L.D. Sunderland, 5 Griffin Drive, Apalachin, N.Y. 13732

EAA T-18 - Paul Poberezny just wrote to me asking if the T-18 builders would help get the EAA headquarters T-18 completed to help inspire interest in persons attending the Fly-In so they will get started on a T-18 or a metal airplane. He wants our help and can have the airplane and much of the material ready for action. The wing spars and other wing material will be ready. He needs completed ribs and also horizontal tail ribs. I'm sure any donations of parts necessary for the completion of this T-18 will be most appreciated. If you can help with assembly or donate parts, please contact me.

Material Source - Sport Aero, P.O. Box 1394, Brunswick, Ga., 31520 has a new quotation for materials assembled. It offers most materials for the aircraft and takes into account the "packages" offered in the last Newsletter. The hand tool list has been greatly expanded. Sport Aero is automatically mailing to all old customers plus those who have written to enquire. If you would like a quotation and haven't written them, a postcard will get you on their mailing.

Sport Aero recently offered tooling to fit the Whitney punch which would allow dimpling and squeeze riveting. Advertising for this was first in Trade-a-Plane and the majority of the supply was purchased by A&Es. Sport Aero is presently out of all except 1/8 100° dimplers. A resupply of all tooling is being made up and should be available in quantity by April 15.. Kent Hugus advises that all present backorders should be enroute by this printing.

I tried one of the dimpling tools for the Whitney punch and it does a nice job. This type of dimpler usually produces a dimple surrounded by a slightly depressed area but he has solved this problem with a small flange on the die.

Kent has done a good job rounding up the hard-to-get items for the T-18 and doesn't try to compete with other established scurces, For instance, he had a whole set of price lists made up ready for mailing when he received Newsletter #15 listing the various kits we had lined up. He immediately revised his listing to advertise our kits instead. He will supply the partial sheets to allow you to purchase a partial kit.

Kits - The kits listed in Newsletter #15 have received a surprising response. Apparently a person from California can save enough money to justify shipping costs so the first orders were from the West. It appears that a savings of about $100. is possible. If this works out well, the kits will be made available on a permanent basis. If you plan to order a kit, let us know right away so we can get the quantity prices. We have 3 orders now, so need 2 more.

There was a mistake in the partial kit listing. There should be one 1/2 x .035 2024T4 tubing in the partial kit. Since the trim drawings are out, the partial kit will have added one 12 ft. piece of 1/4 x .035 2024T3.

The kits include enough aluminum sheet and tubing to complete the entire T-18. It does not include tubing for fuel, hydraulics or pitot static and pressure lines. Since 12 ft. sheets are included, it requires a splice near the tail for side skins, but you won't find this objectionable. Thorp approves it, (mine is made this way).

Corrosion Prevention by Kent Hugus (Sport Aero)

Metal corrosion defined: The disintegration of a metal caused by the interaction of its surfaces with other substances in its environment.

Metals vary in susceptibility to corrosion. The least active metals are termed cathodic. An example is gold which has a solution potential of 0.0 in the electro-chemical series. Very active metals are termed anodic, such as

magnesium which leads the solution potential parade with -1.66 volts. (2024 aluminum and steel stand -.68 and -.67 respectively).

Why solution potential ratings? Because corrosion is generally believed to be an electro-chemical activity. When metals are immersed in an electrolyte such as dirty water, the difference in potential creates an electron flow from anodic to cathodic material. The metal particles on the anodic metal are transformed into ions which combine with non-metallic ions in the electrolyte and form corrosion products. These products are usually brittle, scaly and weak.

A corrosion spot on a single metal may result from a casual electrolyte. The drop of electrolyte may vary in strength throughout its mass, creating a differential in potential from one area to another. Likewise the metal itself may vary in its composition with more alloying elements in one area than another and you again have a potential differential.

What can be done about it?

1. Keep it clean. Dust is condensation nuclei for moisture and moisture is an electrolyte. Keep your metals covered. A plastic drop cloth is fine provided it is propped up to allow some air circulation. Finger prints may last forever if allowed to "set up". Work should be wiped with solvent after handling to remove prints. I use alcohol. Steel wool and crocus cloth both leave corrosive residue so don't use them on aluminum. Substitute good quality wet or dry #400 paper and aluminum wool. Mild corrosion may be removed with any of the good aluminum polishes available or with non-chlorinated "Bon-Ami".

2. Follow the drawings. The use of zinc-chromate for faying (contacting) surfaces and closed assemblies such as rod ends serves as an insulation. It also supplies a constant supply of chromate ions, the "good guys" in the corrosion battle. The anodizing called-out for certain parts provides an oxide film which inhibits corrosion.

3. Protect your workmanship - Protective finish for aluminum should comprise the following, in order from inner to outer layer: a. Chemical film such as Alodine. b. Wash primer. c. Zinc-chromate. d. Lacquer or enamel. If you are located in a corrosive atmosphere, it may be well to invest in an Alodine 1200 kit for treatment of heavier, bare parts. This is a two part treatment which uses an acid cleaner followed with a protective film. To use the kit a plastic bucket, nylon bristle brush, rubber gloves and plenty of water are required.

This is a brief treatment of a very wide field. An excellent manual is available on the subject. Ask for Issue 49 from Lockheed Service Digest, Burbank, California 91503.

Trim System - You have no doubt recently received the drawings for the trim system. My first impression was that it was quite complex, but now that I have completed mine, I can't say that it was too bad. John says he went through a long process reducing it to an absolute minimum. Of course, it isn't as simple as a spring hooked to the stick like the first few ships, but it is much more satisfactory. Not only will it be better functionally, but will also be safer. As one of the EAA publications recently stated, the longitudinal trim system should provide a back-up in case of a failure in the control linkage.

I ran into several problems in making the trim system which might be of interest. It is absolutely necessary that there be no appreciable slop in the linkage from the screw jack to the surface. First, I had trouble cutting good tight-fitting threads and then the jack screw bearing had a large amount of end play.

The tapped threads were no problem but I had a few rejects on the jack screw. The screw can be made from an ordinary machine bolt, but don't try to use any of the original threads because there will be a necked down section between the new and old threads making a sloppy fit. The original bolt should have an unthreaded portion longer than the finished threaded portion. To

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make the screw fit well I had to open up the die and make successive passes, each time tightening it a small amount. The die holder wouldn't allow the die to be opened far enough, so I had to hold the die in a lathe chuck. Then the threads were cleaned up and polished. The screw was then plated.

The bearing problem has been solved by John Thorp as described in the following letter:

"Yes, we ran into the bearing end play problem on Dick Hanson's T-18. I haven't yet found a more suitable bearing, so made the following fix:

1. Ground a .25 radius on a small portion of the head of the #704 jack screw.

2. Made a plug 3/4" dia. and approx. 06" thick which is inserted between the head of 704 and the A-582 doubler.

The thickness of the bare 2024T-3 plug should be sufficient to take out all but a couple thousandths slop.

The 1/4 x .035 2024T3 bent to route shaft was used and works good. The #701 system works good with the plug. The plug should be lubricated with lubriplate before assembly. The flex shafts have been found in machine tool surplus. When it all settles down, I will put out some revised drawings.

At long last I have an acceptable way of hooking up the flap control system. It shouldn't take too long now to finish the drawings.

There doesn't seem to be any new T-18's close to flight. In about a year there should be a half dozen or so. It is a big job to build an airplane. I will have a tough time to get the new Skooter ready for Rockford."

Floor Boards - In Newsletter #9 we stated that the clearance slots for the exhaust stacks should be welded in place to seal up the cracks. John says that they need not be welded in place but the ducts themselves should have any cut-outs in the flanges welded up. I made mine from stainless instead of 6061 aluminum. I silver-soldered the cut-outs in the flange since this is much easier than welding stainless. John says that the slots aren't absolutely necessary, but they bring the exhaust stacks out at a much more efficient angle and every little bit helps when it comes to reducing drag. Never bring the stacks out at 90° to the slipstream.

ZIP Codes - The post office people give me dirty looks when the Newsletters don't have ZIP codes, so if your ZIP is missing from the front of this issue, please send it to me. But please fellows, try to keep it simple since I don't have time to answer 400 letters. If you have any helpful hints, by all means send them to me, but if you have questions, try to make them general enough to be answered in the Newsletter.

Serial Numbers - I try to file all correspondence by your plans serial number. When you fail to refer to your number, it takes me an awful lot of time looking it up. Also include return addresses on letters - not just on envelopes.

Building Instructions - Reprints of the Sport Aviation Building Instructions are available from me for $2. I just discovered that the printer omitted page nine from some sets, so if you are missing a page, let me know. Whoever asked about this, please re-order, if you haven't received yours.

John Tonzer - Last month I visited some of the builders in the Los Angeles area and picked up some interesting tid bits. John Tonzer, has about everything completed but the wings. He is a VW mechanic, having learned his trade in his native Austria, and has included some VW features in his T-18. He discovered that a Carmen Ghia fuel gauge works perfectly. (It is mechanical and requires no electric power.) The only modification needed is the lengthening of the float arm rods. They are simply replaced with longer ones made from welding rod. A flexible shaft leads from the float assembly to the panel

indicator. I'm using one and I think it is great. Thorp also is using one.

I found out how John arranged the spinner deal. He overhauled a VW for a guy who runs a metal spinning shop and got the low quote as a favor in return. But finally the guy had to raise the price to $45. because he was losing money. Someone else got a quote on spinners and the price was $100. After I tried spinning the trim wheel I think it might be worth it!

John Tonzer has found a way to make very light fiberglas tips. He uses a very thin layer of fiberglas and then fills them with polystyrene which is foamed into place with the tips in the mold. They look mighty strong and light Thorp notes that this process should be done carefully since the foam has a lot of power if confined tightly while being foamed and might ruin a mold.

Fiberglas Parts - Lee Hamlyn, who works for Volpar doing twin Beech conversion took me out to see his fiberglas workshop. He does all of the fiberglas work in his garage. He just completed a new set of wing tip molds which are nice and smooth. He showed me his new 3-piece fiberglas cowling designed by Merle Soule. I now have one and it is a real beauty. I was anxious to see whether it would clear my alternator and exhaust system and it does. Lee is supplying a cowling for the EAA museum T-18 so you can see it at Rockford.

The prices on the new cowling are as follows: Nose piece - $45., bottom - $25., top and cheeks - $45. The cowling has the proper size inlet and cutlet openings for good cooling of the 125 hp engine. Total inlet area should be 54 in^2 and the outlet 10% more. Lee also supplies tail tips, wheel pants and just about any fiberglas part you want.

Assembling the spinner by Bob Kaergaard - I have been asked to describe how I assembled the spinner parts that I bought from John Tonzer so here goes -- First, I made a hole template by laying a piece of scrap .040" sheet aluminum under drawing #640 and pin-punching the seven hole centers right from the drawing. These punch marks were carefully drilled with a #30 drill bit. The large hole in the center was cut using a fly cutter in a drill press duplicating the hole already in the #639 rear bulkhead. A word of caution about using the fly cutter -- keep your hands away from the piece you are cutting! Clamp the piece you are working on to the drill press table over a piece of wood. Otherwise, if the cutter should "grab" the work, this piece becomes a "finger slicer" of the first magnitude -- I know!

Next, the hole template was clamped to the #639 bulkhead carefully aligning the two large holes. Then the six #30 holes in the template were drilled into the bulkhead. I didn't have the proper size drill so rather than buy one, I first enlargedthe six #30 holes with a 1/4" bit and then using a tapered pipe reamer in a carpenters brace, I carefully enlarged each hole stopping just short of the finished diameter. The holes were finished to size by using a fine tooth half-round file and constantly checking for a nice snug fit on the driving lugs in the crankshaft flange. This may seem like a lot of unnecessary work, but to me this part of the job is the most important step of the entire thing for if the rear bulkhead runs "out," the entire spinner will hop as it rotates.

The cut-outs in the #641 shell were made using a template I made first of the prop shank profile. Probably no two props will be alike in this respect so each builder will have to satisfy himself as to the fit. I ended up with about 1/16" between the prop and the shell. (It is important that the shell doesn't touch the prop or it will wear a dangerous groove.) With the cut-outs made, I marked off the center hole location for the eight nut plates at the rear end of the shell. These eight holes were made with a #30 drill. Laying the rear bulkhead with the flange down on my table saw, (you should use a flat surface), I placed the shell over it. Slipping my left hand thru one of the cut out holes, and pressing down firmly, I drilled thru one of the #30 holes in the shell while my Mrs. pressed down on the shell. The idea here was to align the rear edges of the bulkhead and shell as perfectly as possible.

With the first hole drilled and clecoed, we repeated this process 180° away and so on for the rest of the eight holes. At this point I though it would be a good idea to mark the parts so that they will always go together the same way. A little dab of finger nail polish on the inside of each part did the job nicely.

The #642 front bulkhead prop bolt holes were drilled using the same hole template as before on the rear bulkhead and then the holes were drilled to finished size. Both bulkheads and the prop were bolted to the engine and the shell was slipped over this assembly and clecoed to the rear bulkhead. I then marked off the location of the eight screw holes for the front bulkhead and drilled the holes using a #30 bit. It would be wise before drilling to be sure that the holes will be in the proper place in the front bulkhead flange. If the thickness of your prop hub is more or less than the 3-1/2" shown on the spinner assembly drawing, this variation must be considered; otherwise, the front bulkhead will not fit the shell properly.

Now came disassembly and the 32 #30 holes were drilled to size using a #17 bit. To drill the nut plate rivet holes, place a nut plate over a hole and on the outside of the bulkhead flange,and run a short screw into the plate from the inside. A short screw will not mark the elastic stop material and is quicker to install and remove. With the nut plate thus held securely in position, I used a #40 bit and drilled the two rivet holes using the plate as a hole pattern. Countersinking and riveting completed the installation of the sixteen nut plates.

The shell can be dimpled by using a 509 screw as the male die and making a female die from a piece of scrap aluminum plate stock that has been properly countersunk. It takes a little experimenting to get the countersunk hole just right in order to get the proper dimple. I was in a big sweat to get my T-18 in the air last year so I took the easy way out by just using the oval head AN 526 screws. Perhaps I'll "clean up" the assembly and go to the AN 509 flat head screws Thorp calls for at some later date. For looks I buffed the shell on a cloth wheel 'til it shone almost like chrome. This was the slowest and for me, the hardest part of the whole job, but it pays off every time someone remarks about that "beauty of a spinner"! Soooo-o-o, that's about it. Good luck, and I hope that this will help a little.

For Sale - Don Waters, 4200 Hatton Ct., Alexandria, Va., has a complete main gear, heat treated, built exactly to the plans for sale for $200.

Tailwind Type Gear - Ron Zimmerman, 1915 McKinley St.,NE, Minneapolis, Minn. 55418 designed tailwind type gear legs for his T-18 and got Thorp's approval before building the gear. He sent some photos but I can't reproduce them. Here is what he has to say about it -"The main gear has a short "A" frame in which Tailwind type springs plug in. It stands 3" higher than the "stock" gear and weighs 3 lbs less (including axles) than the "stock" gear (without axles). My guess is the spring action should be about halfway between the stock T-18 and a Tailwind (due to the difference in angle of sweepback between the two planes).

The tail spring is a round tapered spring (like Cessna 180) that moves the tailwheel back 7-3/8" from stock position. The tailspring attach points in the fuselage have been beefed up to take care of the leverage of the longer spring. The tailwheel and spring is the same weight as the "stock" spring and Scott TW assy. It should have less drag and a softer spring action.

The cost of material for both main and tail gear was $74.74. The total cost for main and tail gear less wheels and brakes (machinery, welding, heat treating, magnaflux, and material) was $234.24. The main gear was designed to be 100% interchangeable with the "stock" gear. I am sorry to say that it looks like there won't be any flight or taxi tests of this gear until after '66 Rockford. (Ron is still making prop extensions.)

Hinge Stock - John Foy, 299 Edith Dr., West St. Paul, Minn. 55118 has purchased 400 pieces of hinge stock so if you are in a hurry, write to him. As soon as he figures out the packing costs, we will publish the price, but it will be reasonable.

Visit with John Thorp- We asked John how much the tail spring could be softened and he said "so it doesn't bend the rudder." Some people feel that it is too stiff, but I don't think it is anything to worry about since it can always be whittled down if you don't like it.

John has a supply of gas caps per drawings for $5. each. He found that you can get more horsepower from an O-290-G by replacing the valve seats with the O-290-D2 type. The air filter and heat box could be made from fiberglas. John has a molded fiberglas seat from a new Air Coupe which he says would work fine on a T-18. The rear canopy rails can be shortened and moved inward and aft to make room for a cut-out in the aft deck for a jump seat. The flap handle will be mounted on the forward tunnel. The pitot and static tubes mounted on the fin of Thenhaus' and Hansen's ships whip around a bit but they provide accurate airspeed data. John doesn't have a better suggested arrangement. The pitot extends 16-1/2" and the static 14-1/2" above the fin. The two aluminum tubes are tack welded together for added strength.

More Riveting Tips - 17S AN rivets, the ones with a dimple in the head, normally can be driven without being annealed. They do grow harder with age and after some period are too hard to use. Driving a rivet which is too hard causes four problems. 1. It is difficult to drive it straight. It wants to bend and results in a lop-sided shop head. 2. It must be driven harder and the extra energy in the gun may cause deformation in the parts being riveted. 3. The shop head may crack giving an unsafe rivet. The crack will show up along a diagonal shear line. All rivets should be carefully inspected for this 4. The hard rivet will put a higher expanding force on the material being joined and cause it to crack. This is particularly true with dimpled sheets.

If you have been having any of the above problems, you can very easily solve them. Take all your rivets to a heat treat shop and have them annealed. Then bring them home and store them in the freezer. You have a real surprise coming if you haven't tried this. Riveting really becomes effortless with soft rivets. It makes driving AN's almost as much fun as using pops!

If you are a person who can't admit a mistake you shouldn't use AN rivets. Remember, if a rivet doesn't look quite right, drill it out. Don't even try to rivet without a hand drill by your side or you may tend to let some bad ones go.

Dimpling can easily start cracks. Carefully debur before dimpling and inspect every hole afterward.

When driving a flush rivet located close to a heavy fitting or extrusion, it is nearly impossible to keep from deforming the metal at the edge of the heavy member. As an example, the rivets in the fuselage just above the 3/4" extrusion at WL42 are very hard to drive. This can be solved by driving these rivets inside out where possible.

The rivets in the side skins which attach the 601 frame are nearly impossible to buck after the wing fitting is riveted in place. Either rivet the fitting on later or machine down the flange on the fitting to allow bucking clearance. Bill Warwick said some of his rivets worked loose in this area and he attributed it to poor riveting due to the tight bucking space.