause us to slow the plane below the planned cruise speed. From Picayune MS we flew to Crestview FL. Heavy military training in the area resulted in many MOAs and we couldn't miss them all. We stayed as high as possible to avoid overflying small fields near their pattern altitude. Crestview is a civilian field but it looked like the military owned it with significant helicopter and light twin military traffic. I was happy to get clear of the area and head north to Georgia. The weather all across the gulf coast looked like it might start raining and storming at any minute. The forecast when we left Crestview was for scattered T'storms and rain showers all up and down the coast. The national news that evening reported

the combination of heat and humidity along the coast as "dangerous". When we turned north the visibility started to improve and by the time we reached Griffin GA we had effectively left the humid, low ceilings of the gulf coast. Also we had left the high density military traffic. The overnite at Griffin GA was interesting for its contrast with other airports, particularly in the west. No one answered the unicom, the line boy overflowed the gas tank even though he was cautioned, the airport had an overnite tiedown fee, none of the motels had a free pick up and of course the airport didn't have a courtesy car. The taxi to the hotel was prompt and the hotel nice so things went well.

June 20, 1990 Griffin GA to Greenville TN Flying time 1:45

From Griffin GA to Clemson SC we started seeing hills for the first time since west Texas. At Clemson the approach to the airport from the east provides a good view of a large sport stadium which we took to be the Clemson football stadium. From Clemson to Ashville NC the hills got higher and steeper. Just a few miles south of Ashville we found a very tall antenna right on our route which looked like it was high enough to snag airplanes. From Ashville to Greenville TN was an interesting flight up a wide pass in the mountains. As we approached Tennessee the land opened up into much flatter (not to say flat) terrain. The weather to the north and northwest of Greenville didn't look good and a phone call confirmed that a weather front blocked our path with ridges obscured and visibilities of less than one mile. We sat around the airport a while and finally gave up. We took advantage of the delay to change the oil and check the torque on the propeller bolts. I took the intercomm out and carried it back to the motel. The motel driver (turned out to be the owner) agreed to swing by a Radio Shack so I could buy a soldering iron, a roll of solder and two 2.2K resistors. I repaired the intercomm at the motel and it worked for the rest of the trip although it was noisy. A loud sputtering sound was in the audio and it made the continuous use of the intercomm tiresome. At the same time I reversed the antenna connections to the Alpha 200B. This brought the Omni to life again. I guess I had reversed these

connections the last time I installed the panel and never checked. This got all the electronics working again except I didn't have any display of frequency on the 706 comm radio.

June 21, 1990 Greenville TN to Fredrick MD Flying time 3:06

The weather continued bad the morning of the 21st. We hung around until about 10:30am until we were sure of our destination and an alternate. The weather at first was low clouds broken to overcast. By the time we reached Pikeville KY the ceiling was at least 5000 AGL and broken. The Pikeville airport had been the cause for much concern due to the entry in the Flight Guide about a drop off 800' from the end of the runway with landslide damage to the runway. We plotted several alternatives in case we got there and decided not to land. It turned out OK since the runway was long enough to avoid the damage area. From Pikeville to Beckley WV was a very pretty trip. There was no level ground to speak of and everything was covered with trees. This terrain continued almost all the way to Shenandoah VA. The small towns were down in the Vee shaped valleys and were frequently only one street wide. From Shenandoah to Fredrick MD we flew up the Shenandoah valleys. I couldn't resist trying to imagine the large Confederate and Union armies moving up and down this terrain.

June 22, 1990 Fredrick MD to Ithaca NY Flying time 6:16

This day promised to be the most demanding day of the trip. I started off hoping to get as far as Maine. We actually got all the way to western New York. The weather was good with a high scattered layer later in the day. However the haze was everywhere and visibility varied from 7 to 10 miles. Light to moderate turbulence came up in mid day and increased into the afternoon. When we left Vermont for Ithaca we went to 8500' and the air was very smooth. At that altitude we were just above scattered clouds. We flew from Fredrick to Middletown DE and then circled around the Philadelphia TCA to the coast and up to Farmingdale NJ. This took us practically over Lakehurst and the large dirigible hangers were

very easy to see. However we never did see Philadelphia. When we left Farmingdale we flew out over the Atlantic ocean for a mile and then turned to steer through the narrow gap separating the Philadelphia TCA and the New York TCA. We had to be very careful with navigation here as we wanted to fly completely around the New York TCA to Waterbury CT. This is when the Loran decided to just plain quit! Fortunately the Omni was working by now and we would be able to continue but the Loran would really be missed. I checked the signal strength and found that the master station (I didn't check the slaves) had zero signal strength. I suspected that the station was off the air and sure enough in about 10 minutes the warning lite went off and the Loran started working good as ever. Nothing like this ever happened again and I am now convinced that the trouble was on the ground. In any case we flew west around NYC about 25 miles out and never saw the City. What is more surprising is the amount of open land and woods we saw so close to such a large town. As we swung around to the NE and over CT the population density increased rapidly. Air traffic was not a problem even though there was more of it here than we had seen before. I'm surprised how few airports have active towers. Unicom is used everywhere and the traffic is well behaved. We landed at Waterbury Connecticut and again at Pawtucket Rhode Island where we bought gas. A landing at Fitchburg Massachusetts and on to Sanford Maine which marked the turn around point. Everything from here on was on the way home. Maine, New Hampshire, and Vermont were very lush with trees covering everything which wasn't town or highway. The ski runs on the mountains were obvious. Population density had dropped off quite a bit from early in the day and airports started getting farther apart. We landed in Keene New Hampshire for gas and just stopped by at Bennington Vermont. We flew just north of Albany NY and south of Syracuse on a line to Ithaca. The weather and visibility remained good into Ithaca but it didn't look real great to the west. Within two hours of tie down at Ithaca

we were experiencing a light rain. We had flown up to the front of a weather system headed east while we were headed west. We would spend two and a half days waiting for this weather to get by so we could continue. After tying the plane down we started calling hotels/motels but they were all full. So we tried to rent a car so we could look for a place to stay and all the rental agents reported 'no cars'. Finally we phoned an economy motel and got a room and took the airport limousine to the motel. We made arrangements to be picked up first thing in the morning on the reasonable assumption that the weather would be good.

June 23, 1990 Ithaca NY

The weather was not flyable at all. We hung around the airport for a while and even borrowed some tools and checked the plugs and plug wires trying to locate the source of inter-com noise. Finally gave up and started the hotel search routine again. This time we found a hotel with free pickup (but very expensive rooms). So we spent another night.

June 24, 1990 Ithaca NY

Another rush trip out to the airport and a call to Flight Service and another day grounded. This time we finally were able to rent a car and took off to see Harris Hill at Elmira NY about 45 miles south. I had known about Harris Hill since I was a small boy but this was my first visit. They were flying gliders in spite of low ceilings and strong winds. We also toured the Glider Museum. With a car we were able to locate another economy motel.

June 25, 1990 Ithaca NY to Bowling Green OH. Flying time 3:41

The weather where we wanted to go was reported good but Ithaca was marginal until midmorning. After we could see blue sky overhead and only broken clouds on the horizon we took off. The first thing we found was that the bottom of the broken clouds was only about 1000' AGL. The visibility was at least 10 miles so we struck out on course. The clouds didn't

improve so we stayed below them. The ground did get higher until about 70 miles west of Ithaca we were unable to continue. We turned back to Elmira which was the last good airport we had passed. After some confusion on my part as to which runway we were supposed to land on we put the plane down and started waiting again. There was a FSS on the field. The briefer didn't think the weather was as bad as we had actually found it. However in our discussion with him he pointed out that all of his reports came from airports which were always in the valleys and might not accurately represent what we found in trying to cross the hills to the west. I finally woke up and checked the map and sure enough it was totally unnecessary to fly over the high ground. If we diverted due north for about 40 miles we could end run the hills. It worked. By the time we got back on course in very good weather we had pretty well shot the day. We landed in Port Meadville for gas and continued on to Bowling Green Ohio. The FBO at Bowling Green OH was very helpful and loaned us a courtesy car. An uncertain age green cadillac. It ran and that was enough.

June 26, 1990 Bowling Green OH to Elk City OK Flying time 7:22

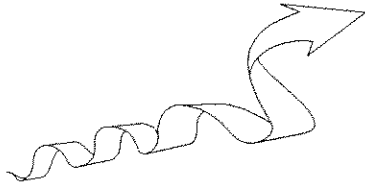
The day started off as the best flying day since we left Phoenix. The air was clear with visibility in excess of 30 miles with no clouds. The run up to Coldwater Michigan gave us a good view of Lake Erie. From there a smooth run down to Kokomo Indiana and we were beginning to believe all the weather was behind us. As the day progressed we picked up some small summer Cu but scattered and well above us. We made great time and got all the way to Effingham IL with no delays. However at Effingham we met a student pilot who had just cancelled his cross country trip due to thunderstorms. I called Flight Service and sure enough our next planned stop in Missouri was at that very moment under a 'violent' thunderstorm. There was a line of T'storms running NE to SW pretty much on our course. It was reported to be moving to the SE at 35 knots. It was not part of

a front. After waiting an hour we took off and flew under the east end of the line of storms. We flew around a few light showers and came out on the back side of the heavy clouds. When we got to Lebanon MO and called Flight Service they told me that Rogers AR was just north of a very heavy storm which was moving SE. They suggested we wait an hour and call back. Since we had clear air and were on the back side of the storm we waited for about 20 minutes and took off. We had no problems into Rogers AR but could see the dark clouds of the storm just to the south. Flight Service cautioned that the route from Rogers Ar to Elk City OK was subject to scattered thunderstorms with moderate turbulence. We didn't see a thing and had a nice trip into Elk City OK.

June 27, 1990 Elk City OK to Phoenix AZ Flying time 6:00

Elk City to Double Eagle airport (Albuquerque) with a gas stop at Tucumcari NM and we were on our way home. Things went very well. As expected the Loran started acting up just about the same time the omni lost St Johns VOR. I thought we had it made and hadn't even bothered to call Flight Service. About 35 miles east of Payson we started running into heavy smoke and had to make a 180 turn to maintain visual contact with the ground. I called Flight Watch and was told of numerous fires all along the rim and told that VFR flight over the rim was not possible. I turned south thinking to skirt the fire but found the smoke everywhere. As we flew south over very rough terrain with all the valleys filled with smoke the Loran gave up and died. I was too far for the Salt River VOR and we couldn't match the ground with the sectional. Finally I recognized Cherry Creek and turned toward Phoenix. A short time later I saw Four Peaks, the omni picked up SRP, and the Loran decided to give it another try. The ATIS at Deer Valley was reporting 109 degrees and it was only 11:20am! Welcome home!

TRAILING EDGES



by Floyd Meyer

A bit on trailing edges. Most have said "Clamp them, then squeeze the rivets" and I must agree, for it worked well for those cases when I could use that method. But -- I had borrowed a squeezer from a friend, who now had it in full time use. My rudder and trim tabs were ready to close. So I opted to try an alternative, which worked, and which just might be of value to others -

Assume the mess is done, except for closure of the trailing edge. Then

*. Align the edge, using the eyeball. Clamp it between angles, drilled to provide clearance for Clecos and rivet sets.

*. Drill, and Cleco, # 40. I am not sure this is necessary but I do it pro-forma.

*. Drill out to #30, using dowels in about every 4th hole (I used taper pins - slope about .002"/inch - which worked great. I do not know where to get them - I borrowed them from a machinest friend.) Cleco every hole not doweled.

*. Dissassemble the mess and debur it. Reassemble, dowel, cleco, and clamp it tightly, and now you are ready to rivet.

*. Set air pressure at the gun at the absolute minimum which will set the SOFT rivet with about 4 - 5 hits. I used the "Coin Press" method of dimpling - described before in the Newsletter - then drove the rivet. Riveting started at those holes with taper pin dowels. *. Perhaps the most critical part is hole alignment. Should a rivet not enter the hole with just finger pressure, then REAM the hole - do not attempt to lever (Ice-pick) it into alignment. My tests on scrap clearly showed that the latter always caused a wiggled trail edge, whereas reaming the hole did not. I guess the soft (470-A) rivet

expands without distortion of the edge. The resultant trailing edges were straight, per eyeball assessment. So here is an alternative if you do not have a squeezer, which I would use if I had it. Floyd Myers

KENTUCKY DAM FALL 1991

The following folks were at the Fall 91 Kentucky Dam Event. Hope I didn't miss anyone!

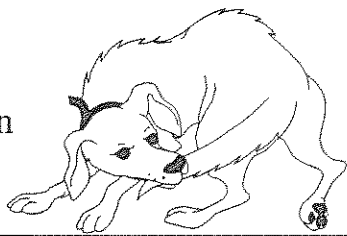
Roy & Karen Farris, Noble, Ill
Clif Redden, Georgetown, OH
Dwight Scaggs, Blanchester, OH
Don Warner, New Smyrna, FL
Steve Hawley, Tucson, AZ
Joe Forbes, Planto Center, IL
Mac Booth, Daleville, AL
Bud & Marge Payne, Austin, TX
Joe T. Miles, Crossville, TX
Lee Skillman, Mobile, AL
Paul & Helen Shifflett, Earlham, IA
Dan & Jane Wolfe, Fairburn, OH
John & Neora McClure, Marietta, GA
Stash & Gladys Simpson, Wichita Falls, TX
Bill Williams, Tampa, FL
Bob & Susan Highley, Sumter, SC
Leroy & Mary Holt, Savanna, OK
Ed & Jeannette Ludtke, Sioux Falls, SD
Gary & Maxine Green, Granbury, TX
John (Bob) Olds, Davenport, IA
Richard Snelson, Clinton, IL
Dick & Mary Amsden, Mt. Clemens, MN
Bob & Carolyn Jaeger, Northlake, IL
Chuck & Michelle Meyer
Ken & Mary Rhoades, Peoria, IL
Gary Cotner & Judy Barfield Collinsville, OK

KENTUCKY



DID YOU SHAKE YOUR TAIL TODAY ?

by Walt Giffin



After the T-18 forum at Oshkosh 91 concerning severe tail oscillation, I became concerned about looseness in my own stabilator. Shaking the tail on N78WG after the forum seemed to increase the deflection I had previously noted. Maximum deflection measured at the outer tip of the stabilator was approximately 0.25 in. Since this airplane had accumulated over 1300 hours since its completion in 1979 and had never had the tail removed for lubrication or any other purpose, investigation seemed in order.

My good friend Dean Cochran of Broomfield Colorado properly chastised me for delinquent maintenance and then agreed to fabricate any bushings we might need to tighten up the control system. Upon removal of the stabilator we found very little play in the 594 spacers and evidence that the original Lubriplate grease was still providing lubrication. Dean fabricated spacers which were .002 oversize and removed nearly all of the play in the stabilator. No reaming was necessary.

When the rudder was removed and the pressure of the rudder springs released, considerable play in the top rudder bushing (581) was apparent. The hole in which the bushing rides was worn in an elliptical shape with the major axis of wear being perpendicular to the fuselage center line. The bottom bushing seemed tight and both appeared to be adequately lubricated. The mounting holes were straightened and aligned with a guide and expansion reamer provided by Dean. An oversized micarta bushing was fitted to the top attach point. An additional problem was noted in that the AN 23-9 Clevis bolts which attach the rudder cables to the rudder horn were found to be severely

grooved and were replaced.

To complete the reworking of the control system, all bushings from the stick sockets to the tail were removed, inspected and lubricated. All bushings (496, 554, 555) were found to be snug and adequately lubricated in spite of over 12 years use accumulating 1300 hours of flight time and no previous maintenance.

One other unrelated problem was discovered during the extensive tail maintenance. The tailgear fitting 583 had developed three radial cracks from one of the rivet holes which fastens the fitting to the fuselage belly skin. Both the necessity for that particular rivet and the reason for the cracks remain a mystery to me. The cracks were stop drilled and frequent inspections are planned to evaluate the need for a doubler in that area.

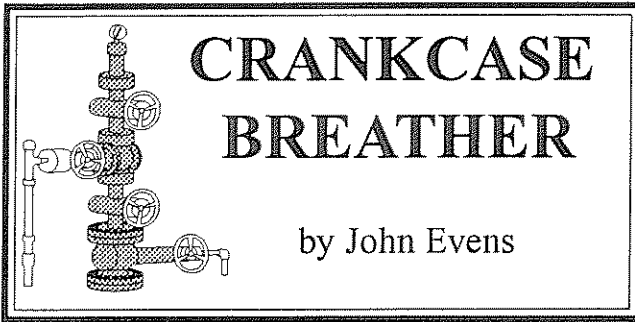
So there you have it. I now have more peace of mind and a very smooth functioning control system. The moral is: the T-18 is a very well designed airplane; it is great to have knowledgeable friends to help make repairs when necessary; and at least once every 1300 hours you should take time to "shake your tail" to see if it has any messages for you.

FOR SALE ITEMS

Set of prepunched metal templates and wood form blocks for Standard T-18. Also 120 3/32 and 300 1/8 clecos. Gerald K. Czarniak, 4536 W Norwich Ave. Greenfield, WI 53220 Phone 414-541-0318

For Sale: T/S-18 Horizontal Stabilator, S-18 Ailerons, S-18 Plans with Sunderlands's Book, also 180 HP 63 Olds A1 V-8 professionally rebuilt ready for reduction unit. Alan Reich 2161 Gazebo, Idaho Falls ID 83402 Phone (208) 522-3191

For Sale: A flip over project, some wrinkled skin fwd. Aft fuse good condition, wings will need some skin work. 600 hr 0-290-g goes with it. A lot of extras \$1500 Bob Slagle, (409) 265-8383



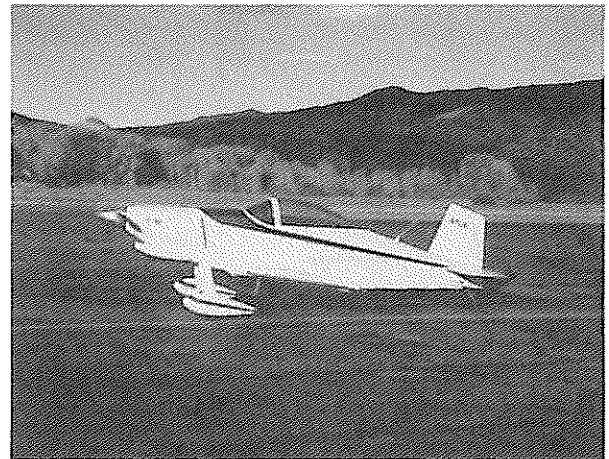
CRANKCASE BREATHER

by John Evens

October 30, 1991

Thought I'd give you an update on 71JE (s/n 1171). I've put 116 hrs. on it now in the first year. It flies like a dream! Luckily, my wife and kids love to fly with me, and the only problem is who to take. We're based at Jeffco airport in Denver with Dean Cochran (11DC). I've flown to Butte, Montana (past the Tetons, over Yellowstone, etc.), Rapid City, SD (Mt. Rushmore), Nebraska, Kansas, all over Colorado (including Leadville and Aspen), and most recently to Kerrville, Texas for the fly in (where we were very happy and proud to win "Reserve Champion - Plans Built Custom"). It was great to see 6 other T-18's and Dick Cavin there. I recently installed a Garmin GPS100 (global positioning system receiver) and it is really something! Weighs approx. 25oz., and gives 3D navigation at up to 49ft. accuracy anywhere in the world. It has features too numerous to mention, and is only 6.25" x 2" x 3.95" deep. It uses a tiny little antenna which I've mounted on the deck behind the seats. Anyway, some of the guys at Kerrville said I should share the crankcase breather system that Dean Cochran and I are using. It uses a common G.M. emission part - a check valve (part #22048214 or equivalent) which is attached to a small tube which is welded to and protrudes a small distance into one of the exhaust tail pipes. The end of this small tube is cut off at a 45 degree angle, facing downstream. This produces a small amount of suction on the tube as the exhaust gases flow past. The check valve is there as a safety device in case of backfire - flow can

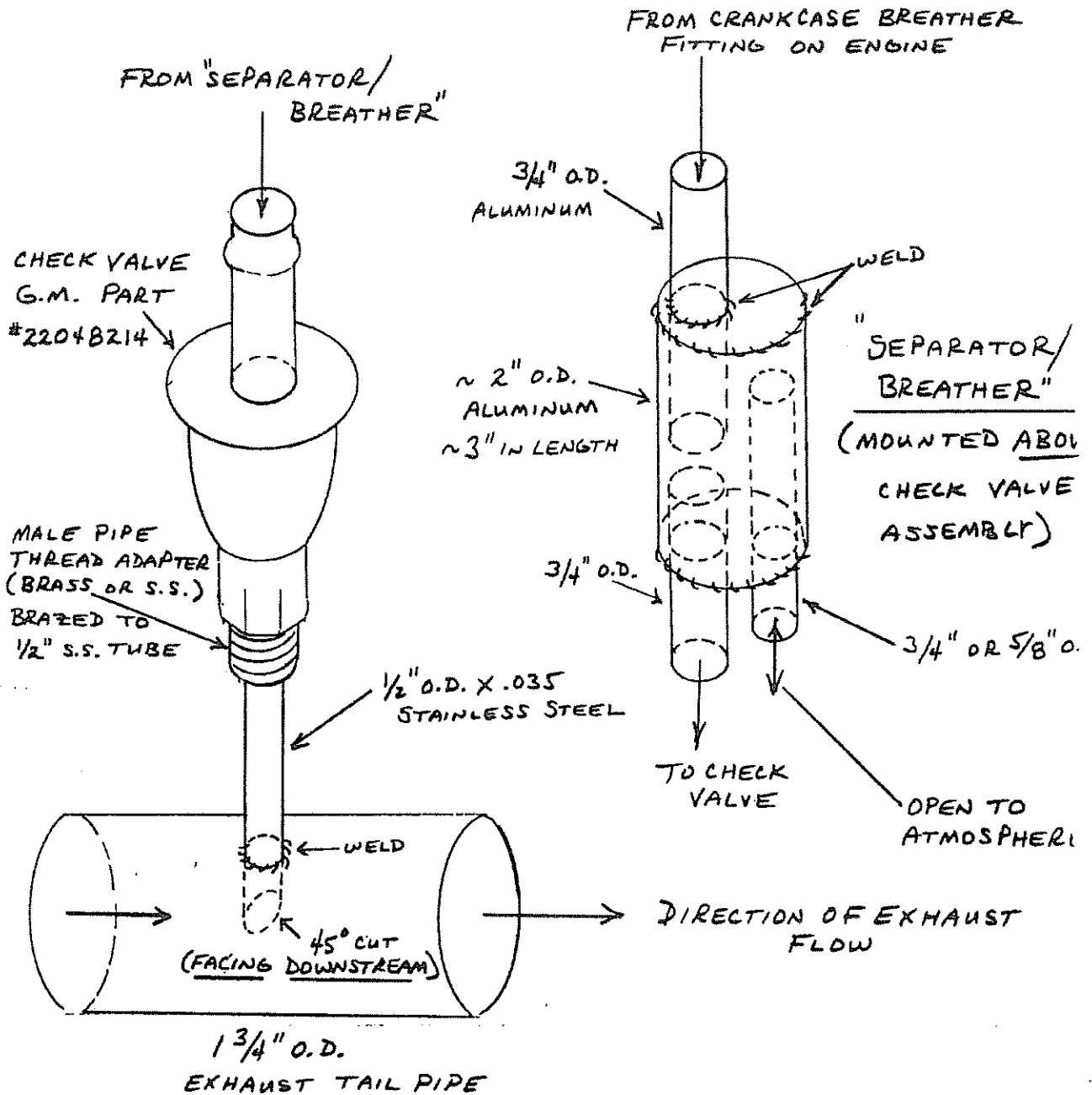
only go in one direction. The crankcase breather line goes from the engine into a small separator/breather", which is just a chamber made of aluminum, which allows positive free breathing to the atmosphere, yet any oil which comes down the tube drips straight through and into the checkvalve/exhaust pipe, where it is burned instead of getting on your airplane. Please excuse the drawing, as it was done in a big hurry. The tubes on the "separator/breather" going from the crankcase and to the checkvalve can be one piece by simply making a good cut-out in one side (located towards bottom of chamber). This will simplify alignment and fabrication. I have used this system for 116 hrs. (1 year) with no problems. It is not an original idea, but the addition of the "separator/breather" is. When measured, we found that a pretty good amount of suction was produced through the checkvalve, and I didn't like the idea of either pressurizing or depressurizing my crankcase. That's all for now. John Evens 6855 Allison St. Arvada, Colorado 80004 (303) 420-27254 PS - Enclosed is a picture of my plane at Aspen, Colorado this last September.



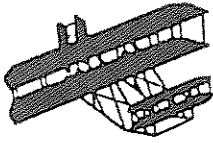
John Evens T-18 at Aspen, Colorado

CRANKCASE BREATHER SYSTEM

BY JOHN EVENS



NEWS RELEASE



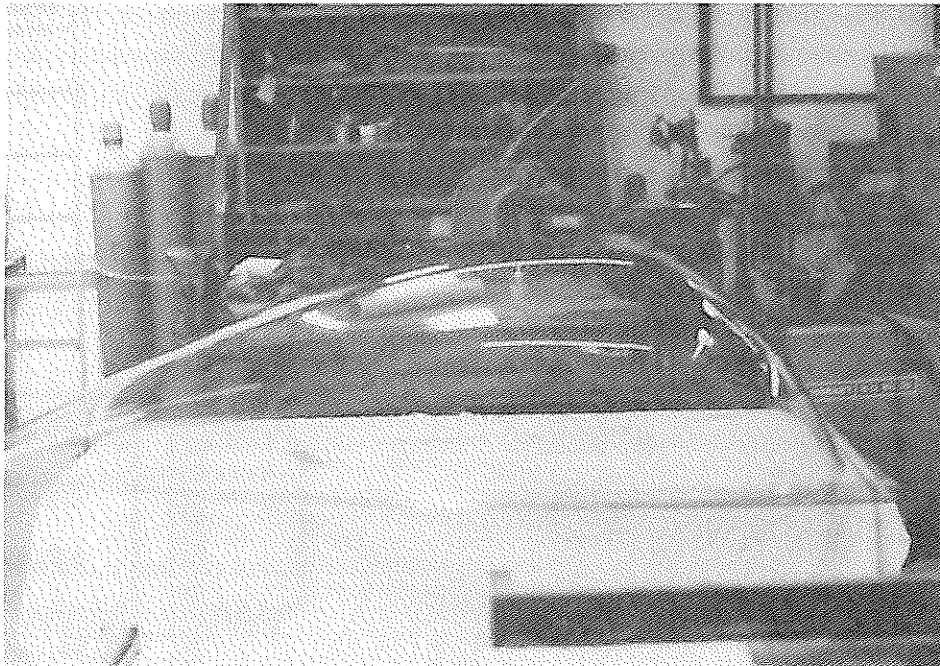
THE AIRPLANE PLASTICS COMPANY

8300 Dayton Road, Fairborn, Ohio 45324
(513)864-5607

From: Airplane Plastics Co. A Division of Fox Lite, Inc.

Subject: A break through in canopy forming technology.

Airplane Plastics Co. of Dayton, Ohio, is now making airplane canopies by a new molding process that produces high quality optics comparable to military fighters. This new proprietary process has been in development since 1975, when the original company, The Airplane Factory, started making free blown canopies for the KR-1. Production molds now exist for the Thorp T-18, Thorp 211 and Questair Venture. Other molds for producing extra high quality canopies for home built aircraft are planned for 1992. Walter S. Hoy President/Chief Engineer



FOR SALE

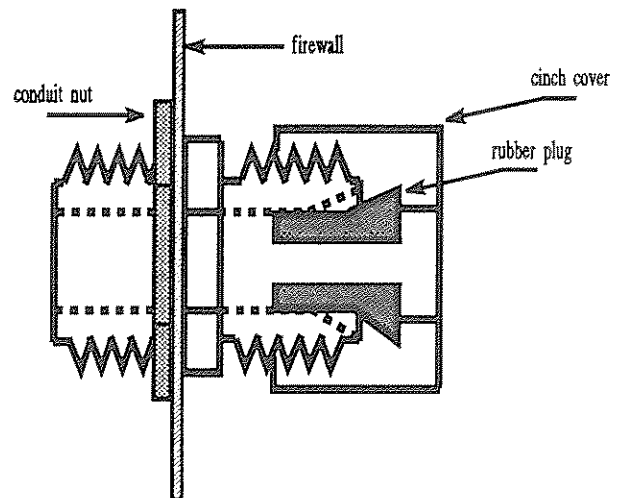
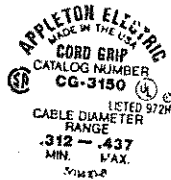
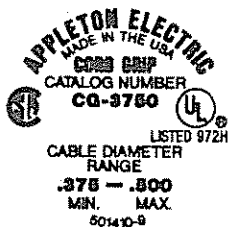
Canopy Covers: T-18 canopy covers specify regular or wide body. Made from "Evolution 3", a fabric designed to "Breathe" but not let moisture or dirt penetrate. Should prevent plexiglas etching due to moisture & heat buildup. Price \$90 each. Contact Ed Ludtke, 2301 Dartmoor, Sioux Falls, SD 57106 Phone 605-361-2301

Editor's note: I have one of these and they are great! Those of you at Kentucky Dam last Fall got to see on of these covers. Ed is also looking for an engine, see below.

Wanted 0320-0360 Lyc Engine in any condition, must have dynafocal mount. Contact Ed at the above address or phone number.

Building Tip

This building tip came from Cliff Redden of Georgetown, Ohio and it's covers a small electrical device called a Cord Grip that makes about the nicest firewall feedthru for wires or throttle/mixture cables that you can get. They are made of aluminum with a rubber insert sized for electrical cords. They look a little like a pipe bulkhead fitting with a standard electrical conduit size with a conduit nut for connection to the firewall. As the cover is tightened down the rubber is compressed against the cable or wire for a tight fit. I put a small piece of abestos in them on the firewall side for fire protection. For the throttle/mixture control feedthru I turned them around backward which put the rubber and it's cover on the inside of the fuselage, this gave me about another inch for the cables to move with the engine bracket that attaches to the carb.



CORD GRIP

Cord grip labels, you pick the grip range to suit the application. They also come in right angle models that would be nice for large wire bundles.

SPRING 1992 T-18 MUTUAL AID SOCIETY MEETING

Oct 30, 1991

Dear Rich,

As I mentioned on the phone a few days ago, I have reserved a block of 26 rooms at Western Hills Lodge for the 8th and 9th of May, 1992. The rooms are \$49 for lakeside and \$54 for poolside. There are also 3 cottages available for \$80 per night. Each cottage can accomodate 2 couples (3 couples if they chose to use the couch/hide-a-bed). Maxine and I plan to reserve one of the cottages and hope the other two cottages will be taken by others in our group. By the way, one only has to take a room for one night instead of two as at Texoma Lodge and Western Hills does have a bar. What I think we should do is to plan a hamburger cook out at our cottage on the Saturday evening instead of trying to organize a banquet. If we can get T-18ers in the adjoining cottages, I think we can pull this off fairly efficiently. The Lodge will cater the cookout if we choose to go that route, or we can do it ourselves. The airport is called Sequoyah Park and is on the northeast corner of the Dallas-Ft Worth sectional. There is no fuel on the field but Tahlequah is about 12 miles east and Muskogee is about 12 miles southwest. We'll also have to arrange for a port-a-potty to be available. There is a phone at the airport and the lodge will provide a shuttle on request. The "Short Winged Pipers" had their national convention at Western Hills a couple years ago and from all reports I've heard they were very pleased with the entire setup. They seem to understand airplane talk. I'd suggest folks make their reservations now. They can cancel their reservations later up until 5 days in advance unless its for an emergency in which case they may accept a last minute cancellation. The number to call is 913-772-2545 and ask to talk to Aletha. Tell them you want to be with the Green T-18 party. You can write to: Western Hills Guest Ranch Box 509 Wagoner, Ok 74477

I hope you have your T-18 finished and flying in time for our Spring get together. I also hope I have mine re-painted by then.

Gary Green
2530 Bellechase
Granbury, Tx 76048
817-579-1995

Technical Tips

Reprint from The EAA Publication TECHNICAL COUNSELOR

BEWARE OF COUNTERFEIT BOLTS

By Martin Hollman Aircraft Designs April/May 1991

Every part that goes into the construction of an aircraft is critical. Seemingly insignificant parts often play very essential roles. Examples of these small but vital parts are the bolts that hold much of our aircraft together. Because the hardware involved in aircraft are subjected to extreme stress and demanding conditions, it is absolutely imperative that the bolts be of the highest quality. Many bolts are being substituted for lower grade bolts. These counterfeit bolts are of substandard quality and pose a possible risk. The manufacturers of the bolts are able to mass produce the hardware at a lower cost by using cheaper grades of steel and using nonstandard heat treatment. These lower grade substitutes are becoming increasingly common. Examine any bolts you purchased recently. The following key will help identify counterfeit bolts. Be wary of all Grade 5 and Grade 8 fasteners of foreign origin that do not have any manufacturer's headmarks. Note: Grade 5 bolts have three marks. Grade 8 bolts have six. The headmark (if any) will normally be in the center of the head. A hollow triangle as illustrated below is a suspect counterfeit bolt and should be replaced.

The following headmarks manufactured by the indicated companies are suspect fasteners. Any suspected counterfeits should be replaced with known quality fasteners.

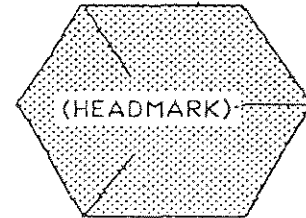
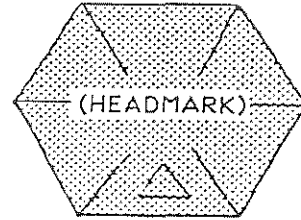
HEADMARK

| | |
|-----------------|--------------------------|
| A | Asohi Mfg. (Japan) |
| NF | Nippon Fasteners (Japan) |
| H | Hinomoto Metal (Japan) |
| M | Minamida Sicybo (Japan) |
| MS | Minato Kogyp (Japan) |
| Hollow Triangle | Infasco |
| E | Daici (Japan) |
| KS | Kosaka Kogyo (Japan) |
| RT | Takai Ltd. (Japan) |
| FM | Fastener Co. of Japan |
| KY | Kyoei Mfg. (Japan) |
| I | Jinn Her (Taiwan) |
| UNY | Unytite (Japan) |

MANUFACTURER

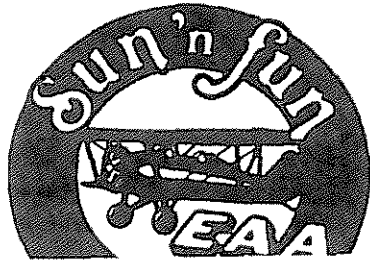
Editor's Note: EAA Headquarters has been contacted by U.S. Customs in Florida and the state of Washington regarding the counterfeit situation. This is a SERIOUS problem. The problem is that it became known as a way to make a great deal of money and it is obvious you can see that both Taiwan and Japan hopped on the bandwagon. We have had literally thousands of pounds of these bogus bolts stopped by Customs and the process is an ongoing one. The problem is that a great number of these bolts are in the pipeline and in the hands of suppliers to date. At this time, there is a new congressional mandate that manufacturers must supply their distributors with full technical information on the bolts they manufacture. Apparently, the distributors are not required to do the same for wholesalers or retailers unless specifically requested. Probably the best thing is to specifically ask the supplier for further information on the bolts. It will end up costing everyone more but this is about the only way to be sure. The

other thing to do is to either have Rockwell or Brinnell hardness tests on a group of bolts you buy. In particular, this would apply to propeller, wing and landing gear attach bolts or any bolts that are operating near the maximum of their strength. The Government agency that is taking the most action on this is U.S. Customs and in particular I want to thank Ed Smith of the Tampa office for bringing this to our attention again. If you would like a copy of their quality act, House Rule 3000, dated November 16, 1990, you can write to EAA, Information Services for it. Many thanks to Congressman Thomas Petri, WI Congressman, for supplying us a copy of this law.



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