

NOTICE (STANDARD DISCLAIMER) As always, in past, present, and future newsletters, we would like to make you aware that this newsletter is only presented as a clearing house for ideas, opinions, and personal experience and 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.

PROGRESS REPORT ON SAFETY AND OPERATIONS MANUAL: First of all I'd like to call your attention to page 20 of N.L.#58. PLEASE take it out and re-read it. It is a full page letter from VERN PEPPARD, in which he lays out what will be necessary for YOU to do if we are to have a truly worthwhile Operations and Safety Manual. Did you notice that Vern is underwriting the entire production expense of such a manual. It will be a bound volume, with the ability to add pages in the future. It will be a VERY valuable part of either your flying T-18 or your T-18 project when and if you sell it some time down the line and will be a definite plus for a builder or owner if a question of liability arises. It will certainly enhance the value of the newsletters to the oncoming builders, too.

I guess most of you read that and said, "Yes, I'd like to help, but I'm in the dark as to what to write about or what category to volunteer for." That seems to be the situation, as only a trickle of response has come in so far. I well know it's human nature to procrastinate to the point that it disappears completely from your mind. Right? I well know, too, that each and every one of you guys that have finished building your T-18 could write down a whole volume of problems and solutions, experiences flying it, small or large maintenance problems that you have encountered, and suggestions, warnings, etc., for avoiding potentially troublesome or dangerous situations...EACH AND EVERY ONE OF YOU. Every T-18 is different! No two are exactly alike, so you DO have SOME area you could write about. For an idea, perhaps it would help to re-read some older issues of the newsletters. For instance...do you remember EARL ODY's excellent account of his problems with electric fuel pumps? Have you ever had a forced landing or had to make a precautionary landing in your bird? What events lead up to it?

Here's one of my T-18 experiences: I was checking out a new T-18 builder on how to make power off approaches to accurate spot landings from the down wind leg. When I pulled the throttle back to idle, it just kept on coming back...about a foot or so. The hard piano wire inside of the protective flex sheath had fatigued and broken where an improperly installed safety clip was secured to an engine mount member...and in less than 25 hrs. of flying, too. My new builder was pretty apprehensive when I cut the switch, but it was a piece of cake just flying a speed and relative angle profile. I even made it look easy by not braking it and letting it roll up to the hangar ramp at the far end, thus giving him a better measure of confidence.

Now this brings up a safety point that everyone should know, but I have found a surprising number of those I've done Designee inspections on that didn't. If your throttle breaks, the arm on the carb should have a spring attached that will cause it to go to the FULL throttle position. You could manage to fly quite a long way and make an approach and safe landing by flipping the ignition switch on and off. You could even make a go around if the first approach didn't look good. The spring set-up is required on factory types and it makes good sense.

Now does this remind you of something in your experience that would be good to pass on? Even if it pertained to another type airplane, but would be applicable to the T-18 let's try it on for size. Perhaps you have access to the newsletter of another type of airplane and come across an

item that could also apply to the T-18. Send it in.

It's been several weeks since I wrote page #1 of this N.L. and to all of you that have been wondering what happened to the T-18 newsletters I must apologize for the delay. About the first week of Feb. I began to feel really lousy, had no energy, went to sleep every time I sat still, plus developing severe abdominal pain and a few other symptoms. I went in for a complete physical and found out that I had developed diabetes. It took three weeks more to get in to see a specialist and when I did he hospitalized me that same day. I spent a week there and then went into a clinic for another week, where 25 of us underwent 30 hours of intense, concentrated classroom instruction by doctors from Southwest Med School, who taught us how to live the rest of our life as diabetics and exactly what to do to control it. It requires a rigid diet and exercise program, and the following of this program has eaten up most of my time since then, but it seems to be getting results. I lost my medical, of course, but I have hopes of getting a waiver for a 3rd class a little later. I may wind up having to sell my T-18, but I'll cross that bridge when I have to. Anyway, I hope you all will be patient until I can get things under control. We hope to get at least the first part of the T-18 Owners Manual out before OSH time this year. I won't make it this year, but I made 29 straight, so I can't complain I guess. LOU SUNDERLAND will be there and he, LEE SKILLMAN, and JOHN WALTON will handle the T-18 Forum. The regular T-18 Annual Dinner will again be held on Tuesday nite at Butch's Anchor Inn, with Gerri Knowles and John Walton handling the reservations. DON TAYLOR will speak on his flight over the North Pole, so it should really be a good 'un. Have fun, amigos. Wish I could join you, but I've promised the family we would take a long delayed auto trip around the Western part of the U.S.

SOON TO FLY: KARL LIPSCOMB, 100 Grand Ave., Lamar, MO, 64759 was signed off to fly in late May, so he probably has flown by now. Karl has a wide body, with folding wing. He has a new Lyc. 180 and c/s prop on the nose. His wing is the one Kenny Knowles had on his wide body and is the std. airfoil. This saved Karl many weeks of work. Karl and I go way back. We both learned to fly in Springfield, MO in the early '30s and both of us flew for Braniff. He bought a Starduster Too from me that I had up to the cover stage and finished it out beautifully. It was judged the best of the 'Toos and was the Too representative at the Dayton Air Fair a couple of years back. Maybe next year he'll get to go back to Dayton with his T-18, who knows? Competition will be stiff, tho'. Sure are lots of fine looking T-18s showing up these days. Some of them are second or third owner airplanes and the new owners have outdone themselves with slick new paint schemes, new instrument panels, new upholstery, etc. (IT FLEW)

ANOTHER NEW ONE: BOB HIGHLEY, 211 Bloomingfield Dr., Brandon, FL, 33511, writes: "T-18 ser. # 835, N711SH finally flew on 19 Feb 84 after 1 1/2 years of building! It flew hands off and far exceeded my expectations. Quite a relief after bragging so long about how good it was going to fly." Here's some specs on it:

- *Standard Thorp with sta'd wing.
- *Electric trim, electric flaps
- *O-360-A1GG (180 hp) Lyc, Hartzell c/s prop
- *Empty wt. 984# with oil, no fuel.
- *15# lead in tail.

Some prelim performance numbers:

- *High cruise at 1000' MSL, (24 x 24) 195 mph IAS
- *Low cruise (21 x 21) at 1000' MSL, 170 IAS
- *Top speed level flight at 1000' MSL 206 mph IAS
- *Sea level Rate of climb, one pilot, 15 gals. fuel, 4000 ft/min (!)

*At 10,500' MSL cruises 165 IAS, and still will climb 2500 ft./min!

(cont,d)

(cont'd)

I have done some mild aerobatics (3½ Gs max) and find the roll and pitch rate very pleasing. As I fly the F16 Fighting Falcon for a living and it takes a LOT to impress me. Believe me, the T-18 IS impressive!

Will be looking forward to the Safety and Ops manual. Thanks for your hard work on the newsletter." Bob Highley. (Thanks for the kind words)

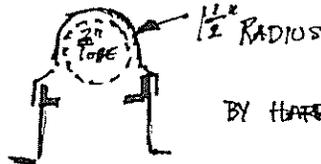
- ④ STILL ANOTHER NEW 'UN: FRED GINRL, 101 Broomfield Dr., Agincourt, Ont. Canada, MLS 2W3 says: "I now have 13:10 on my #558 "Tiger" as of 1 Feb. and I LOVE it. Was a little left wing heavy, but installed Norm Smith's electric Airo-trim and it now flies hands off. I figure the last ten years were well spent."

- ④ A 2nd OWNER WRITES: PETER LEFFE, 16 Ketch 1, Marina Del Rey, CA, 90291 says: "I bought #126 from builder ROY Oberg. It was bought over a 15 year period, with first flight in July '81. When purchased it had 42 hrs on it. It now has 125 hrs on it and is doing very well." (he made it to OSH with it last year). Some specs on it:

- *0-320 150 hp Lyc
- *67 x 66 wood prop
- *Max speed 2700 rpm @ 500' MSL 60° OAT 195 mph IAS
- *Cruise, 75% power, 8500', full throttle 175 mph TIAS
- *Economy cruise, 2300 rpm, 150 mph, 7.4 gph
- *Rate of climb: solo, full fuel 1400 fpm
dual, full fuel, 1100 fpm
solo, half fuel, 1600 fpm
- *Empty wt. 950 lbs.
- *Has Rattray cowl, wing tips, wheel pants.

- ④ HARRY WHEELER, 2 Marion Rd., Salem, MA, 01970, another enthusiastic 2nd owner sent in a picture of his new paint job. Design and colors by his son, with his wife doing the new nylon and naugahyde interior. He spent a year doing the complete overhaul and refurbish work. One of the improvements made was the moving of the rudder cables outboard (as per Bob Dial's sketch in the N.L.), eliminating the forward tunnel. He also was able to reduce the width of the tunnel between the seats by splicing on a piece of sheet metal at the top, which was formed with a 1.5" radius, which gives ¼ in. clearance on each side of the elevator push-pull tube. (see sketch below). He didn't say whether or not he had retained the manual flap handle, that little torture contraption that gouges one's leg on a long XC, but if so he probably made a saddle affair to mount on the top of the tunnel. Harry's mods certainly should help the in-flight comfort situation for large people. If you are getting close to the upholstery stage there are quite a few of us that strongly recommend you use Harlo McKinty's Temperfoam for your seat cushions, even tho' it is expensive as compared to polyfoam. Your lower left and right cheeks will thank you over and over again at the end of a long XC. The standard T-18 is admittedly "cozy" in width, but the above mods will make life a lot more enjoyable. You can buy a lot of extra comfort by keeping your upholstery very THIN above the WL 42 extrusion. Otherwise the copilot is probably going to have to put his arm around the pilot's shoulders on a long XC and that can get a little tiresome. Don't just sit in the bare airplane and make a quick, snap judgement that there will be plenty of room. Get two of you in there and sit there for a couple of hours. You might be surprised at how things can "grow" inside.

AFT
TUNNEL
MOD



BY HARRY WHEELER

The following letter from Tom Keins should be of considerable interest:

18 March 1984
4218 Ticino Valley Dr.
Arlington, Tx. 76016

T-18 MAS
10529 Somerton
Dallas, Texas 75229

Dear Dick;

Thank you for another excellent newsletter. I have been busy lately getting ready to move my family to Columbus Ohio. I have accepted a position with North American Rockwell as a designer/analyst in their Navy fighter design group. I will move on March 29 then return to Texas to pick up my T-18 sometime in April or May. I would like to comment on two items that appeared in the last newsletter.

④ MANEUVERING SPEED, V

The maneuvering speed on page 6 of the "flying" section must be in error. Maneuvering speed is the speed at which the wing is just capable of reaching design load limit (max "G") at stall. Theoretically, the airframe cannot be damaged by gusts or abrupt maneuvering when flying at or below maneuvering speed.

Using data published in John Thorp's brochure on the T-18, the C_{Lmax} would be 1.31 with flaps up. My airfoil tables and textbooks show a range of 1.02 to 1.34 for the airplane depending on surface roughness. These C_{Lmax} yield V_{stall} of 159 and 182 MPH calibrated airspeed respectively for the design condition of 5.0 "G" at 1500 LBS gross weight. This means that V_{stall} on a clean winged T-18 with standard airfoils would be 139 MPH CAS.

Many builders are using advanced airfoils similar to the Whitcomb GAW-2. A T-18 wing with GAW-2 airfoils has a much higher maximum lift which would reduce V_{stall} to about 139 MPH CAS (based on 2-dimensional C_{Lmax} of 1.75 for GAW-2).

④ "TUCK" WITH FLAPS DOWN

On page 7 of the "danger directives" section of newsletter #58 there is an excerpt on Bryant Rowland's violent pitch down problems with 30 degree flap and forward C.G.. Bryant says that with increasing speed he gets stick buffet and a forward tug followed by violent pitchover due to stabilator stall.

My airplane (N10TK) has never "tucked" but it did show strong signs of onset which I was able to cure. In my early test flights, I had triangular cross section wing root fillets patterned after those I have seen on many California T-18s. I installed them

because builders told me the fairings would promote pre-stall buffet. They did cause a lot of buffet with flaps down but it was due to turbulent flow at the flap/fairing interface rather than true stall. With flaps down flying solo above 100 MPH my stick would oscillate fore and aft 1/4 inch at about two cycles per second, and increasing amounts of backpressure were required for trim at increasing speeds. The stick oscillations and reversal of stick force gradients were very disconcerting.

The underside of my wing root fairing directly above the flap was open, leaving a triangular cross section cavity in which turbulent air could swirl when the flaps were lowered. I closed this cavity with a "floor" per the dashed lines in my sketch, reducing turbulence at the flap/fairing junction with flaps down.

With the "floor" in place, my airplane behaves normally in tests up to 120 MPH. Simultaneously, the buffet which the fairings generated with flaps down disappeared. The only quirk which remains in flap down operation of my airplane is a very slight forward tug on the stick when I slip with flaps down at forward CG. I will try installing endplates at the inboard ends of my flaps to see if they have any effect on this.

Builders with a tuck problem who use wing root fairings should try removing them or installing a floor as I did.

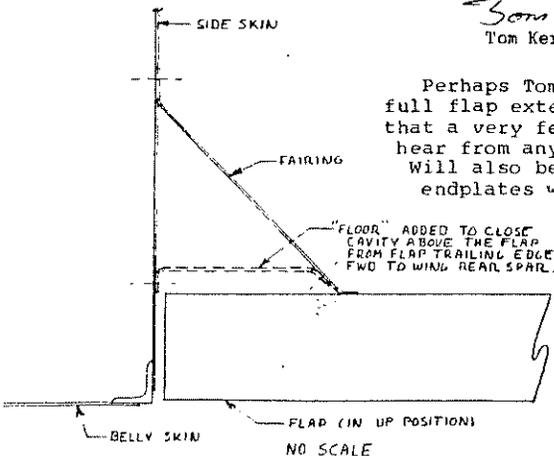
Respectfully,

Tom Kerns
Tom Kerns, sn.71, N10TK

Perhaps Tom's fix on the tuck tendency with full flap extension will alleviate the problem that a very few T-18s have. I would like to hear from any builders that try this fix ASAP. Will also be interested to learn if flap endplates will show marked improvement.

We sure hated to lose Tom from our area. He's a very sharp young engineer, who has done a most professional job in the building & testing of his T-18.

(Ed.)



Tom also attached the following note to his article on V_a & flaps:

"Dick, this might do as a simpler explanation of what V_a is:
Maneuvering speed (V_a) is the speed at which the wing will encounter an accelerated stall just before exceeding the maximum design "G" capability of the airplane. At speeds above V_a , abrupt control movement or a strong gust could overload the wing, causing structural damage. At speeds below V_a , the wing will (theoretically) stall before damaging load levels can be generated.

When flying in heavy turbulence the prudent pilot will slow to V_a , or a bit less, to protect against possible structural damage.

Thanks again, Tom, for the articles. All of really do appreciate your sharing of your professional expertise with us.

In 1963, when I started my first T-18, another EAA type living less than a mile from me (Merle Soule) ordered his T-18 plans a couple of months after I did and it was natural that we built both together. When Merle's T-18 looked like it could fly in a couple of weeks he developed severe health problems and was eventually forced to sell it. It sold to a cattle buyer in Waco, TX, who died soon after. The widow finally sold it a couple of years later to LOU FALCONI, an engineer for LTV in this area. Lou kept being loaned to Boeing-Seattle for a year or so at a time, but last summer when his retirement date was almost on him the airplane was finally ready to fly. Since most of Lou's flying was on sailplanes he wisely called on Tom Kerns to test it for him. Outside of out of round tires causing vibration problems it flew okay. Tom finally checked a very nervous Lou out on it, but he needed quite a bit more practice to be truly competent with it. Lou's retirement home is in Roswell, NM, about 400 miles west of Dallas and all agreed that it wouldn't be wise for him to fly it out there, so Tom and I used that as an excuse to go T-18 flying. We flew formation out there and since I'd never flown Lou's T-18 before, I made my first landing with it on our fuel stop at Snyder, TX. The airplane flew quite well and it was quite a nostalgia trip for me to fly a bird I'd helped build so long ago. I reluctantly said goodbye to it and Lou at Roswell and rode back home with Tom. I was also very pleased with the way his flew and how well he flew it. While each T-18 is unique and different, they are all a delight to fly. To really appreciate what a great airplane they are, fly one and then get right out and go fly a Cessna or Piper, etc.

I have heard from a lot of T-18 builders out there that spent 10 years or more building their T-18 and one fact stands out loud and clear: Not only is the T-18 one of the finest designs anywhere, but there are a lot of builders out there that are made of exceptional stuff, that have taken all sorts of discouragement, frustrations, etc. without breaking their spirit and have doggedly pushed on...sometimes only an inch at a time.. and to me this says a lot about a man's character. Some have had to sell out when adversity temporarily won out, but a surprising number have started all over again when things smoothed out for them. While EAA people in general are pretty super people, I believe that T-18 people are truly the salt of the earth. People like Don Taylor or Clive Canning, just to mention a couple.

The next few pages relate to T-18 builders in New Zealand, but I think the subjects will be of general interest.

From TONY SCHISCHKA, 7 Hale St., Blenheim, New Zealand:

Dear Dick,

In reply to your note on the back of my last N.L. re the grounding of T18s in N.Z., the story started with a "Permit to Fly" renewal inspection on ROD DAVIS' T-18 (ZIC ROD), on which cracks were found on the welds at the lower mount gussets of the MLG. Somehow a tape measure was put on the MLG and it was found to be 2" longer (surprise!?) (bought from Ken Knowles. The C.A.D. decided the extra 2" had caused the cracks. As you can read in my letter to Lu Sunderland and his reply, we believe that it simply was a miserably small weld. Since the extra 2" was a change from the C.A.D. approved plans, this was their basis for grounding.

I prepared a mod'n for approval, to accept the larger gear, using logic and Lu's letter, and this was approved, thus lifting the grounding. Fortunately I had previously accepted a mod'n for splitting the gear, so after welding up the large cracks we were able to re-heat treat and get the aircraft back in the air. (No heat treat ovens are big enough to take the whole MLG in N.Z.) (Very few here, too. -ED.)

I think we operated on much worse surfaces out here, because the only other T-18 flying (Greg McNuchols' ZK EDF) also cracked in the same place. Rod's T-18 has probably only ever been on paved runways a dozen times in its life!

By the way, how did YOU find out about the groundings?

I must say I was impressed by the quality of photos in the last NL and I must try to get a photo of Rod and Greg's T-18s together to send to you for inclusion. Hope this explains the situation.

Kindest regards, Tony.

Tony also sent a sketch of where the cracks occurred, which were on the bottom side of the gussets, on both the front and back. Lu's letter in reply is too long to reproduce in its entirety here, but he made the point that all T-18s in Australia have gears that are 3" longer, due to their requirements for prop clearance with one flat tire. There have been no gears cracking there or here in the U.S., with virtually all T-18s built in the last 10 years having longer, softer gears. He pointed out that Thorp originally designed the gear to meet an old Air Commerce Bulletin 7-A for a particular static load strength of 4.33 G yield and 6.5 ultimate. At 1250 lbs. gross (the original Gr. Wt.) the gear would take 7 g's static load. The more recent CAM 3 Load Factor Requirement for LG design is based on energy absorption capability and is based on a formula including vertical velocity at touchdown, and a flexible gear can pass this test even if its static load capability is quite low (inertia reaction can be as low as 2.67 g's).

Lu further said that he preferred an oxy-acetylene weld over heli-arcing, as the h/a weld produces a very small bead and if GREAT care is not taken to pre-heat and post heat this high stress area that rapid heating and cooling can cause cracks to occur in the weld, due to locked up stresses. The oxy/ac'n weld also has a much larger fillet, with much less localized stress build up.

Conclusion: Improper gear fabrication caused the gear cracks, not over-stressing during rough field usage.

Since the area is easily accessible to frequent visual inspection it isn't considered a problem of great magnitude.

Here's another note from Lu Sunderland:

Dear Dick, you might like to print the following in the newsletter:

- PROPELLERS: Sensenich Corp. has appointed a distributor for ALL of their experimental propellers. He is: JOHN W. BENJAMIN, 973 Nissley Rd., Lancaster, PA, 17601. He not only handles all W66LM (125 hp thru 160 hp Lyc) and W68LY (180 hp Lyc) propellers, but also wood models for the Varieze, Longeze, Tailwind, Sidewinder, RV-4, and Mustang II.

Sensenich is in the process for APPLYING FOR TYPE CERTIFICATION for the T-18 propellers, so this may help to reduce the required flight test time in the US and shorten the landing gear legs for T-18s in Australia, which are now required to use standard length certificated propellers.

Sensenich just confirmed my contention that the brass leading edge took about 5mph off top speed. On a Cassutt racer with test runs on the same day, they got an 8% increase in power and the same decrease in fuel consumption with a plastic leading edge vs the brass leading edge. They now offer an improved plastic material which is less prone to rain erosion.

Sincerely, Lu.

- Recently JIM FERNANDEZ (Seattle) called me to say that he had installed a Ted Hendrickson wood prop on his airplane and was delighted with it. He said Ted first routs out an area about 1/16" deep on the LE, then injects the plastic into a close fitting female mold, which leaves the plastic slightly oversize when cured. It is then sanded down to contour and is flush with the wood aft. It, too, is supposed to be very rain resistant and he said the guys in the Pacific NW really give it the acid test, as they have rain there more days than clear skies.

- I'm personally a little goosey about flying my Cassidy prop in any rain. LEE REILLY flew his Cassidy prop at reduced airspeed thru what he said was light rain for only a few minutes and it scared him to death when he got down and looked at it. It had not only eroded the fiberglass LE, but also had started on the wood and he had a major prop repair on his hand. I sincerely hope the new plastic LE works out, as the wood prop solves several problems for us.

- I had occasion to talk to Lu again the other day and he said they had just completed the T-18 started by Jeff Shinn some years back and Lu says it is really a fine airplane. The paint scheme is the same as he and John Shinn had on their T-18s and I think all agree that they are very pleasing to the eye. If you have seen Lu's or John Shinn's T-18 you know the interiors are also excellent. Lu says the airplane is FOR SALE, or will be shortly. He was considering whether or not to test hop it before selling it and my opinion was that a buyer of it would certainly prefer that it had several hours on it before buying it. Lu said he probably would fly the time off and bring it to OSH this year. They haven't finalized the price yet, but it will come out somewhat over 20K. Yes, airplanes are getting expensive, but if one considers that a Cessna 150 is up around 35K these days, that's not too bad. If one totals up catalogue prices for the T-18 airframe parts and adds on an engine, prop, paint, upholstery, canopy, etc. at today's prices it comes out well over 20 K if you go for a new engine (the T-18 Lu is talking about has a NEW 150 hp Lyc). Lu's home phone is A/C 607-625-3084 and his work phone is 770-2001, so give him a call for details.

LANDING GEAR PROBLEMS IN NEW ZEALAND

PROPS

PROPS

MORE ON PROPS

FOR SALE

52 JR FLIES! JIM HUNTER, P.O. BOX 1704, Big Bear City, CA, 92314, serial # 1235 worked himself out of a hobby when his T-18 flew for the first time in Dec. of '83. In Mar. '84 he wrote: "I now have 35 hours on it. The local GADO in Riverside made the test period 40 hrs, because the prop wasn't certified (with the engine), however they were lenient in the test area he assigned...40 mi. radius of Big Bear and a 40 mi. radius of Bullhead City, AZ, and a direct line between. As we winter in AZ it worked out fine. The test program is going well with no problems...a little trim tweeking here and there is about all. The airplane is stock. Has an O-360 A4A, a 68/63 Sensenich prop EM76. Even with the coarse prop it operates at gross out of my home at Big Bear City, elev. 6750, with no complaints. Ken Knowles in Norco has been of tremendous help to me with parts and know how. He and his wife, Geri, are fine people. (Shucks, I can't think of many T-18ers I've met that weren't pretty first class types-ed.)"

JAVELIN FORD V-6 FLYING: If you go to OSH '84 you'll have a chance to see and possibly fly the Cessna 175 that DAVE BLANTON has installed the 260 hp V-6 in. I recently made a trip to Wichita with 3 other local chapter members, one of which was a T-18 builder, and we all got to fly or ride in the airplane.

I made 5 takeoffs and landings with it and to call it a test flight was a misnomer. The airplane flew so close to a standard Cessna as to be almost boring, except it is incredibly smooth. Throttle response is as good or better than with a st'd A/C engine. Starting is one blade, no more.

All instruments were standard, even the tach. Tach shows PROP rpm and at the 2:1 ratio one simply doubles tach rpm for engine rpm. The engine puts out a dynamometer verified 260 hp at 4800 rpm, but Dave used the original prop off the 175 (a bad choice of props), which is 84" long and has so much pitch that the engine only turns 4200 rpm on t/o and at that rpm it not only is well below the peak torque rpm, thus well below the its max 260 hp capability. Once it hits 80-85 mph and the prop quits lugging the engine it really gets with it (for a Wichita Wallflower, that is). Get the engine rpm up above 4500 and it will climb 1700 ft/min solo. Dual, with OAT temp at 93°F and very humid, it would climb at 1400 ft/min at an IAS of 96 mph. Wide open it would indicate 135-140 mph in pretty short order. At 2100 prop rpm for cruise it was very quiet in the cabin and was indicating 115-120 mph (that prop was definitely wrong). The only new instruments were a small water temp gauge and a coolant pressure gauge which would instantaneously show a loss of coolant). Water and oil temps were in the normal acceptable range, even at that OAT and the amount of high power being used most of the time.

Dave has a super accurate engineering fuel flow meter mounted on the right cockpit wall and at 2100 rpm the fuel flow was only 6.8 gph! Right by the F/F instrument was the switch for the electronic mixture control, which automatically sets the power jet for proper max lean. It has two standard ignition modules (solid state) and one is used as a standby. After several oil cooler failures Dave adopted Ford's latest innovation to keep oil cool—a heat exchanger under the oil filter that directs coolant thru the exchanger and then to the st'd radiator (mounted just forward the firewall).

Weight with all accessories, prop, and coolant, and radiator comes out to about 15 lbs. of an O-360 Lyc with C/s prop. For better balance and the elimination of lead in the tail (that's normal with the O-360) the radiator could easily be mounted aft of the baggage compartment, using a flush

NASA type inlet and exit scoop, or even a P-51 type belly scoop. Coolant lines would have to be external in this case. The V-6 will easily fit in the present cowl, with present openings greatly reduced or eliminated, which might possibly be enough to cancel out the drag of the aft mounted radiator.

The engine is un aspirated, so it can run on non-leaded automotive fuel. Ford says they will soon bring out a turbo V-6, but it would require a higher octane fuel. It would put out 375 hp, but fuel consumption would be fierce. The present engine SFC is as low as .35 at 2100 rpm (compared to .56 for an air cooled or turbo'ed engine). This engine conversion would cost the builder possibly as much as \$3000. You MIGHT find a mid time Lyc of 150 hp for about \$3500, but consider the difference in the cost/hr in fuel burn and the increase in range with the present tank.

While Dave is flying the Escort engine in a Cessna 150 at present the engine is NOT recommended for the T-18. By the time it met its goal of hp the cost of conversion with special intake manifolds, turbo, special cam, and other items made it uneconomic. The V-6 is here NOW and appears to be a rugged and reliable engine that can be installed and operated very economically....but it's still too early to see if it will be a superior choice from all the engineering aspects. It will present several construction problems to put in the T-18 and someone will simply have to take the bull by the horns and wade thru these problems, one by one. We could take this airplane RIGHT NOW and put it into an airframe especially engineered to take THIS engine and I've no doubt that it would be a BIG winner....but as for the T-18, I really don't know for sure.

I hope a number of you at OSH this year will take a sharp look at the V-6 as a possible T-18 power plant (whether you would or wouldn't consider putting it in YOUR T-18) and then send me your observations and opinions. You would be doing an excellent service for many homebuilders.

You might also note Dave's test bed exhaust system (3 pipes on each side that funnel into a single short extension) is a poor arrangement and is on there for expediency only and highlights one of the areas that could be refined to raise the overall installation efficiency, but let's not overlook this opportunity for evaluating a powerplant that might make our flying costs much, much less. Such an opportunity for many builders to put the unit under a microscope may never come again. Let's have your frank opinion, good or bad.

On the basis of paying about \$600-\$700 for a low mileage 230 V-6 engine, putting in the special camshaft, replacing the ignition wiring with one of aircraft quality, adding the additional ignition module, along with a specially sized radiator core and coolant lines and fittings, plus the complete speed reduction system (which will cost about \$1800), the total cost of the engine could be as high as \$3000. Comparing fuel costs per hour against a Lyc O-360 (@ 10 gal/hr) would save the operator \$11.75/hr for fuel alone, or \$1175 per 100 hrs of operation! In 300 hrs the engine would pay for itself in fuel savings, so you can see the economics are impressive.

To compare the weight of the (Windsor built) Ford 230 V-6 with a Cont'1 O-470 (230 hp and close to the displacement and swept volume of the V-6), the V-6 weighs 387 lbs. dry vs 488 lbs. for the O-470. Add 27 lbs. for the radiator, lines, and coolant, 10 lbs. for oil, and 10 lbs. for tail pipes, and the total weight is 434 lbs. for the V-6...which gives a total wt. savings of 54 lbs! The Lyc 180 wt. is 14 lbs. lighter than the V-6,

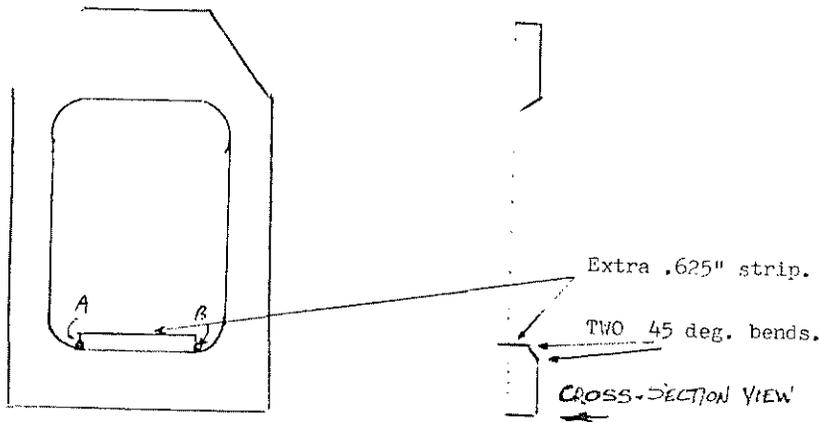
BUT ADD A C/S PROP & THERE IS LITTLE TOTAL WT. DIFFERENCE.

EVALUATING THE JAVELIN FORD 230 V-6 ENGINE CONVERSION

FLYING THE JAVELIN FORD 230 V-6

- **BULKHEAD FORMING TIP:** from JOHN BURKE, 216 Tomswood Hill, Hainault, Essex, England. He says, "When laying out material for fuselage frames allow a little extra (about .650") on the lower inside edge, which is to later be bent to 45°. An extra bend of 45° on the additional strip will take the flange to 90° for supporting a board or plank during construction or maintenance. This reduces the risk of splitting the flange during forming while trying to get it to 90° in one go. Don't forget to punch relief holes at A & B and be sure to SMOOTH ALL EDGES."

A very good tip, John, and very practical, too.



(To balance newsletter space better we've put letters from two more of our English builders a little farther along in the NL)

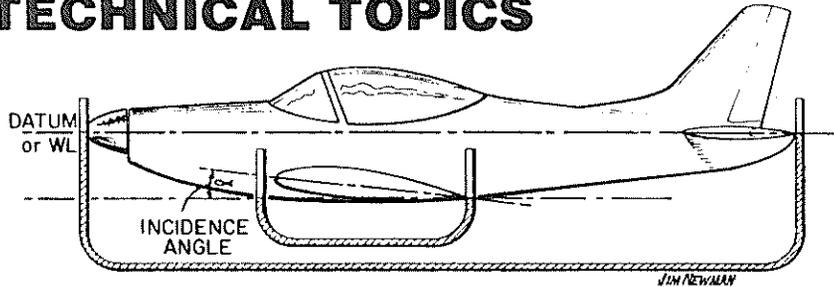
- **TAILWHEEL TIP: KEN RHOADS**, 175 Hickory Lane, Peoria, IL, 61611, called a few days ago to tell me his T-18 had just flown for the first time and it flew just great. Ken didn't feel qualified to be a test pilot, so he got an airline pilot friend (who also has a Pitts) to fly it the first time. PAUL KIRIK flew his new T-18 down from Moline, IL and he flew Paul's bird around a few times to get used to T-18s. He also spent quite a little time taxiing both Paul's and Ken's and it was his opinion that ground steering via tailwheel was much too sensitive on the T-18. A conference with a local Designee resulted in a simple, but very effective "fix". The solution was to bolt a piece of alum angle (3/4 x 3/4) to the rear set of holes in the rudder "mast" (the steel plate arm that transfers rudder cable steering commands to the tail wheel via chains and springs). The holes that the chains/springs attach to on the mast are moved INBOARD by 1" on each side. This means that it takes a much larger movement of the rudder pedals to get the same response from the tail wheel.

I personally feel that this is almost as good as a non-steerable tail wheel as far as making it easier for a pilot with little or no tail wheel time to master the lightning quick response of the T-18 to rudder movement. I think most new T-18 pilots get into most of their trouble in their over eager rudder pedal action that is usually too much and too late. This is another way of saying over-controlling, which in itself is an out-of-phase response to directional changes of the airplane, caused by crosswind or

- (TAILWHEEL TALK CONT'D) whatever. Most of this sort of trouble originates when the airplane is on final and when it begins its flare without all drift correction taken out and the airplane pointed straight down the runway. I've observed even experienced pilots trying to point the tip of the spinner down the runway instead of a point on the cowl directly in front of them. I've even had to put pieces of black tape on the nose cowl directly in front of the pilot and another on THEIR center line just ahead of the windshield to break them of this bad habit.

Anyway, I think this tip of Ken's is a four star one. Now take note that this method does NOT change the full throw of either the rudder pedal or the tail wheel. It simply means you will have to move the rudder pedal more to get as rapid a tail wheel response as before. If you are going to sell your T-18 it might be a good idea to put one of the de-sensitizing angles on for the new owner to use for awhile. Perhaps later the holes could be moved halfway between the 1" and the original position as the pilot gets more accustomed. Perhaps you might want to modify the original mast to have more than one set of holes if you are at the rudder building stage of your project. I'd appreciate your comments on the subject if you try this little mod.

- **CECIL HENDRICKS (SEATTLE)**, who is the son of long-time T-18er, FORD HENDRICKS, flew his T-18 for the first time this past year and he sent me a brief note saying that he had modified his Scott tailwheel so that it could be locked or unlocked for steering in close quarters, and that he would send a sketch of the details soon, so perhaps by next NL time we'll have the dope. I wonder if any of you have done that with a Maule?
- **STILL ANOTHER NEW ONE FLIES: PAUL KIRIK**, 2921 28th Ave A, Moline, IL, 61265, flew his bird for the first time back about April, I think. He called me before he flew and we discussed some of the procedures and cautions for initial flights and some of the pre-planning that should be done for any "surprises" that might surface on the initial flights and how to cope with them. The basic principle is to take each and every aircraft system and plan an acceptable emergency action if any part of that system goes sour. Paul had had some 15 or 20 hours of time flying a couple of T-18s in this area, so was better qualified than many are at that stage. I had gone over his project thoroughly when it was about 75% finished and I was sure that he would have one of the outstanding T-18s, if workmanship was any criteria. Sure enough, it flew beautifully in every respect and he was soon in love with it. He promises a complete report on it as soon as he has 50 hrs. on it. Paul is maintenance supervisor for John Deere's corporate jet fleet at Moline. You may recall some of the construction tips he sent for NL #46. You might want to go back and re-read them. Anyway, congratulations Paul, Ken, Fred, Karl, Bob, and all the rest of you guys with new birds in the air. As you now know, there really is a treasure at the end of the rainbow and dreams really CAN come true.
- **HOMEMADE CRIMPING TOOL: RON BOSTIC**, 7334 Vallejo, Dallas, TX, 75227 came up with this one. Recently he had an occasion to crimp some sheet metal, but had no tool. His cleco pliers were laying there with a cleco nearby and suddenly the light came on. He used the cleco as the male die with the fork of the cleco pliers as the female of the die. The cleco is positioned over the fork part of the pliers, with the solid button part doing the pushing of the cleco barrel between the tangs of the fork. I tried it and it makes every bit as good a crimp as a pair of store bought crimping pliers, so Ron just saved himself about \$15 that he can use for something else. Have any of you come up with any handy little tools or jigs that can be a wampum saver for the homebuilder? A simple sketch or description will do fine... (hint, hint).

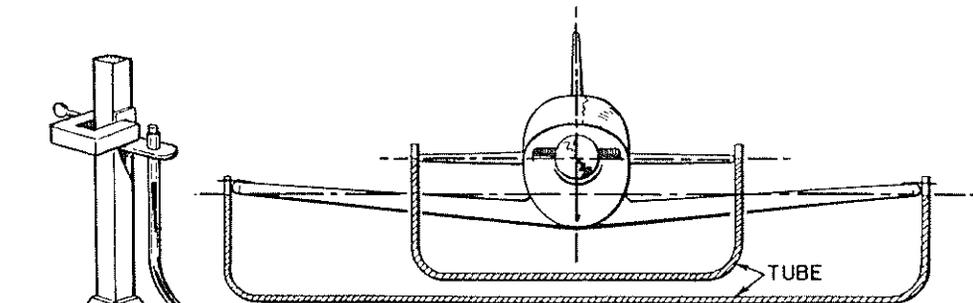
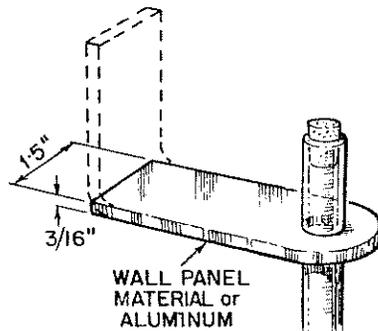


PLASTIC TUBE ALIGNMENT GUIDE

From the Dulworth Chapter 34 SKYWRITER
Method for checking alignment with a water level made of plastic tube

This method has been used by several builders. 1/4" to 1/2" plastic tubing is used filled with a solution of water, any type ink and a very small amount of liquid dishwasher soap. The soap is used to reduce the surface friction in the tube. This method is a very accurate way of setting incidence angles, water lines, wing tip wash out, and incidence angles between wing and stab. Scrap wall panel make good holders to keep tubes in. Position drill holes for plastic tube for snug fit.

NOTE FROM ILLUSTRATOR Jim Newman, EAA 109981. I use this system extensively on construction projects around my house and to check the rig of my radio control models. As a consequence I have shown the alternate of having a 90° bend in the bracket — allowing it to be clamped or taped to a vertical surface. I have also illustrated the simple stands I use around my (model) planes and these are an enormous help, along with card tabs strategically taped to the plane and on which the datum is marked. The tabs sticking out allows them to be set against or behind the liquid column. I also use an alcohol food dye mix to preclude bacteria growth in the tube and subsequent discoloration.



FROM THE EAA DESIGNEE
NEWSLETTER, JULY '83

(SUBMITTED BY T.J. MCCORMICK)

face of the casting with a 1" mill cutter, removing only enough material to present a flat surface for the mounting block to seat on. Corners near the king pin can be squared off with a 1/2" mill cutter. See Figure 1.

The milled slot must line up with the bushing center line and must be parallel with the spring surface.

The mounting block can now be attached to the casting with an AN6 bolt to assure that all parts will line up. This should be done before the final brazing is done.

If all parts fit and move freely, the mounting block can be brazed to the casting in the following manner: silver brazing alloy sheet can be obtained from your local welding supplier. Cut a piece of the sheet to fit exactly under the block. Cut a generous clearance hole (3/4") for the bolt. You don't want to braze the bolt in place. Coat both sides of the sheet liberally with flux, then bolt the block to the casting, sandwiching the silver sheet between the two. Torque the bolt, as you want a preload on it when the silver melts. Heat the entire assembly until silver is seen to flow from under the block. The idea is to heat the entire block and casting in this area broadly and uniformly to the flow point of the brazing alloy. When the silver is seen to flow from under the block, you can add a small amount to form a fillet around the block to help relieve stress at this point. The casting must be cooled down slowly. An easy way to accomplish this is to wrap insulation around a large can and place it over the part as soon as the brazing is finished. The part can be sandblasted clean after it is cool.

Final Assembly: the push pull cable and all other hardware are AN quality and can be purchased from any aircraft parts supplier. Mine came from B&F Aircraft in Oak Lawn, Illinois. Attach the cable inside the fuselage using ty-raps. Safety wire all bolts. The 1/2" compression spring can be found in any hardware

This answers my question on pg. 12 about converting a Maule. From Aug. '82 issue of Sport Aerobatics, available from EAA HQ, OSH, submitted by T.J. McCormick, of Hamer, S.C.

Altho' we are reproducing both these pages full size the details on the illustrations are hard to read without magnifying, so you may need to secure a copy of the mag for clarity.

TAILWHEELS, AGAIN

There are several subjects which seem to be perennial Tech Safety subject, and "tailwheels" is certainly one of them. The following article submitted by an IAC member concerning a common tailwheel malady is excellent in its detail and instructions.

"Why Lock Up Your Maule?"

"I think everyone will agree that the Maule SFS is a great tailwheel for taxiing around an airport, particularly since you can steer with the rudder and because it is full swivel. Unfortunately, if you're landing a short coupled airplane like a Pitts, on pavement, in a crosswind, it can be a real handful, especially for a low-time pilot.

"So, I tried one of the popular locking tailwheels on the market today. The locking tailwheel which I tested made the plane extremely difficult to steer when there was any kind of a wind because it wasn't linked to the rudder. In addition, the use of a torsion bar instead of a leaf spring caused an omnidirectional bouncing in the tail which I didn't like. It was a little lighter but you usually need extra weight in the tail of a Pitts anyway; it was also more aerodynamic, but someone who needs a locking tailwheel is probably not ready for unlimited competition anyway, so a few extra miles per hour doesn't make that much difference.

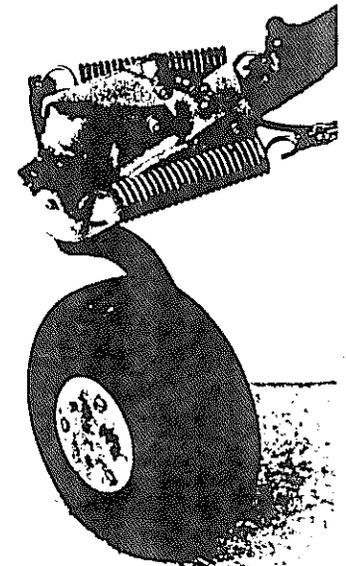
"To solve my problem, I decided to try to modify the Maule tailwheel which I originally purchased for my Pitts. It was relatively simple and worked extremely well so I decided to share my experience. Following is an explanation of how to convert the Maule SFS to a lock tailwheel as I did.

"The first step in the conversion is to replace the ring on the steering arm. To remove the old ring, I used a mill. Prior to welding on the new ring, you must be sure to completely remove any remaining brazing allow. I used a sandblaster for this.

"Next, clamp the new ring on the center line of the steering arm. Since the steering arm is hardened, I recommend tig welding using TigTectic 680 filler rod, a product of the Eutectic Corporation. Weld size should be no more than 1/8" to avoid warping the steering arm. To complete the steering arm, reassemble the locking pin in the arm making sure it slides freely.

"Next, a flat must be machined into the upper sur-

HENRY HAIGH'S TAIL WHEEL



1 1/2" O.D. 1 1/4" TO 1 1/2" I.D.

(This article should be put in your T-18 Safety manual)

③ T-18 Carburetor and Engine do not match

I bought a factory reman engine 0-320-A2B - 150 HP, Lycoming, zero time, equipped with a Marvel-Schebler MA4SPA, part # 10-3678-32 carburetor.

After installation in my Thorp and ground run of 2 hours plus one flight around the pattern I decided the carburetor was not right. The ground run-up produced heavy soot, rich mixture and fouling of plugs. Leaning 3/4 distance made some improvement but not totally. I was getting 1950 max RPM on static run-up. (MUCH TOO LOW)

Called Lycoming in Williamsport, PA (1-717-327-7077) and talked to Ken Johnson, Mgr., who gave me the nearest Western Regional Office: Avco Lycoming Division 9841 Airport Blvd, Suite 1130, Los Angeles Cal.90045 (Phone 1-213-645-1760). After talking with representative Ivan Gunston and many calls back and forth with him and Don Lewis and Bob Walters I secured a loaner carburetor from them. This carburetor part # 10-5135 improved engine performance considerably. After 5 hours of flight time I was satisfied with the carburetor. Engine ground run on this carburetor reached 2100 RPM's, EGT 1250, leaning mixture to EGT 1400 increased 20 RPM gain and this was satisfactory, I thought.

Then came a very disturbing event. The plane ran fine on Wednesday and was fine when shut down. On Saturday I took it up for a run. The first time the engine quit (as though no gas) when I was about 25-50 feet off the ground. It did not quit entirely but was on and off. After shutting it down to idle and landing it sounded OK on the ground.

I taxied to the pumps, filled the tank (14 gallons), and drained and checked the gas in the filter. Upon ground run up everything

was fine, no misses. All seemed well so I taxied to the end of the runway, ran it up and as it sounded great I took off. I got off the ground to 300-400 feet when it shut off. It came on again and thinking it would clear up I continued to the south, making the turn, still climbing. The plane was shutting off about 3-4 seconds and then back on 3-4 seconds. This continued half way down the downwind leg where it cut down to an idle and wouldn't run at full throttle.

A Cessna was about to land in the pattern. I radioed "emergency" and came around in front of him which meant a short landing. I set down halfway down the field at about 90 MPH, and began braking it at touchdown and braked to the end of the field. With no choice and unable to make the turn because of my speed I ran straight forward onto the grass at the end of the runway.

The threshold lights extended across the runway about 6-8 feet apart. I hit the middle approach light with the left wheel. The tip of the prop ticked the light and I broke the left pant and bent the strut cover. Also cracked the right pant cover and scratched the fusilage, thankful that no more damage was done to my new "baby".

I hit the ditch at the end of the blacktop and the tail flipped up and the plane nearly went over. It righted itself and ran 200-300 feet down the grass where it stopped. The engine was still running so I taxied back to the runway with the engine sounding fine and running beautifully on the ground. I wondered what could be wrong with the gas: was it the carburetor, vent, gas line plugged, a plugged screen or an air block in the line? Why today when it ran so good two days prior?

At this point I returned the 10-5135 loaner carb.....

I tried to trade my 10-3678-32 carb for a 10-5135 with no success. Lycoming's explanation was my O-320-A2B engine and 10-3678-32 carb are mated for the Super Cub, Tri-pacer or Cherokee 140 planes. However, they offered to sell me a new carb for \$1,120.20, which I felt was out of the question. I then sent the 10-3678-32 carb to Lycoming in Williamsport PA for corrective action. After several months and many phone calls it was finally returned with "no service required". The carb was in the middle of the performance curve according to their tests.. One dealer in California would take a trade-in (\$285.) for a rebuilt carb, but it must be an identical part number, which I did not want. They offered a rebuilt carb for sale outright, no exchange at \$483.

While waiting for the return of my 10-3678-32 carb from Lycoming I found a used 10-5009 carb for \$300. I now have one new 10-3678-32 for sale. Remember Lycoming said it "performs in the middle of the performance curve".

After checking all other possibilities and finding no defects, the plane was back in the air after a 6 month delay. It now runs perfectly and has been signed off by the FAA on 2-25-83

My advice to anyone buying a Lycoming 150 HP engine is to make sure you get a 10-5009 or 10-5135 carb with it . Dealing with Lycoming manufacture direct did not seem to get results, after the fact. A used engine from a Cessna Cardinal with a 10-5009 carb, is running fine for my friend Ford Hendricks' T-18.

I conclude by saying this whole experience was a most trying and unexpected one for me.

FROM
John Kenton, 16611 126th Pl. SE, Renton WA 98055 (206)255-7110

Thank you JOHN KENTON, old friend, for that info. I'm glad, too, that you didn't bend your pretty bird on the forced landing. John further added that he felt that this information is especially important to all new builders that are using the carb air box that Ken Knowles sells (which essentially is the same as the one that George Leider built and that we ran pictures on in NL #45).

AIRBOX SIZE VS CARBURETOR JET SIZE: I can identify with John's problem with the carb. When I installed the O-320 160 hp Lyc in my bird I couldn't get it to turn up more than 2000 rpm static before it began backfiring and belching out black smoke. I even tried it with the cowl off, thinking my air filter might be the culprit. The engine had been installed in a Super Cub and of course ran great. The fellow I bought it from, Bobby Osborn, even put it on a test stand and ran it for me before I bought it and it just did great. I couldn't figure out for awhile why it would run fine in one airplane and not in another, until I remembered that on the test stand run we had no airbox on it. That was the common denominator. I called a friend who had put this same engine in his Mustang II and had had the very same problem and it was solved by going to a leaner jet. When Piper had put that engine in the Tri-Pacer they had problems and there was an AD put out to change to this leaner jet. Yes, they had made airbox changes. So if you are about ready to fly a bird with one of the O-320 series engines and have this sort of problem arise, you might well look at the carb first. Be aware that the shape and size of cowling air scoop could well make a significant difference, too.

5:00 x 5 TIRE PRESSURE: I had trouble finding out what the optimum and recommended tire pressure was for 5:00 x 5 tires and in the past I had just eye-balled the tire, using a pressure that raised the outer tread ribs just off the pavement. I decided to ask TOM KERNs what he could find out thru his engineering contacts. Here is what he said: "I have access to a Goodyear Aircraft tire application book, which is used to determine tire size, pressure, and deflection under load.

Working with Goodyear design tables, I calculated an optimum tire pressure of 28 PSI for Goodyear Flight Custom II 5.00 x 5 tires of either 4 or 6 ply rating (this is for 1400 lb. gross weight. Pressure would be proportioned up or down for other weights).

The 4 ply tire has a maximum inflation pressure (under load) of 32 PSI and a maximum static design load of 800 lbs. per tire. The 6 ply tire has a maximum inflation pressure of 51 lbs. PSI and a max static load of 1260 lbs. per tire.

Use of 28 PSI on a T-18 tire should give even tread wear. I experimented with higher pressures and I was surprised at how much harder the airplane rides...and bounces! Lower pressures will increase rolling friction.

Happy Flying, Tom Kerns s/n 71 N10TK

Thanks, Tom, for the info. We're going to miss you around here, but your recent letter sounds like you are going to enjoy your new job with NA in Columbus, OH. Hope you make OSH this year with your bird. If not, perhaps you can make it back down this way in Oct. when we organize a 2nd Annual dinner and conflag of T-18 types like we had at Temple, TX, in '83.

(We'll hit on that in NL#60, that will be in the mail by 1 Sept.)

Mid October '83

Dear Dick,

Herewith £ 15 for the fund. I know it costs more to mail newsletters here. Sorry you could not make it here. My phone number is not listed but if you are this way again and require picking up from Heathrow or wherever (after 5p.m.) it is 0329 - 832754.

Enclosed is a photo of my T - 18 - possibly the most advanced in Europe - certainly in the UK, taken during trial assembly a couple of months ago. I now have it indoors, the U/C has been heat treated to the satisfaction of my inspector and I am finally assembling the fuselage. I started with small parts - fin, rudder, ailerons etc, then wings. This gave an important psychological boost - always something to look at as signed out. It also made for easier storage and cash flow. I was able to keep and fly my previous homebuilt until a year ago. The cash I got from selling it financed my nav/com., engine and soon, I hope, propeller, canopy and paint job. Had I started on the fuselage I would have had a lot of outlay at the beginning with little to show for it and would have had to sell my Nipper Mk3 a couple of years earlier. As it was I just had to fly the statutory 5 hours this year to keep up my licence.

My T-18 is wide bodied with folding wings and 2" longer u/c. I have a Narco nav/com. and instruments for a complete IFR panel (although it is only legal to fly homebuilts VFR here). I suspect I'm a bit of an instrument nut but, having had two flameouts with my previous VW engined mount and having heard from my CFI friend how their Cheetahs with similar engines to mine cruise on 4½ (imp.) gallons quite happily when leaned out correctly, I reckon the more monitoring one can do the better for one's safety and pocket.

My inspector is very much a belt and braces bloke. On his suggestion I am fitting an electric turn & slip, vacuum driven artificial horizon and I have gone for a Hamilton vertical card compass - a real jewel, this. He got me ~~two~~ ^a new Cessna wingtip strobes ^{at} much less than the price of one but I have jibbed at ~~the~~ fitting more weight near the wingtips. The aircraft will be finished cream and red in a similar pattern to that of John Shinn's aeroplane (which stares accusingly from my living room wall when I eat or watch TV) but, in our crowded skies, I still reckon to need all the seeability I can get, particularly around VOR beacons at weekends. I originally went for the Ken Knowles fin tip radio aerial but, having seen it in mock-up have decided it spoils the

- 2 -

chunky look of the beast and also, with VOR aerial in wingtip I wanted an anti-collision strobe on my fin. The flasher unit fits neatly on its modified bracket on the bottom longerons between bulkheads 576 & 575. This is not as accessible as I would like nor as near its strobe but, like most things to do with aeroplanes a barely acceptable compromise. The rudder cables clear it nicely and their exit holes provide ventilation.

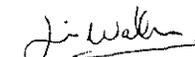
The trial assembly was for two reasons. Firstly I wanted to be able to position the wing fixings accurately on the fuselage. Secondly I needed to see what a T-18 looked like at close quarters and let the PFA, our equivalent of the EAA know that I had not given up.

When I put the fuselage together for the first time I only taped the 601 bulkhead in position with a pointer to centralise it on the 592 bulkhead. I found the Ken Knowles fuselage skins accurate but was not prepared to risk the 596 and 601s being too close - unable to get wing in or too far apart - resulting in stresses being set up drawing the two together. What I did was to assemble the centre main spar of the wing to the 601 bulkhead and drill and ream the 522 and 602 fittings together.

Having centre drilled 3/32" the 597 fuselage and rear spar fittings I put the clecoed up fuselage on trestles and eased the wing centre section into place and supported it. Once the wing was seen to be correctly positioned and parallel with the stabilator I drilled the rear spar holes out to 5/16" and bolted them up. I then bolted the 601 bulkhead to the centre spar and drilled locating holes through it, the fuselage and the 494 shear plate. When I measured from each wing rear spar to centre of stabilator spar there was only 1/8" between them. I hope to be reasonably sure that when, next spring, having fitted my Lycoming O320 E2G, instruments, controls etc, I take the whole fuselage outside for final assembly, there should be few problems.

I have gone for monel a/c pop rivets almost everywhere because I am working single handed for 99% of the time. If I were to get my wife to help I would be expected to mow the lawn, prune the trees and generally do the jobs non-builders do around the house. As it is she cheerfully accepts that I do not own an aeroplane - it owns me.

Best wishes,


JIM WALLER

Thanks, Jim, for your very excellent report. I hope the rest of you blokes here in the USA appreciate how much easier we have it in dealing with the bureaucrats.

The Landing Gear was another saga. First, Jim Waller (Another T.18. builder.) obtained the 4130 tubing after many weeks, from the U.S.A. through an English Company called Tube Sales, in Southhampton. (A very helpful organisation.)

After it was cut-up and shaped by hand, (This was done downstairs in my business premises at a week-end, the neighbours thought we had the decorators in.) the whole thing was set-up on a $\frac{3}{4}$ " Block-board Jig and taken around to several CAA approved welders. All of them threw their hands up in horror, and said it could not possibly be done by Gas Welding, and anyway there was only ONE firm that were likely to tackle such a job in the U.K. and that was XXXXXXXX at XXXXXXXX Airport (I had better not mention their name.)

I delivered Two Sets of gears and the Jig and their welder agreed to do the job. Could I wait while they done it? Sure!

Twenty Minutes later, I was shown the lower ends of the legs with the Axle pads attached..... you have never seen such a mess in all your life. A ten year-old kid who had never used a torch in his life, could have done a better job. I went to see their Managing Director, taking the legs with me, and he agreed to send to the United States for some more material, re-make the parts and get them re-welded by his Son who was also a CAA approved welder, but insisted that Hell-arc was the only way to go.

Weeks later, we had two welded-up gears which looked good, and no cracks. We now spent weeks trying to find a Heat-treating shop with a large enough oven.

Eventually, we found one. After FIVE ATTEMPTS to get them up to 180,000 lbs, they returned them, with apologies, but recommended another firm who managed it on their SECOND ATTEMPT. When I collected them I could have cried, the legs were actually S shaped. I have since managed to get mine straightened out but I had to use a torch to sort out the upper U bracket where they hit the oven during it's removal. Jim's inspector has passed his, as it is.

A few weeks ago, I sold the business, and had to move everything out of the apartment. Fortunately, everything had only been Clecoed except the small fittings and the Main Beam webs etc. so removal was no great hassle.

Now, due to a divorce settlement dispute, I have the Lawyers acting for the other side, claiming that I have "A very valuable Private Aeroplane." which is a very unusual thing in the U.K. and THEY have set a valuation of \$ 16,000 on the bits made so far. To-morrow, I shall actually show them, what we have to-date, which apart from the fuselage is still dismantled. If I delay the mailing of this letter for one more day, I may be able to give you the result.

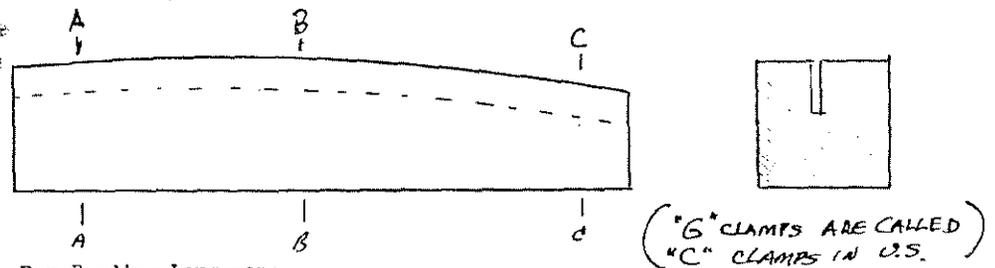
As far as building tips for the rest of the troops, I do not have a lot to contribute other than the idea for bending the longerons easily, which I previously submitted. (I enclose it again, herewith.) But, a new member of our T.18 builders in the U.K. who has just started, John Burke, has asked me to mention the following:-

After lending him all the wooden formers which I had made, he decided to make a start on his Fuselage Frames. In trying to get the inner flange down to 90 deg and after scrapping two frames, he came up with the idea enclosed, which simplifies the operation, allows boards or planks to be laid inside the fuselage for maintenance etc. and adds a lot of strength to the frame for very little extra weight. At the same time, it eliminates the possibility of cracking the frames during forming.

All the Best, *Ron Miller #1344.*

P.S. To date I have no progress with the Lawyers, they could not agree on its value.

Here's Ron's tip on bending longerons: (from pg.25)



For Bending Longerons.

Block of wood 2" x 2" x 10" slightly curved on Top Edge, with saw-slot to take one edge of angle to prevent buckling. Hold block in vise to prevent wood from splitting, and clamp A-A with "G" clamp whilst SLOWLY bending angle with two more "G" clamps at B-B and C-C. Frequently remove angle and slide along block and bend a bit more, being careful not to OVER-DO it.

Thanks, Ron, for both the tip and such a newsy letter. When I read a letter such as yours it truly touches me. Sometimes we think we have it tough here, but when I hear of what the homebuilder has to go thru to even be allowed to start building an airplane, the mountainous problems of obtaining materials and the unbelievable costs, it makes our problems mere molehills in comparison. You guys just gotta be made of the right stuff to hang in there and endure and my hat's off to you!

TOM KERN'S

● On a previous page I failed to give credit to TOM KERNS for the article on the alternator. Tom has a Ford alternator in his T-18 and has well over 100 hrs. on it, so he, too, can't help but wonder if this isn't one of those cases of someone blowing a lot of smoke in order to justify an astronomical cost of an item...JUST because it goes on an airplane. To use one on an IFR certificated airplane might be justified, but on a VFR homebuilt, is that too much of a gamble?????

● PITOT DRAIN: Some time back I posed the question of a good way to have a cockpit-accessable pitot drain. I've only gotten one response and that one was from ol' Hank Steiginga, out in Lancaster, CA., but his solution is a simple, but effective way of doing it. Many times the simple way is far and away the best way. Hank says: "The pitot drain on N512S is a tee in the plastic tubing under the left seat. A two inch stub tube extends down and is plugged off. Simply loosen the "B" nut and check the stub tube for moisture."

Hank didn't give details as to whether one could reach the "B" nut while in flight. I suspect it isn't accessible, but it seems that the tee and stub tube idea could be moved forward, so that the stub tube could be hidden behind the vertical part of the dash panel, or some such place.

As a little minor "emergency" drill, have you ever practiced approaching and landing your bird with the A/S covered up. If you are coming into a small field you don't want so much excessive airspeed (to be on the 'safe' side of stall) that you float and run off the other end, nor do you want to be barely a couple of knots above stall, either. Try finding a spot on your windshield where the horizon crosses and mark this in your memory, whether you are or aren't using power. This gives a safe angle of attack

(CONT'D)

mechanical "crutch" you can use in a pinch. In practice (at altitude) you should closely observe the very minute differences of horizon location, using airspeeds of 80, 90, 100, 110. Pay careful attention to how much rpm being used at those speeds and record them. Your rate of climb indicator will give you still another clue. Get in the habit of checking your sink rate/min EVERY time you glance at the A/S on final approach. When you are practicing stalls with and without power notice what the R of C does just prior to flow separation.

••• STALLS •••

I feel that practice of stalls on a regular basis is very beneficial for any pilot, regardless of their experience and regardless of their familiarity with the airplane. Most T-18s have little if any pre-stall warning buffet, so it's good to accumulate as many pre-stall clues as one can. Another most important objective in stall recoveries is to prevent the airplane spinning and this takes a trained and practiced reaction. The natural, but WRONG reaction to picking up a low wing is to use AILERON. That low wing is already stalled and actually trying to move BACKWARDS, while your high wing is moving FORWARD and still developing SOME lift. A 'down' aileron to pick up a low wing, in effect increases the camber of that wing, GREATLY increases the drag on that wing and tends to deepen the stall.....The RIGHT reaction is to ALWAYS pick up that low wing with RUDDER....Actually you should get in the habit of immediately and fully OPENING UP YOUR HAND on the stick as a practiced, trained reaction to a stall. This is a time when one's natural INSTINCTS ARE wrong,..and they could be DEAD WRONG at low altitude. Many people don't like stalls, so they don't like to practice them, telling themselves, "I'LL never stall MY airplane". Old timers will tell you that there are only 2 categories in this respect....those that have accidentally stalled an airplane and those that will...and when it happens you'll likely be at or below traffic pattern altitude. Keep that fact in mind as you practice, too, and make note how much altitude a stall can cost you and see what that does to thinking on what your minimum altitude should always be when making your turn from base to final....for that is the danger spot in many cases.

In NL#60 I am going to include an 8 page article (that we have reduced down to 4 one-half size pages) by an acrobatic pilot, which records his research results on a simple spin recovery method, a one, two, three method...that will work for ANY spin, inverted, flat, or otherwise. The first action is to close the throttle, 2nd, release the stick, 3rd, kick full opposite rudder against the spin direction. (This article will be for insertion in your T-18 Operation and Safety Manual).

This method has been thoroughly tested by IAC chapter members and recently the local IAC made a video tape of spins of all types, using a video camera mounted on the vertical fin, and I assure you it was an eye-opener. I wish all of you could see the film and hear the commentary, but I've been told it will be several months before such a tape will be available. I think it will first go to IAC chapters and then EAA chapters, etc.

A BEAUTY FOR SALE: LEE SKILLMAN, whose T-18 you've seen at OSH and some of the other fly-ins is reluctantly (almost) decided to sell his T-18. His beautiful bird was the T-18 rep at the Wright Bros./Dayton Air Fair two years ago, so that tells you a bit about what a jewel it is. Lee has been transferred to Mobile, AL, 36608 (6964 Airport BLVD, Apt. 82. His home phone is 205/342-3967 (evenings only). I lost the slip of paper that had all the vital stats on his bird, but I remember he was going to price it SOMEWHERE in the vicinity of 21 or 22K, so if you are interested in a creampuff, give him a call.

Here's an item you should file...along with a reminder to tell you NOT to depend on your own 'educated' sense of touch when tightening nuts and bolts and to use a torque wrench. If you don't want to take time to do it RIGHT, when will you find time to do it over and do it right then?

• TORQUE LIMITS
By Dewey Ballard, Designee 1064, as printed in TOUCH & GO, Overland Park, Kansas Chapter 200's Newsletter

One of our Chapter members mentioned that he would like to have a convenient chart of torque limits for use with the more common airframe nuts and bolts used in aircraft construction. The values in the chart below are for standard cadmium plated nuts with oil-free threads and used only in metal-to-metal assemblies. In joining wood, unless bushings are used, nuts are torqued up only tight enough to prevent rotation of the bolt and without crushing the wood fibers. In the chart, column A is the torque range for tension type nuts (AN310, AN365), column B is for sheer type nuts (AN320, AN364). The values are in inch-pounds.

Tap Size	A	B
Fine-thread bolts		
8-36	12-15	7-9
10-32	12-15	12-15
1/4-28	60-70	30-40
5/16-24	100-140	60-85
3/8-24	160-190	95-110
7/16-20	450-500	270-300
1/2-20	480-690	290-410
Coarse-thread bolts		
8-32	12-15	7-9
10-24	20-25	12-15
1/4-20	40-50	25-30
5/16-18	80-90	48-55
3/8-16	160-185	95-100
7/16-14	235-255	140-155
1/2-13	400-480	240-290

A bolt of the proper length should have no more than one or two threads showing when tightened with the proper torque. Checking for cotter pin hole alignment after reaching the low end of the torque range allows for a bit more turning to secure alignment without exceeding the torque limit for the bolt and nut. Never back-off a nut to obtain hole and castellation alignment. Self-locking nuts (AN364, AN365) require no specific alignment. They can be used on drilled or undrilled-shank bolts.

When using them on drilled-shank bolts be sure that there are no burrs around the cotter pin hole. A self-locking nut can be used more than once, until it can be turned on or off by finger pressure alone. Just remember, a self-locking nut must not be used on a bolt which is subject to rotation, unless it happens to be one of the super-duper nuts which have a self-locking feature plus castellations for a cotter pin.

From the Designee File: Lyle Trusty, Designee #52

CHECKING YOUR AIRSPEED INDICATOR ON THE GROUND

from a 1976 edition of *The Omaha, Nebraska Chapter 80 Newsletter*.

Materials: Ten feet of clear plastic tube (inside diameter to fit outside diameter of pitot tube.)
One dropper. One measure (inches or centimeters). One stick or board. Water.

Bend the plastic tube to form a skinny "U" about 3 feet long and attach this to the stick or board. Fill bottom 4" of tube with water. Attach one end to pitot on airplane (water should be the same height in both sides of the "U".)

Now add water, drop at a time, until your airspeed indicator reads 60 mph (52 kph) tapping the tube to make sure all the water gets down. Then measure the difference in the heights of water and record your reading. Repeat with airspeed indicator reading 10 mph higher each time. Readings should be close to those in the table below. **CAUTION:** DO NOT ALLOW WATER TO ENTER PITOT TUBE.

Next check for system leak by checking for reading changes after five minutes at the highest pressure. There should be no change.

MPH	MPH = miles per hour and KPH = Nautical miles per hour			
	KPH	cm/H2O	in/H2O	in/H2O
60	52	4.5	1 13/16	120
70	61	6.2	2 7/16	130
80	69+	8.0	3 1/8	140
90	78	10.0	3 15/16	160
100	87	12.5	4 15/16	180
110	95	15.0	5 7/8	200

THANKS AGAIN TO LYLE TRUSTY

This is a relatively simple way to insure a reasonably accurate ball park reading on your A/S in the low speed range prior to your first flight. It will also show up leaks in the pitot system, which aren't too uncommon.

TACH CHECK: If you don't have a good speedometer shop in your area to do a bench check on your tach for accuracy there is another rather simple way. This is a ramp check that will be very accurate in a couple of the rpm ranges you are interested in. The only requirement is that it be done at night. Simply position the aircraft in the light of a mercury vapor or fluorescent light. Immediately you will be aware of the pronounced stroboscopic effect on your prop blades. This is due to the 60 Hz AC line cycle current. The prop blade will appear to be motionless anytime you are at an rpm multiple of 60 (1200, 1800, 2400) etc. If the test is also observed outside the aircraft a two bladed prop will show an "X" pattern at 1800 rpm and if you could turn up 2400 rpm you would see a six-pointed star.

THE WHISTLE SLOT: Probably most of you gents in the frozen North are aware of this, but just in case you aren't.... There have been any number of forced landings in bitterly cold weather when the breather tube froze over. This causes pressure to build up in the crankcase, so that it will eventually rupture the nose seal. When that happens most of the engine oil will be lost in short order. The results could be a badly bent airplane or a ruined engine, or both. If you have to relocate the breather tube where part of it may be subject to freezing, be sure and cut a little notch or hole where it will be in the warm area and the moisture that is being expelled from the crankcase can vent inside the cowl. If the exposed part of the tube should freeze over and block the exit of oil the back pressure forces it out thru the whistle slot.

FOR SALE : A local builder, Robert Clark, passed away from cancer about a month ago and we are helping his widow dispose of his T-18 parts and tools. He has a wide body fuselage that I built for him, with just about everything needed to complete the fuselage and tail group. He also has a set of spar caps (main wing only). All parts were given a coat of zinc chromate and all parts were purchased from Ken Knowles in late '79. The gear is the long gear and is complete with wheels, brakes, axles, tires. He also has a set of T-18 plans, newsletters, WB plans, and CW plans. Also some extra items. Mrs. Clark would like to get the inventory ('79) price out of it all in one pkg, but will consider parting it out to some extent. It's a good buy for someone, about 20% cheaper than current prices with much of the work already done. It is clecoed now, ready to rivet. If you are interested, call me at 214/351-4604 anytime between 9am and 10pm CST (if the phone rings before 0900 my wife has been known to snarl).

HARTZELL CONSTANT SPEED PROP: This prop flew on Hugh Grammer's T-18 a few years back. It is 70" in dia. and is for Lyc. 150-160 hp and has full feathering capability and I think has been recently overhauled. I've lost the model # and other details, but the price is \$550. T-18 builder BOB YEAKY, 9729 Bellewood, Dallas, TX, 75238. (Just found the specs on the prop. It's an HC 82X L-2C, serial # is 52-4-R, Model PC10. It has a manual with it, too. Bob's home phone is 348-2947 (214), evenings only, please. His work # is 214/351-6093.

It's now the middle of July and getting mighty close to OSH time, so I will bring this NL to a close, even tho' I have a good sized stack of all sorts of really good stuff that will have to go in #60. I feel certain that I can get it in the mail by Sept. 1, as much of the material is usable as is and doesn't require typing or re-writing. I apologize for taking so long to get this NL out, but there have been so many things to interfere this year. The latest was my Mother fell and broke her leg in May and at her age of 97+ she simply couldn't come back and passed away in late June. Since then it's taken me an extra long time to get geared up to writing. I also had three magazine writing assignments that I had to get out, but I'm up to speed now and plan to have #60 at the print shop by mid-August. The Opxn/Safety Manual is coming, too. Please be patient. Sorry to miss OSH, but you all go around and pet T-18s there for me.

Best wishes for a great fly-in, amigos,

Sick Edwin

N.A.S.A.D.

(NATIONAL ASSOCIATION OF SPORT AIRCRAFT DESIGNERS)

AIRCRAFT BILL OF SALE

FOR EXPERIMENTAL-AMATEUR BUILT AIRCRAFT. THIS FORM SUPPLEMENTS & DOES NOT REPLACE FAA FORM AC8050-2. N NUMBER (IF ASSIGNED:) N SERIAL NUMBER (OF BUILDER'S CHOICE:) THIS AIRCRAFT IS A FACSIMILE OF AN AIRCRAFT KNOWN AS A:

This aircraft is not designed or built to meet any standards of airworthiness, as with a certificated aircraft. This aircraft does not have a FAA Form 317 Statement of Conformity on file, since there is no FAA approved data to conform to. This is an experimental aircraft and the registered owner is the experimenter. The aircraft was not built in a permanent jig and parts are not interchangeable with any other aircraft of the same facsimile. FAA records list the registered owner as the manufacturer of an experimental-amateur built aircraft. The registered owner is free to make any modifications or changes he so wishes. The aircraft is an example of the owners creative ability. The new owner of an experimental-amateur built aircraft becomes it's manufacturer, when it is registered to him. He becomes responsible for it's aerodynamic and structural concept. The new owner is responsible for the performance and fit for purpose of every part and piece on the aircraft. Warranty is not expressed or implied for any feature or part of this experimental-amateur built aircraft.

I accept the terms of this Bill of Sale and all responsibility for the aircraft described herein.

PURCHASER NAME: ADDRESS: SIGNATURE:

I this day of 19, do hereby sell, grant, transfer, and deliver all rights, title, and interest in and to such aircraft.

SELLER NAME OF SELLER: ADDRESS: SIGNATURE:

This Bill of Sale must be signed by both parties. The seller keeps the original and gives a copy to the new owner. Send a copy of the original to FAA with the canceled registration (if registered.) Sign before a notary if required by the state where the transaction occurs. FAA dropped the requirement for notarizing in 1972.

NOTARY SEAL SPACE

TO ALL T-18 BUILDERS AND OWNERS

THE FOLLOWING FEW PAGES ARE THE FIRST OF A SERIES OF SUBMISSIONS FROM T-18 BUILDERS AND OWNERS AND THIS SERIES WILL BE FOLLOWED BY OTHER SUCH ARTICLES AND SUBMISSIONS IN THE NEAR FUTURE.

WE REGRET THAT CIRCUMSTANCES HAVE DELAYED THE PUBLICATION AND DISTRIBUTION OF THE T-18 BUILDERS AND OWNERS SAFETY AND OPERATION MANUAL.

THIS MANUAL WAS THE IDEA OF MR. VERN PEPPARD, OF DALLAS, TEXAS, THE PRESIDENT OF GEOMAP, INC. MR. PEPPARD ANNOUNCED SUCH A MANUAL AT OUR FIRST ANNUAL T-18 REGIONAL CONVENTION AT TEMPLE, TX, LAST OCTOBER. HE IS ALSO MOST GENEROUSLY UNDERWRITING THE COMPLETE COST OF THE PRINTING AND BINDING OF THE MANUAL. I KNOW I ECHO THE SENTIMENT OF ALL OF YOU IN EXPRESSING OUR GRATITUDE TO MR. PEPPARD FOR HIS SINCERE EXPRESSION OF GOODWILL AND CONCERN FOR THE WELL BEING AND HAPPINESS OF HIS FELLOW MAN. IT'S ANOTHER WAY OF HIS SAYING, "THANK YOU, JOHN THORP, FOR GIVING US SUCH AN OUTSTANDINGLY FINE AIRPLANE."

WE ARE ALSO IN DEBT TO HANK STEIGINGA, OF 45528 NEWTREE AVE., LANCASTER CALIFORNIA, 93534, FOR SUBMITTING THIS MOST EXCELLENT AIRCRAFT HANDBOOK FOR HIS PARTICULAR AIRPLANE. WE SUGGEST THAT YOU USE THE FOLLOWING PAGES AS A GUIDE IN THE OPERATION AND INSPECTION OF YOUR OWN AIRPLANE, USING IT TO PREPARE YOUR OWN MANUAL FOR YOUR INDIVIDUAL AIRPLANE.

PLEASE NOTICE THAT ANY AND ALL INFORMATION CONTAINED IN BOTH THE T-18 NEWSLETTERS AND THE T-18 BUILDERS AND OWNERS SAFETY AND OPERATIONS MANUAL IS PRESENTED AS A CLEARING HOUSE OF IDEAS, OPINIONS, AND PERSONAL EXPERIENCES OF VARIOUS PEOPLE, INCLUDING ANY SUGGESTIONS EXPRESSED, AND ANYONE USING ANY PART OF THE INFORMATION PRESENTED BE AWARE THAT THEY ARE DOING SO AT THEIR OWN RISK AND DISCRETION. THEREFORE, NO RESPONSIBILITY OR LIABILITY IS EXPRESSED OR IMPLIED AND IS WITHOUT RECOURSE AGAINST ANY OF THE PARTIES INVOLVED IN THE WRITING, PUBLICATION, OR DISTRIBUTION OF THE EXPRESSED IDEAS, OPINIONS, AND EXPERIENCES.

UNTIL SUCH TIME AS THE BOUND HANDBOOK ARRIVES, WE SUGGEST THAT YOU REMOVE THE VARIOUS ARTICLES PERTINENT TO THE BUILDERS AND OWNERS MANUAL THAT HAVE BEEN PUBLISHED IN PAST NEWSLETTERS AND PUT THEM IN A LOOSE LEAF BINDER FOR THE PRESENT. THERE ARE SEVERAL SUCH PAGES IN NEWSLETTERS #58 and #59. THANK YOU FOR YOUR PATIENCE AND UNDERSTANDING

DICK CAVIN