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Just in case this is the first Newsletter you've received in the new series, this is the 2nd of the new series. The original series stopped with #4. A couple of years back it was re-written in a condensed form, that eliminated obsolete material and duplication.

TO NEW BUILDERS: If you are a new builder and do not have the older N.L.s, they are still available (only) from Lu Sunderland, 5 Griffin Drive, Apalachin, N. Y., 13732 for \$10. If you are missing some of the older series, write Lu and enclose a S/SA envelop and allow about 12¢ per page to cover cost of Xeroxing. Many builders say they couldn't have built the airplane without them and that they are truly essential. I agree. There's invaluable info in them.

That's a tough act to follow, but we hope our efforts in the new series will be equally appreciated. So far all comments have been complimentary except one and he took me to task for my cautious approach to bending wing skins. He had stood on a 2" x 10"-6 ft. long and it had taken him 3 times to bend the required radius on his wing leading edge.

MORE ON WING SKIN BENDING: First of all, I outweighed him 2 to 1, and I used a 2" x 6", which gave me a big advantage in p.s.i. I'll have to repeat, tho', that it is EXTREMELY important to take care not to bend too sharp a leading edge. Thorp strongly recommends that one should use a female template taken from the airfoil layout to check the contour, using a light on the other side of the template. Several builders that have had the occasion to re-skin wings have been amazed at how much slower they could fly with a bit "softer" L. E. radius (John Thorp was one of those). Anyway I don't think there was any real disagreement with my critic, as we both want the same thing--- a well behaved airplane, that won't roll over on its back and bite when it stalls. Right?

NEWSLETTER NEWS: We've found that the success of a N. L. is directly proportional to the degree of participation of all the members. If it falls on the shoulders of one person to generate information it will founder sooner or later. The T-18 M.A.S. newsletter was not only the very first of the newsletters, but has been widely acclaimed as the very best, too-- because of the volume of information that came from the builders. Let's keep it that way. The "M" stands for Mutual, meaning all of us.

I've already received a good number of builder tips, project progress reports, flight performance figures, opinions, etc. in response to our request in N.L. #45. T-18 builders are a unique bunch, in that there is an almost family relationship among us. Our N. L. is the cement that binds the M. A. S. together and many close friendships have been the resulting benefit of our helping the next guy realize his dream a little easier.

Response to our ad in Sport Aviation hasn't really been overwhelming, but we've been getting contributions coming in at the rate of two or three per day. We also sent out quite a few complimentary copies, so human nature being what it is I'm sure a lot more of them will gradually get around to signing up, so we'll be hanging in there. Due to the fact that some of you very generously sent in \$5, \$10, \$20, and \$25, instead of the suggested minimum of \$3, we are barely over the minimum we needed to hack the lower cost minimum mailing rate (3rd Class).

OUR BUDGET: We're trying to keep our costs to 30¢ per issue and to do this we have to mail 3rd class. Our 2 oz. N. L. costs about 8¢ to mail this way.

3rd class can only be sent within the U.S.; a minimum of 200 pieces per mailing; and it is necessary to mail all at one time. This will preclude individual mailings in between newsletters, so if you didn't get N.L. #45 drop me a note and I'll pitch one in for you when #46 goes out.

FOREIGN MEMBERS: If you will go to your Post Office and purchase Universal Postal Union coupons I can exchange them for U.S. stamps. For Canada, you will need to allow 30¢ for each mailing (2 oz), as all foreign mail must go first class. Airmail to other countries will require even more postage, of course. Perhaps some one of you in Australia should start a T-18 N. L. there and include pertinent info from this N. L.? It would be cheaper that way.

ADDRESS CHANGES: If you change address and miss out on a N. L. let me know and I'll try to get you caught up at the next mailing. If possible, advise in advance.

REQUEST TO MEMBERS: As much as I'd like to respond individually to your questions, etc. I'm sure you realize that this isn't practical. If you do write, please leave space for an answer after your questions and of course include a stamped/self-addressed envelop. If you're really in a hurry for an answer plz write me your phone number and I'll call you collect during the time period you specify.

SERIAL NUMBERS: We need to know your plan serial number if you have one. If you bought from someone else please send their serial number, name, etc. We'll re-register it with John Thorp for you. If you have not bought plans and have joined the M.A.S. for the info, that's okay, but we'd like to know so we can classify you. Sometime soon we'll publish a sheet that lists the numbers of all current drawings and points out which drawings are obsolete or are the latest mod'n drawings, etc.

MODIFICATIONS: If you've bought plans (or a T-18) from someone else, here's some of the recommended changes, especially if you are using a 180 hp engine:

.032 center wing skins and closer rivet spacing on nose ribs (service dictated); .032 side skins (at least back to sta. 170 & all the way out); 0-0 for bulkhead #601 (rough ground taxiing) and double row of rivets each side flange. .063 external gusset above; .032 skin over tank (optional); and of course the complete stabilator mod. This is a mandatory mod as far as Mr. Thorp is concerned!

TAIL MOD THOUGHTS: It shouldn't be necessary to repeat this, but there are still some T-18s flying without the tail mods called out. The builders are likely telling themselves that, "I'm safe, as long as I don't go over 180 mph." NOT TRUE! Thorp says you are riding a bomb with a lighted fuse if you do. Altho' he had previously pushed #2997 up much faster, he once got a "burn" out of it at 165 mph! (Before the mods were done). He now feels the stab is good up to 'sonic' speed, but has realigned it at 230, because other components of the airplane (rudder, ailerons, etc) could enter destructive resonance regimes at speeds above those tested. Why gamble your life or your passenger's life--or those on the ground? An accident would give the T-18, BAA, Thorp, and yourself an undeserved black eye. Last year I heard that one T-18 builder was cited by the FAA for "Operating his aircraft in a reckless manner", a careless act under F.A.R.'s, because he refused to make the mod when the inspector brought it to his attention. As you may know the FAA recently boosted the minimum dollar penalty for violations, as an aftermath of the San Diego fiasco, so give it a serious think, huh? You can well imagine what a field day a lawyer would have in such a situation. I have been told that liability does not end if one sold the airplane.

WARNING: DO NOT USE SENSENICH N-74 PROPS. EVEN ON GPU'S! Just at press time I got note from J. Thorp about this. More on it next N.L. (This is a last minute "paste on", due to no extra N.L. space elsewhere).

Space this month doesn't permit full coverage, but I'll go into greater detail in a later N.L. The other day I got a letter from an old friend, John Foy (3801 127th N. E., Bellevue, WA, 98005), one of the original T-18 builders. He told how the T-18 he had built (and donated to the museum) years ago was destroyed in an accident, caused by still another in-flight failure of a cut-down and re-pitched metal prop! This one was a Sensenich from a Cherokee, reportedly. The engine was a 150 hp O-320 Lyc. and there was about 100 hours on the prop since installation. This could have easily resulted in a double fatality, but pure luck and the rugged T-18 airframe enabled the pilot and his wife to survive.

Your choice of a prop is one of the most important decisions you'll make in building your T-18. Previous newsletters have spelled out what you should and should not do about selecting a prop and John and Lu's article on prop failures in Sport Aviation is worth re-reading. Perhaps we ought to reproduce it in its entirety. Above all, don't blindly buy a prop. If you don't really know, don't be afraid to ask. THE M-76 IS OK APPARENTLY

If you lose part of a prop in flight you might shake the engine out before you could get it shut down. If that happens about your only hope of keeping it from stalling would be to quickly roll it into a steep turn. I lost a prop on an old biplane in 1937 and I can promise you that you'll never have a more exciting time in your life. THE M-74 IS NOT!

NEW ENGINE PROBLEMS: A word of caution about the Lycoming O-320-R2AD 160 Ross engine, about 3800 of which were recalled by Cessna.

Lee Skillman, 7 Worthington Lane, Parkersburg, W. Va., 26101, has been working on his T-18 for 14 years (that he describes as a "love affair") and he's now close to test flight day. Trouble started, tho', when he bought a factory overhauled engine. The top cross-over tube on the T-18 motor mt. won't clear the engine and one of the lower ones wouldn't clear the sump of this very different engine. Major surgery on the mount was required to make it fit.

It didn't end there either. He then had to butcher his cowl and add 3" tear drops to make room for the fuel pump and prop governor pads (just aft of the ring gear), which he says stick out like rabbit ears. Also the carb is mounted 2.5" right of center, affecting air scoop location.

This wasn't all, tho'. He ordered a cross-over exhaust from Dix Mackey, which was guaranteed to fit all 160 hp Lycs. It wouldn't fit the H series and he sent it back. A replacement was supposed to be there in two weeks, but he's been waiting 5 weeks now, so Dix must be having problems with it.

Lee's not a tail dragger pilot and he'd be very grateful if some East Coast T-18er would come in and test fly his bird for him this July or August. I think that a guy that's hung in there for 14 years and had that much trouble deserves a little help, don't you?

He's also high in his praise for Ken and Geri Knowles for their help, which included some pre-fab parts, too. (I, too, can't say enough about the promptness with which he fills orders and the quality of his work, even tho' he's been swamped with orders from overseas since OSH last year).

SPINNERS: Our only sources for "per plans" T-18 spinners at the moment are the Ken Knowles Co., 5398 Trail St., Norco, CA, 91760 and the Ken Brock Co., 1123 Western Ave., Stanton, CA, 90680. If you're going the constant speed route they have a spinner that's ready to bolt on and go for \$150. If you are using a fixed pitch prop you'll have to check with them for special instructions pertaining to your prop thickness.

I got quite irritated with the Rattray Co. last year. I had just installed one of Bill Cassidy's "Pacesetter" wood props on the 160 Lyc. and I called

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them to inquire if they had a T-18 spinner and how was the front bulkhead set up for the Cassidy prop. Oh, yes, they had a T-18 spinner and were very familiar with that prop thickness, etc., so I said to send me one. 6 weeks went by and no spinner, so I called again. They had no record of my order, but we went thru the complete song and dance again. 3 weeks later it finally arrived. C. O. D. \$128, but the only resemblance to the Thorp spinner was the dia. of the shell base. Shape and contour were very different from the drawing. Not only that, but it was poorly made, with huge burrs left on the holes in the bulkhead. I was suspicious that it was not heat treated. I sent it back for a refund and was charged a 20% re-stocking fee. The refund came fairly quickly. I guess homebuilders have to be a hardy lot to persevere in spite of the frustrations along the way and the time involved, too.

In a future N. L. I'll give a report on how to install a spinner and how to modify the front bulkhead of a spinner when you switch to a different thickness prop. In the meantime you might review Bob Kaergaard's article on spinner assembly in an early N. L. and Tony Ringell's article in his monthly Sport Aviation column. Incidentally, Tony's new book is out, and it's great.

COWLINGS: Here's some good news from Marc Bourget, 351 Quincy #5, Stockton, CA, 95207. Marc is a law student, who lives close enough to John to visit him often, and he tells me that if there is sufficient demand that another production run is possible on the Thorp metal cowl. John has given his permission to assess the demand, as well as authority to coordinate and make any such production runs. If you are interested, please contact Marc (not John).

In case you didn't know, Thorp's cowl design is a functionally superior cowl design, aerodynamically integrated with the rest of the T-18 design, is light, quickly removable for routine inspection and maintenance (A most important feature on a homebuilt). His proven design is the quality standard. Movable internal cowl doors can be added (as on Paul White's "Kong") to reduce drag at cruise to a minimum. Combined with internal flow scooters mounted on firewall firewall sides, they give the ultimate in efficient cooling.

Fiberglass copies of Thorp's metal cowl have been available from Ken Knowles and Merrill W. Jenkins for some time and are of good quality. I've also heard that someone in South Texas has made a fiberglass cowl, that apparently was molded over the metal cowl.

MORE ON MODIFICATIONS: Marc also pointed out that when one starts out to modify John's design that they are tampering with pressure distribution values that have been carefully integrated into a complete design, via coordinates of many equations. It was not generally known until the past year or so that the fuselage shape was defined by equations that dictated the curvature of the side skins. I well remember that John once told me that the angle of the side skins (to B.L. 0) could be borderline for stabilator pitch authority under certain combinations of 40° flap extension and full forward C.G.

All of the above is not saying necessarily to not build a wide body, Marc says, but he well aware that there may well be a performance penalty to pay for that extra room.

LETTER FROM JOHN THORP TO BUILDERS: Quote. "The center wing beam WBS, #537-1, of the heavier T-18s has taken a permanent set from aerobatics.

During the building phase a web of 7075 T-6 can easily be substituted for the .040 2024 T-3 called out now. It is stronger and I would recommend it for

new construction and also for Lu's convertible wings. If an older wing is being re-skinned the web can be beefed up by installing 3/4 x 3/4 x .063 angles in EACH of the two inboard bays on Each side. Use 2 angles between the ribs, making 3 equal spaces between ribs and using existing holes in the web. Use 4 evenly spaced rivets per stiffener.

Chuck Borden's T-18 is the only one that I have seen with a bent center wing main beam. He fell out of a slow roll and ended up in a very high speed pull out. There was over 6G's on the clock. I have heard of at least one other incident. Chuck repaired his airplane with the vertical angles and re-skinning of the wing with .032 and then sold it. He didn't need to worry about the airplane. It is stronger than it was when new".

7075 is a bit more susceptible to cracking than 2024-T3, so be sure to get rid of nicks and scratches.

AEROBATICS IN A T-18: Before you go out and do aerobatics in your T-18 consider this point: A 6G capability is ordinarily considered as the MINIMUM in strength capability for doing aerobatics..safely.Had you ever wondered why truly aerobatic airplanes can take up to 12Gs? If your T-18 weighs over 850# empty, do you know how much fuel and pilot weight can be added before your G tolerance becomes LESS than the 6G Minimum? Do you KNOW how many Gs your engine mount can take safely? And how about your prop blades? Are you a smooth, competent aerobatic pilot/ Are you REALLY competent to do aerobatics in a very clean and responsive airplane? Or has your experience been in slow, high drag airplanes, like a Citabria? Are you aware of the possible consequences if you exceed V_{ne} if you fell out of a 'busted' maneuver? Have you considered the effect of Gs on your gyro instruments? Do you think you could open the canopy at 200+ MPH? Inverted? After you've considered all these points what do you think about the logic of flying your beautiful T-18 into a nearby airport where there is an FBO with a 2 place Pitts for rent to those wishing to stretch their neck a little?

A smoothly done barrel roll, normally isn't considered an acrobatic maneuver (from a practical standpoint only), but letting the nose down while inverted could result (and already has) in excessive airspeed, on pull out and Gs sufficient to bend the main wing beam. Let's not clutter up the landscape with pieces of smashed tin and bloody hunks of meat. It makes the environmentalists furious.

BEGINNERS CORNER: Those of you in the 'beginner' stage that have to ^{MAKE} AS MANY things themselves as possible to stay in the airplane buildin' budget, your very first decision is WHERE TO START. Obviously it should be a simple part, not too demanding in skill, and one that will prepare you for the more demanding tasks ahead. The ailerons pretty well fill that bill.

EXCESSIVE THE AILERONS: (See previous write-ups, too). The plans call for .016 skin for the ailerons, rudder, and stabilator tabs. They will take up about 25 sq. ft. of the 36 sq. ft. in a 3' x 12' sheet (The standard size for .016 and .020). The extra 10 sq. ft. won't be wasted, as the chances are that you probably will want to make one or more parts over (if you're human like the rest of us). Never order the exact amount of material on the plans. Even the pro's don't make a perfect part every time. Allow a little extra for practice and 'goofs'.

If there is a metal salvage co. in your area the smartest thing you can do is buy 2 or 3 sheets of metal for making layouts and templates. Aluminum is preferred, but galvanized will do in a pinch. Temp extremes will give trouble via different expansion rates of alum and other metals. .032 or .040 is desirable for templates. Avoid battered or badly bent metal. Lay out the top and bottom skins on this metal and your parts will come out well.

SOME TOOLS YOU'LL NEED: You'll need a good straight edge (about 4" x 60" or more), a pair of dividers, a prick punch, hammer, sharp metal scribe, and a good scale that's graduated in 10ths, 100ths, & 1000ths. Do NOT attempt to build the airplane with a rule in 16ths, 32nds, etc. A rule 1 to 2 ft. in length is ideal, but you can make do with one 6" long if you mark your straight edge with your scribe to identify various multiples of 6", etc. Your local sheet metal shop or A/C contractor can chop you off a long hunk of galvanized or alum for the st. edge.

You can lay out the skin directly, without a template, if you are super-careful, but when making form blocks for ribs, etc, ALWAYS make a template first (for necessary accuracy). You can then locate index tooling holes in the template, the form block, and the part blank, so that the template and form block can be keyed together or the blank keyed to the form block. Don't forget to reduce form block size by the metal thickness on all sides. Sizes of formed parts (ribs, bulkheads) are outside to outside dimensions. Think of it as the smallest "door frame" you could push the part thru with zero tolerance (after forming).

TIP: Mark the edges of your template with a "Marks-A-Lot" felt pen, key it to your slightly over-size form block and start disk sanding. When the disk sander starts nicking the coated edge it's easy to see that you are making the form block the exact size of your template.

Once your layout is complete on one skin you can lay it on top of another blank and drill both identical parts simultaneously, saving one operation. First drill a hole or two on opposite corners and slip a rivet in each hole, with head on the down side. Secure the other end with a little 'C' clamp, or an alligator clamp, and you've got a perfect dowel pin to index parts together. Don't use cleco's, as they have a bit of "slop".

Use the same template to lay out the hole pattern for the stiffeners and their location on your skin template. The little skin stiffeners are best laid out and drilled in the flat, prior to bending. Take note that the flanges on the top don't face the same way as the ones on the lower skin.

When riveting stiffeners on the thin sheets I prefer to drive them from the back side. I put all rivets in their hole and lay a strip of masking tape over them to hold them there. The sheet is then turned over and a hammer and flat-end punch (or steel rod) are used to head the rivet up from this side. Hold the rod squarely on the rivet and smack it with the hammer. A large flat piece of steel is laid under the skin as a fixed bucking bar. This method avoids skin stretching around the rivet and results in a very smooth skin. It's even superior to using a rivet squeezer.

PILOT DRILLING: It's considered better shop practice to first drill #30 holes, and then as parts are mated, to drill out the holes with a #30 bit. This takes care of any slight mismatch of holes. Take care to use a sharp drill bit and be sure and hold the drill absolutely vertical or you'll 'wallow' out the hole and make it egg shaped. Check the reflection of the drill bit in the sheet to be drilled and you can readily see if it's vertical.

FORM BLOCK MATERIAL: Almost any 3/4" thick wood will do for form blocks-chip board, plywood, etc., so don't knock yourself out trying to find Benelex or hardwoods. Most of the wear is on the radiuses, where the flange is bent over, and you can make many, many parts before there is appreciable compression of the wood. One of the best deals is found at a cabinet shop where they'll have "drop off" pieces of the wood and plastic laminate.

FORMING RIBS, UPDATED: I've received several letters from new builders complaining that 6061-T4 is hard to find and that it's time-consuming and that forming is difficult. It's very educational to learn to make 'em that way,

but were learned to make them an easier way the last few years, using 2024-T3 with the exception of the flap ribs, every rib on the airplane can be made this way...EASILY... and no relief cut-outs are necessary either. This method is now widely used. It's the easiest by far.

In the process of bending metal over a form block (or in a brake) a certain amount of the metal is thinned out where it is bent. This "stretching" causes the outer flange edge to "grow" in length, as this is the only place the metal can move, resulting in a wavy or curved edge. We take care of this excess metal by crimping (between rivet hole locations). Crimping pliers are available from Aircraft Spruce & Specialty for about \$13, or you can cut over into the form block with a cone shaped rotary file in a drill. Tap the crimps in over the notches by hammering them lightly with a wood or metal mallet used as the male part of the "die".

Don't miss the bow out of the rib (caused by forming). Crimps should be no deeper than is necessary for the part to be restored to original straight line condition. Check it by laying it on the bench top. If you've over-crimped just slightly flatten the crimps until it's straight.

Use a rubber mallet to evenly bend the flange down around the form block until the excess metal resists further bending. You will probably have 10° to 20° of springback and a pretty wavy edge at this point. Pull the rib off the form block and start crimping as necessary. You can use the slotted skin brake here now to complete the flange bending to the required angle. We write-up on it later in this N.L.)

Dot marks: Be sure the inner flange edge has been 'set' to the form block so the rib may not have the exact form block shape and size. Also, pre-mark rivet hole locations prior to crimping, making a dot with marks-a-lot.

If you form bulkheads over a form block you'll probably need to straighten them via crimping, too. Brake forming doesn't stretch the metal quite as much as hammering over a form block, so will require less crimping. A longer flange will require more crimping, too. You will note that a crimped flange is much stiffer than an uncrimped one. Every place you crimp makes the metal stronger it's as thick as the depth of the crimp! Obviously the crimps should all be away from mating surfaces.

Give the above method a try. You'll catch on to it quickly and swear by it, and it's a lot easier to do than explaining it in 25 words or more.

If you've 6061 on hand go ahead and use it, of course. The compressive strength of 6061-T4 is nearly as good as 2024-T3, even tho' the tensile strength is much less. To get equal tensile strength with 2024-T3 you'd have to use much thicker material. That's why you don't see 6061 called out for any of the spar or fuselage extrusions. It wouldn't be safe to substitute.

Ribs are loaded in compression primarily, as are bulkheads. Mr. Thorp chose 6061 for ribs, due to its comparative ease of forming by beginners. At that time the common practice was to make ribs and other compound curve parts out of 2024-O (dead soft) and then heat treat to the T3 condition. This method was not satisfactory for builders that lived away from heat treat facilities and in addition there were problems with warpage from improper quenching and corrosion resistance if the pure aluminum coating (Alclad) was not adhesion with the alloy matrix from improper heat application. Mr. Thorp even made it easier for beginners by showing an optional method of pre-forming, using relief cut-outs on the nose rib flanges.

Warning: It might be noted that (6061) T-4 is an unstable condition and quickly age hardens to 6061-T6 within 60-90 days, so usually has to be

special ordered because of limited shelf life. If you get T6 just sock it a little harder, but the EASY way for most applications is 2024-T3. Flap nose ribs and dash frames are two of the parts that require severe forming and are difficult to make with 6061 and nearly impossible with 2024-T6. If you don't buy these parts ready made, you'll either have to go the heat treat route or use relief cut-outs. Crimping can be used, but they'll have to be deep and close together. They probably would interfere with rivet holes, too. If you use relief cut-outs anywhere be sure that they don't deadend in the area being bent, as they are likely to crack under forming stress. Get them on out into the flat area before you stop drill the end of the relief cut.

BENDING EXTRUSION: Several new builders have asked for an explanation on how to bend the angle extrusions used in the fuselage. It's really no big deal. Simply put the extrusions in a vise and give them a tap with a rubber mallet on each side of the vise, then slide it along an inch or so and repeat. Don't slug it and try to get the desired curve on the very first pass. If you get a little buckling going on the compressed side take a ball peen hammer (or your rivet gun) and a bucking bar and work it out flat. With the skins and bulkheads clecoed together you can lay the extrusion against the outside of the skin to establish the bend contour.

If you want to "open up" the angle of the extrusion a few degrees wider than the normal 90° lay it down on the vise anvil, so that it looks like an inverted V, and tap it on top, moving it along as you do. If the sharp corner (apex) of the inverted V is sanded off, so that it is parallel to the inner fillet radius it's even easier to do.

JOGGLE EXTRUSION: There are several places where the extrusions must be joggled or double joggled in the fuselage. It's quite easy to do this with a "joggle fork" in a vise...providing the sharp corner is sanded off (as in the paragraph above). Always use a joggle fork that's thicker than the joggle depth desired, allowing for some spring back. This is a simple method that works well. Another method is to make a male/female die set-up to use in a vise, but this takes a lot of pressure applied slowly.

JOGGLE FORKS: You'll need a variety of joggle forks for the various material thicknesses. (See sketch of a typical one). Dimensions aren't critical, but all edges in contact with the part to be joggled should be rounded off and polished, so that sharp edges don't dig in and mark the part. Basically a joggle fork is nothing more than a small rectangle of metal, with a slot near the center. The slot is of sufficient height to allow flanges and extrusions to be inserted. The slot should be several times wider than the thickness of the part to be joggled.

In use the fork straddles the area to be joggled and is put in a vise and the jaws squeezed closed until the joggle fork legs are almost parallel to the flange being joggled.

ATTACHING EXTRUSIONS TO SKIN: Over the years there has been some controversy as to whether extrusions should be pre-bent before riveting them to the skin. It was said that riveting the extrusions to the skin in the flat, without pre-bending stretched the skin tightly between the frames and was a superior method. It's been done both ways and I'm not sure what the consensus of opinion is, but it does seem certain that flat attachment will indeed give flat spots between frames, as verified by laying a straight edge between frames and eyeballing it.

There is a middle ground that several builders have used in the past. It entails pre-bending the large [x] extr'n, but the others are first match drilled with the skin and then clecoed to the skin. In the next phase the

heads are attached to the skins, one by one, in order, from one end to the other. This bends the extrusions gradually and also stretches the skin a bit, too. I did this on the last fuselage I made and I believe it's the better way. I think the best riveting procedure to follow after this is to start at the middle and work both ways away from the middle.

RIVETING: Be aware that when you drive a rivet that the skin around it is pushed out some and the skin will grow a bit in length. The more rivets in one long line there are the more you are likely to notice the accumulated stretching. Over-driving rivets accentuates this, of course, but don't under-drive rivets just to have a more pleasing side skin, either.

After driving the rivet, leave the bucking bar in place and smack the factory head with a rubber mallet. This bumps out the depression left in the skin from riveting. If you'll experiment on scrap to find the best combination of air pressure to the gun and bucking bar weight you'll minimize the problem. At all times please don't plaster up rivet heads with body filler in an attempt to impress the troops. All you are going to do is add a LOT of weight - probably as much as 25-30 lbs. if you did the whole airplane that way! One experienced builder weighed his airplane before and after painting with Dupont Inren and it came out 30# heavier...with NO body filler.

Just extra filler wt. will only raise your landing speed, lengthen your take off run, cut your rate of climb, etc. The sad part is that sooner or later it will come off in chunks. Body fillers are simply resins with inert fillers added to enhance their sanding qualities. Polyester resin is known to be a poor adhesive under ideal conditions and epoxy is known to de-bond in the presence of moisture. Resins will continue to cure and shrink as much as 6% when subjected to prolonged exposure to sunlight and heat, popping the paint film loose. The more filler in one area the worse this becomes. Vibration and temp changes do the rest.

HELP WANTED: We'll cover more items for beginners. In the meantime why not drop us a note, indicating what building areas that you'd like more info on. First of all, tho', go back thru the older N. L.s and chances are you'll find the answer there. By the way, have any of you had a chance to work up a Builder's Index for the condensed version of N. L.s #1 thru #44? If so, plz send us a copy and we'll run it as a separate page. If you run across a good way to solve a problem, send it in. It would make my work easier if you would type it up in the format we use and all I'd have to do would be to paste it on another sheet to make the plate. If you can't type, don't let that stop you, tho'. Write it up the best you can and I'll re-write if it's necessary as I type it up.

DEAN DENVER FLIES AFTER 16 LONG YEARS! Dean (255 Hemlock St., Ploomfield, CO 80530) has plan serial #31 and in Jan. '79 his bird was airborne for the first time, to his unrestrained delight. He has a 160 hoss Lyc. in it and one of Bill Cassidy's "Pacesetter 200" wood props on it. Empty wt. is 85# with oil and wheel pants. He says, "It climbs like crazy and seems to be going about 170". As soon as he gets everything settled down he'll send some accurate perf data. He said that Bill Cassidy commented that it was the first one flown in the age-hardened condition!

Dean is an old, old friend from back in the early T-18 days and we used to visit a lot on my Denver layovers when I was flying domestic 707s. He sold a great stainless steel cross-over exhaust kit last year (are they still available, Dean?). I was very pleased with the one I got from him.

Dean Thorp has said over and over that if you don't have a cross-over exhaust on a 4-cyl. Lyc. that you are cheating yourself out of as much as 10% of your horsepower! Another way of saying it is "A cross-over exhaust will pay for itself in fuel in short order and give you better performance in the

in the meantime".

CHINO FLY-IN: I went out of Chino last month annual Fly In and got to look at a bunch of fine T-18s and visit with a great bunch of guys. Don Taylor set a new record on a round trip flite to Las Vegas. The T-18s were the most numerous type there, but "California sunshine" really fouled up the works and kept many airplanes away. The ceiling and viz didn't break both days until noon. Then at 1:30 they closed the field for a much too long aerobic program.

The highlight of my trip was flying Ken Knowles wide-body, folding wing T-18 on its return trip to Corona. I flew it in the air for awhile and I simply could not detect any significant difference between his T-18 and any of the other 21 I've flown or flown in. Even with the shortened ailerons the roll rate and control authority was "pure T-18", which is saying that it is a delight to fly. Possibly the extra 5" of fuselage length increases an already good pitch and yaw stability a small amount, but I honestly could not detect it if it did. I've never flown any T-18 that had anything other than beautiful control and stability, but it would be meaningless to rate one airplane against another in this area, as control friction, c. g. position, etc. would vary somewhat from one airplane to another.

WIDE BODY: The wide body T-18 is noticeably more comfortable at shoulder height, even tho' Ken has 1" thick upholstery above the W. L. 42 extrusion. I'm a hefty 235 lbs, so I don't really sprawl out in full comfort unless I'm in a Cherokee, etc, but the W.B. seems pretty great to me my size. I've flown a couple of T-18s that had thick upholstery up as far as the W.L. 42 extr'n and just cloth glued to the skin above that point and two of us my size were most comfortable with that arrangement. Offset (bent) sticks are most helpful for that little bit of precious leg room, too. I'd recommend them. Even if you personally are trim and slim you might want to consider that some day when you sell the airplane that the buyer will probably be 6'3" and weigh 250 lbs.

FOLDING WING: The folding wing has extra flap area and I was most curious to see what this would do to approach speed and glide path angle. Chris Fast, who built the wing from parts Ken made, had written me that the folding wing weighed 20 lbs. more than the standard wing and I wondered if the extra flap would make up for that extra weight. That extra 20 lbs. "uses up" about 1 sq. ft. of wing area, so there is an increase in the CLEAN stall, but I'm guessing the flapped stall comes out about even, all else equal. Airspeed indicators are notoriously inaccurate at high angles of attack, so unless we calibrate it and do tests under exactly identical conditions we are only comparing apples to oranges. To summarize my observations, Ken had the air speed down to 80 mph IAS on final to Corona, with no visible increase in sink rate and it felt good and solid and there was even a little bit of float in ground effect left when he flared. He feels it flies as least as slowly as the other airplane, but no conclusions should really be drawn from a one time observation.

NEWS OF THE LDS-2 AIRFOIL: From the mail I've received so far the majority of builders are opting to build the folding (pardon me, convertible) wing. At least 3 have already flown; Ken's, Chris Fast's, and Bill Cox's, and several more are on the verge of flying that I know of. I just talked to Ken after my return from Chino and he said Chris Fast had just delivered the new wing to him that was built with the new LDS-2 airfoil and that he was hoping to have it fitted to the airplane the next day. This was the 4th set of wings that Chris has built, incidentally. (More on him next month). Any way we'll soon have some answers on what the new airfoil will do at low and high speeds. Some people doubt that we will be able to tell any measureable difference, while others are most optimistic.

JUNE 25th, 1979, THE T-18 WE/C WITH THE LDS-2 AIRFOIL FLIES: I just returned from California last night, still aglow with the pleasure of a really great weekend. What made it so great was 19 T-18s, 3 Sky Scooters, L Darringer and several other homebuilts and factory built showing up at Lodi CA at the Linde Airpark at 11am in a surprise birthday fly-in and cover-dish luncheon in honor of John Thorp's 67th birthday. Around 60 persons showed up to show their respect and admiration for their good friend and to again express their gratitude for his designing the world's Best sport airplane,

I flew out to LAX on Braniff on Friday afternoon and Geri Knowles met me and drove us out to Corona, where Ken was all set to go part way in the remaining daylight. We were loaded up to gross, with all our bags, cameras, gas, etc., but I got a pleasant surprise as to how quickly the 160 hp and c/s prop combination got us up and out of there. I was also pleased with our rate of climb to 8500 ft, averaging a little over 1000 ft./min. @ 120 mph TAS. Ken doesn't have an outside air temp gauge in the new one, so I can only guess at the temp. It was cool, tho', as the inward opening cockpit vent in the canopy almost made it too cool. At cruise Ken pulled square power of 23" and 2300 rpm and we were indicating better than 162 mph most of the time. I don't know what crz hp we were pulling or what our TAS was, but we made the 215 miles we flew to Vicalia in 1 hr. 15" from takeoff to touchdown and that comes out to mighty close to 180 mph, including climb to 8500' and that was against a forecast headwind component of 10 kts! That's mighty good perf in anyone's book, I'd say.

During crz I was experimenting with pitch stability by raising and lowering the nose a few degrees and releasing the controls and seeing how many long period oscillations it took for it to return to trim speed. Our c. g. at the time was probably fairly close to the aft limit, with about 15 gals. of fuel remaining, and I don't think you'd want any better pitch stability. Kicking the rudder to deflect the nose 10° would zero it back out after a decreasing series of 3 oscillations after release, also just about perfect. Our really pleasant surprise came at the end of the return trip, where Ken stalled the airplane, carrying about 1500 rpm. Without flap it was indicating about 60 when it broke very GENTLY, with LOTS of pre-stall buffet and very good aileron control remaining at the stall. The pitch down was about 15°.

Now all these figures are only the very first sampling of numbers and you shouldn't consider them cast in stone until more data can be acquired and instrumentation verified, but it appears that the new airfoil doesn't hurt crz speed and it stalls perhaps 5 mph slower than the regular airfoil and it does have better stall warning and desirable pitch qualities it seems. Remember that the new airfoil is on the outer wings only and the flow at the dihedral break might be a big factor in stall characteristics. Tuft tests should tell us several things, so again, until we have hard facts and figures let's not jump at too many conclusions. Ken and I were both very pleased with its over all perf, but both of us are so crazy about how T-18s fly that I'm sure that we could be accused of just a little prejudice.

Our return consistently showed a ground speed of 180 mph or better when I dia time checks between check points. We were at 7500 ft. and Ken was using 22" and 2200 and indicating 160 average.

I was again taking a look at aileron effectiveness at crz. I could squeeze a tiny bit of aileron pressure on, with no detectable movement of the aileron (referenced against the T.E. of the wing tip) and get a roll rate of at least 5°/sec. I had time to observe several things enroute and one of the things that is worthwhile is the "joggled" stick, where one curves one way and the other the opposite. That way no one's leg gets pinned landing in a strong crosswind operation.

It's a real pleasure to be around the T-18 gang on one of those get togethers. Each and every one of them are something special to me. I've heard others say the same thing. Perhaps we all operate on the same wavelength is why we chose the T-18 design in the first place. It seems that all of them are always willing --even eager-- to share information to help the next guy. I've noticed other groups are close-mouthed or even a little bit surly in that respect. It seems they let their pride of accomplishment inflate their hat size, but I've yet to meet a T-18er with that attitude.

I would go into greater detail about John's surprise party, but Don Downie and his wife were there (both writers and photogs) and Shirley Clarke, too, so you'll be reading all about it Homebuilt Aircraft, Private Pilot, Plans and Pilot, and possibly other mags, so I'll just say we all had a marvelous time and that is was a thrill to see that many T-18s lined up for pix.

I was sick when I got home and discovered the color film in my camera had jammed in the factory carton and I didn't get a single picture in color. I had another camera with B&W film in it, so I didn't get skunked, but I was looking forward to some color shots to look back on some day.

OSHKOSH '79: You've probably already seen the announcement in Sport Aviation about the 2nd Annual T-18 Builder's Dinner, again organized by John Walton, formerly of Keenah, WI, but now a resident of Houston, Tx. This year it will be held on Tuesday, July 31st, at 7:00 pm at Hatch's Anchor Inn, That's on Arizona St., just off W. 20th Ave., on the N.E. side of Wittman Field. The first meeting brought over 100 T-18ers together and we had a ball. You can make reservation on the T-18 Flight Line at OSH or in advance by contacting either

Sandy Cordeza		Barbara Walton
3 Juniper	or	temporary-P.O. Box 40307
Woodland, CA. 95695		Houston, Tx. 77040
(916) 666-9106		call info for ph. #

Prospective T-18 builders are welcome, too. It's a great way to get acquainted with people you'll enjoy knowing over the years.

Bob Dial: Those of you that know Bob will be happy to know that he's on the way back from the heart attack he suffered earlier this year. He says he will be at OSH again with his T-18-with a legal P.I.C. of course.

Chris Fast: He, also is making excellent progress on recovery from his heart problem and he, too, carries a legal pilot.

Oats Togle: I saw Oats at John's party and he has hopes of getting a 3rd class ticket before too long. Oats didn't have an attack, but they caught him trouble on a treadmill EKG luckily, for his piping was practically choked off. Oats flew DC-10s for JAL.

We were all delighted to see John and Kay looking in good health and spirits. I don't think I've ever seen John smile so much in one day and Kay was positively radiant. I'm sure that John has averaged getting 5 or 6 long distance calls a nite since the design came out and perhaps some people might think she would get bitter at the constant intrusion, but if she does she really doesn't show it. She's always been most gracious to all of us weirdo airplane nuts.

Perhaps about now you're saying, "I thought this newsletter was supposed to be all how-to-do-it-stuff". Well, there's a very pleasant social side to it, too, and it's a big part of the fun of it all. As you know, I'm pretty much a nut on my admiration for how the T-18 flies, but I also equally enjoy getting to know all the T-18ers well and I think most of you feel that way. This makes me think of something Ken Knowles told me about when he built his first airplane that's worth passing along.

He said that he worked on his airplane only on Mon., Tues, Wed., & Thurs. and saved Fri., Sat., and Sun. for activities with the family. Looking back, I can see that such an arrangement would keep down problems with the wives and children. Some women get to viewing the airplane project as a rival for the husband's affection with predictable results.

PAUL KREIK, (2221 23th Ave. A, Moline, Ill. (1265) is very close to flying his T-18 and I can promise you that it will be excellent. I stopped in and looked at his project on the way to OSH in '77 and the workmanship was very professional looking...as it should be. Paul's the chief honcho in maintenance for the John Deere Co.'s jet fleet. Here's his thoughts on the building of wings and fuselage: "After reading the earlier N.L.s thoroughly, I decided to drill the W.L. 42 fuselage stringers in the flat position with the side skins as templates, as recommended. This worked beautifully for assembly, but upon installation and riveting of the side skins they were drawn slightly, so that the full curvature of the skins was not obtained. I would recommend to anyone making side skins to drill angles upon installation of the skins to prevent the flattening of the side curvatures between the bulkheads. It was most pronounced in the cockpit area between the dash frame and the roll bar upright. I doubt very much if this will affect performance, but I'm sure that it will be noticeable with a shiny coat of paint on it. The skins are drum tight."

WINGS: Paul has this comment on wing installation: " After reading so much about wing twist and resultant vicious stall characteristics, I decided to go one step beyond in building my wings. A simple vertical jig was made to support the center wing at the inner and outer attach points. An incidence board was cut out of clear redwood, traced from the airfoil template.

This board, along with a propellor protractor, borrowed from our shop, was used to check the wing for twist during fabrication and the extensively during riveting. This procedure was also used for the outer wing panels. There was no measurable twist in any panel.

When installing the wing to the fuselage, the incidence boards again came into play. 1/8" pilot holes were drilled in the rear spar attach fittings at bulkhead sta. 91. No holes were drilled in the rear spars themselves. The fuselage was leveled, the wing main bolts installed and tightened. A chalk line was struck on the floor and make shift plumb bobs taped to the Leading Edge of the wings to insure a straight L. E. The protractor was zeroed out on the level fuselage, using the W. L. 20 stringer, and then the incidence was set per plans and the rear spars were clamped to the attach fittings. The existing pilot holes in the fittings were then extended into the spars. They were then drilled nearly to size, reamed and bolts installed before clamps were removed. Incidence is exact on both wings. This same procedure was also used to rig the outer panels.

Now that the wings are leveled and set, one final job remains: The installation of the flaps.

INSTALLING THE FLAPS: In my years of admiring the T-18s before I took the plunge, one major discrepancy stood out: The flaps never seem to align with the ailerons, etc. I realize that the left flap is used for trimming in roll, of course.

When attaching the flap hinges, a template was used, however there seemed a lot more margin for error, so again I drilled a pilot hole in the wing for half of the fitting and didn't drill any holes in the flap hinges themselves. The incidence board was again clamped to the wing, the flaps clamped in place, and the pilot holes drilled into the flap hinges. This allowed the correct incidence angle to also be set into the flaps. They were then removed, reamed

to size and then re-installed. A 1/16" spacer was put on the leading edge of the left flap when the rigging was being done, to allow the left flap to be raised higher than the right one if required later for roll trim.

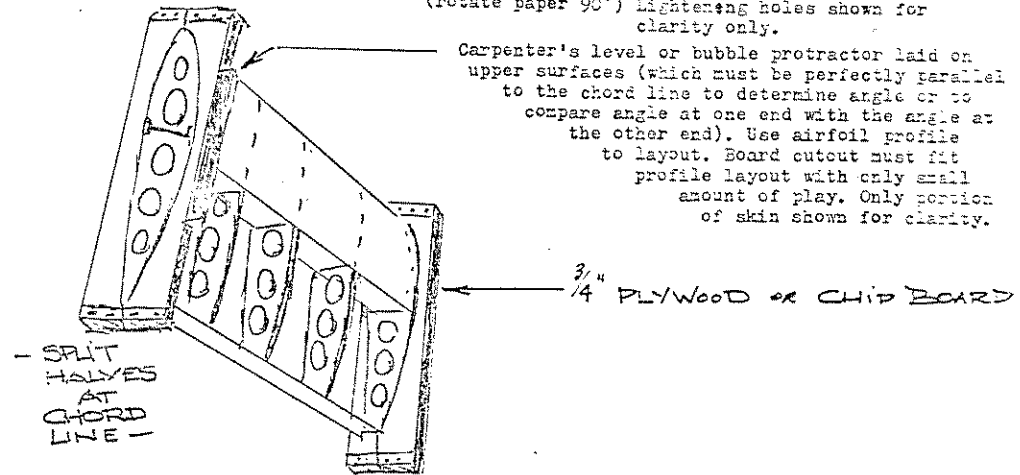
I firmly believe that the wing installation is the most critical procedure for a good flying airplane and should not be left to the possibly less precise procedures and measurements, error accumulations, that are possible when matched hole tooling alone is used. I'll be one very unhappy fellow if I end up with bad stall characteristics or a wing heavy condition. The same incidence board procedure was used to fabricate the horizontal tail.

While speaking of flaps, I had the pleasure of being invited to go flying with Bob Dial in his T-18 when in Detroit for my brother's wedding. His cockpit seemed to be much larger than any T-18 I'd been in and for good reason. He had installed an electric flap motor, removed the forward tunnel, and lowered the aft tunnel. The flap motor was a very simple installation of a G10 power window motor and sector gear (See pictures we ran last issue in #45 N.L.) Bob has lowered his flaps at 120 mph with no problems while testing this installation. (John recommends 110 max for flap extension).

COMMENT ON ABOVE: Well now, gents, THAT'S the kind of report we need from you out there. I ask that you send in anything on the building or operation of the airplane, or your thoughts or questions, doings of T-18s and T-19 people, etc. Just because someone else has told how to do something in the past N. L.s, don't let that stop you. Tell us how you did it. Paul's method above is very good and you certainly won't go wrong if you take that route. Before someone else rises to the defense of matched hole tooling and points out that quite a few of the estimated 300 T-18s that have flown have been built completely with matched hole tooling and without jiggling of any kind and most of them fly superbly. In all fairness, tho', the incidence board method has been widely used for many years and is the simplest way to know if a structure is properly aligned. The wing riveting sequence we described in N.L. #45 used a modified matched hole tooling procedure. Basically that means that it's a way to check on the effect of accumulated hole "slipp". A 1/8" rivet won't fit in a 1/8" hole, so a slightly larger hole, (#30) is used. The tolerance around the rivet can twist structures during riveting, if care isn't taken during the riveting.

INCIDENCE BOARD: I know some of you don't know what we are talking about when we say incidence board, so to save a thousand words I'll make a little sketch of it below.

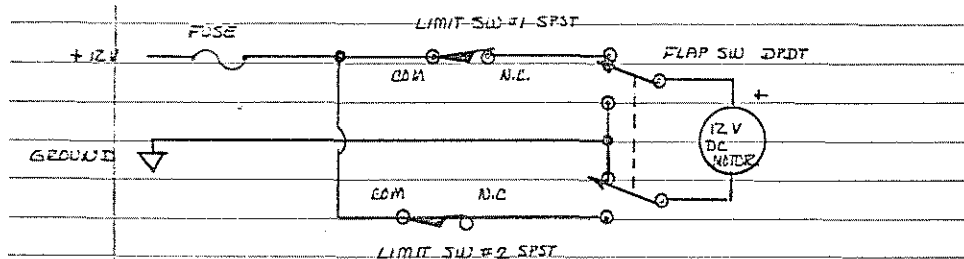
(rotate paper 90°) Lightening holes shown for clarity only.



ELECTRIC TRIM: A good many builders are going to electric trim on the stab-flator. I have flown two airplanes now with electric trim and I was very pleased with it. As most of you already know it's no sweat to fly the airplane without a trim tab, so failure is no problem. One of the airplanes we ran the tab full travel and pulled the c/b, so that it was trimmed full tail heavy. I just reduced airspeed to 120 and could have flown all day with it, so I don't think a runaway motor to full tab travel would present any big problem. A simple "in transit" light would warn the pilot if it continued to run when the switch was released, so the c/b could be pulled long before full travel was reached. Limit switches would be desirable, of course. The pickle switch could be installed on top of the stick or in the vicinity of the prop/throttle control.

Originally it was found that the headlight "eyelid" motor from a '67 Camaro was just about perfect for weight and rpm. They've become super hard to find at Chevy dealers and cost is \$25-\$40. Ken Morgan, 439 Louella, Hurst, TX, 76053, found a little motor that may be even better and it's readily available for \$12. It turns about 1⁰/sec. with no load and if that was a bit too fast a voltage dropping resistor can easily be put in the circuit. It's small and light, etc. Write Herbach and Rademan, 401 E Erie Ave, Philadelphia, PA, 19134 and tell 'em you want a gear head motor, #EM21K038, 12 V. reversible.

Next issue I'll have at least one circuit drawing for the installation. Disregard: Here's one from Al Bosonetto, 32625 Benson Dr., Westland, MI, 48145.



Al also says he is designing a microprocessor controlpanel that will monitor fuel, fuel flow, eng. hrs., CHT, EGT, Time, speed, distance figures, and a warning signal when fuel, oil, elect., or vacuum fall out of specs. It should be small & light, 2 lbs, and would not replace any gauges until it's been proved out. Sounds great, Al. Keep us up-dated on it.

AUTOPILOTS: Howard Henderson and Sylvan Keebler, both of St. Louis, have installed fluidic autopilots (wing levelers) that they built. They are having fun with them, but say they are "cranky" at this stage of development, but will use the later improved circuits. More on these after OSH. Sylvan also has electric trim and electric flaps and I'm hoping he'll come thru with a good article on both. Howard is using the new airfoil on his new wing, but is having a problem converting wing tips. He's been making new molds, etc. to adapt. Ken Knowles solved the problem very simply. He slit the trailing edge of the wing tip forward about 6 or 8 inches, and inserted a pre-cured slab of fiberglass in the slot and stuck it all back together with resin. I looked at it closely and it fits beautifully. ... Back to autopilots. Bryant Foxland, 1007 Shell, Midland, Tx, 79701, has an autopilot in his T-18 and has promised an article and sketches on its installation. We've got a lot of new developments to yak about in coming issues if we just get the input from members.

AILERON AND RUDDER TRIM TABS: I saw one movable aileron trim tab at Lodi and hope to have an article on it by next issue. There was some discussion there of using the same principle of an ultra-light model airplane servo operating via a tiny 1.5 oz. electric motor inside the control surface itself, to operate both rudder and aileron trim tabs. The motors would mount on the forward spars of the control surfaces in order to not deteriorate static balance. There's no denying that such trim tabs contribute a great deal to the enjoyment of an airplane's best flight characteristics. To me, it's a pain to fly instruments with an out of trim airplane. i.e. to have to continuously hold right rudder during climb, etc. Perhaps the fluidic autopilots and wing levelers will fill the bill if we can make them fulfill a dual purpose. If we could use them to trim all three axis, then turn them off and hand fly the airplane until we wanted to relax and look at a map or re-trim for some other condition of flight, I'd really like to have one. Also, to be realistic, such a unit might be a life saver if the untrained pilot blunders into IFF conditions. Let's also be aware that pilot seizures in flight aren't unknown and an autopilot would enable the probably non-flying passenger to get on the radio and get some help. It would probably enable them to fly to an airport and possibly even fly an approach. It would give such a passenger pretty good odds if they had had a few traing landings, but were not current. What's YOUR opinion on the subject?

INSTALLING CANOPIES: This is one area that we need a LOT of input, so that we can explore more than one method of doing things. John F. Kenton, 16611 126th Pl. S.E., Renton, WA, 98055, has sent in this very excellent method of fitting the canopy frame to the airplane. Here it is, word for word:

PREPARATION & INSTALLATION OF THE A650 CANOPY

Prior to installing canopy onto aircraft deck, position frame on work bench as per sketch.

Using 2 straight edges (use extrusion, square tubing, etc.), place to inboard sides of rear pins & aft rollers parallel to each other and full length of canopy and secure with clamps (4 places).

Note: Remove screws retaining rollers & cut dowels instead, to provide flush butting of straight edges to rollers. Also cut 2 pcs. of 3/4 x 3.0" wide by 36.00 scrap lumber and position between frame sides for retaining forward tracking dims (dimensions). Secure with belt, rope, or equiv't.

Now measure dims to outside of both parallel straight edges at pins & roller location. Should be identical.

EXAMPLE: My aft pins to outside straight edges was 15", but my aft rollers were 14.75", ... Replacing .090 spacers with .215 lgth spacers brought the rollers to same dims as the pins.

Now measure dims from inboard side of canopy frame at fwd end cockpit area L/R sides to straight edges. Should be equal. Otherwise it still won't track freely.

You may have to spring the frame to agree, but at the same time hold the 3" inside dim.

Prior to installing tracks, drill #40 pilot holes in the aft deck tracks ONLY (in detail part only).

To install tracks, position canopy frame onto deck in closed position and insert fwd cockpit track onto rollers and clamp to skin, also insert deck tracks onto rollers temporarily.

Note: Use .200 shims to hold clearance between deck and canopy (locate at

(locate at top of seat frame).

Move fwd tracks as high as possible, but holding 1/4" dim edge distance for 1/8" skin rivets and drill #40 pilot holes and cleco.

Position aft tracks with 3rd rivet hole location from fwd end over rivet center line of #571 frame, top flange, sta. 119. Using masking tape secure fwd ends only to deck skin.

Move canopy to open position and secure track aft end with masking tape.

Move canopy a number of times to closed and open position, rearranging the track as necessary, until no binding is evident.

Recheck that 3rd rivet hole from fwd end of track with center of #571 top frame flange, sta. 119. If still in line, pilot drill #40 hole and cleco

Now drill #40 pilots at most 3rd from aft end from each track thru deck skin & cleco from underneath to allow canopy movement for checking & tracking.

Prior to full size drilling make brackets A580-16-2 with 2 pilot drill holes in flange common to #572 frame only and draw rivet center line common to deck skin (use masking tape and pencil).

Locate detail A580-16-2 in position spotting center line with track from 2 each pre-drilled pilots, mark with pencil, remove, check on bench and drill 2 holes each bracket.

Reposition A580-16-2 brackets & cleco from underneath. If still tracking satisfactorily finish drill remaining holes from aft flange of bracket thru frame & track thru deck skin.

Thanks for a really thorough write-up on installing the canopy, John. That was very well done. I'm sure it will be thoroughly appreciated. The canopy has been one area we've neglected to cover in detail in the past. How about more of you writing your method of canopy installation or any other tips concerning the canopy? There are literally dozens of ways to do every job and it would be of benefit if we could take a look at different ways of doing things.

Richard Keller, (5446 Connecticut Ave., La Mesa, CA, 92041) sent me an article for the N. L. about touring the high Rockies country in his T-18, including landing at a wilderness airstrip, which would have been ok except for the fatigue failure of all 4 axle attach bolts occurring simultaneously. The loss of a wheel put him over on his back. It's too good to hoard for our N.L., so I've sent it on to Sport Aviation. If Jack Cox doesn't run it I'll print it in the N.L. It has some points worth meditating over in it. Rick has his bird about ready to fly again and now has a 180 hess Lyc. hanging in it. He has an "extra" engine that he was going to put in it to replace the O-295-C when the 180 came available. He'll sell the extra 160 hp O-320 B2B engine, with the engine mount, horseshoe ring, and Lord mount biscuits, for \$2600, I believe. He may also have a prop. That series engine will also take a c/s prop. It's identical to the one I have on my T-18. There's a thin knockout sheet metal plug in the end that has to be removed and a disk inserted in the shaft a couple of inches back to divert oil to the governor.

Today is July 4th and I'm trying to get this N.L. finished and in the mail so that everyone will get their copy by Oshkosh time, but it's going to be nip and tuck. I have to do it all by myself, printing, collating, stapling, making address labels, etc., so I'll run off some extra copies to take to OSH for some of the last minute joiners. I'll also bring a stack of the baggage compartment drawings, as getting the new plate made will delay this N. L. and I'll just run it the next time. I'm beginning to get some good info and tips in for future N.L.s, so please do your part and write up what you have done on your project...even your mistakes. We'll have an anonymous column of "Don't do what I did".

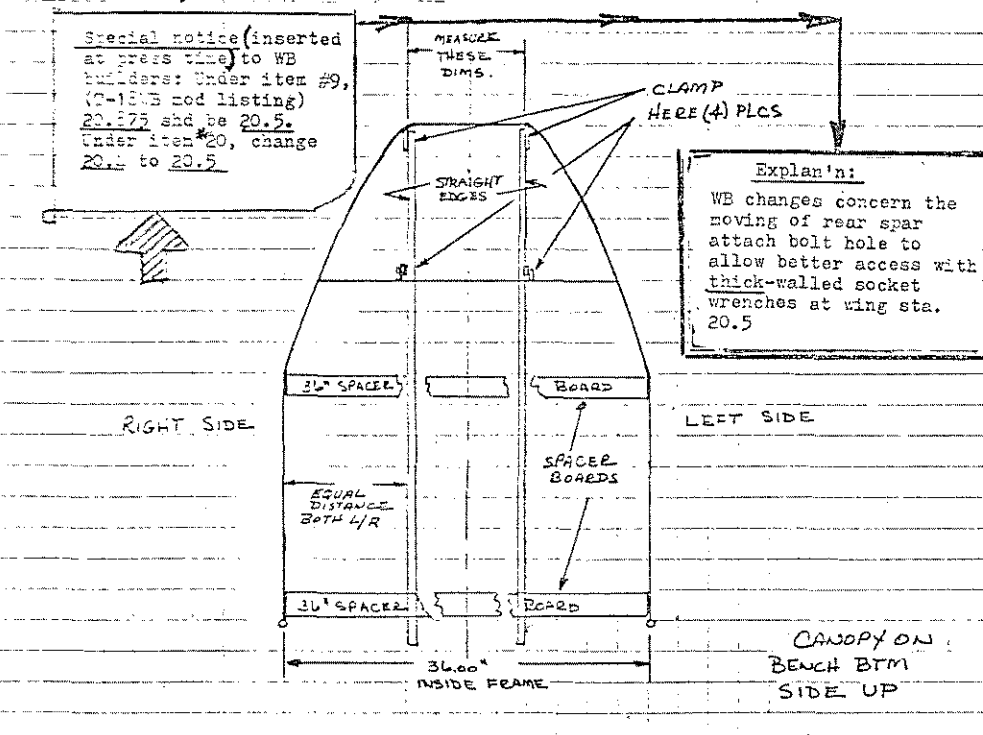
FOR SALE CORNER: We'll carry for sale notices for T-18 M.A.S. members' projects and T-18 related items if it doesn't get to be too big an item. It will be on the honor system. If you sell an item because of the N.L. we request you make a small donation to our fund. We can't assume any responsibility for quality, but if you have items that might not come up to accepted standards please use Trade-A-Plane, etc.

Here's a wide body, folding wing project built by an AI, now in hospital. Price \$4500. Wings, ailerons, flaps, controls, complete. Tail group complete. Fuselage skins, formers, longerons, on hand, no work done. Also cowling, wheel pants, gas tank, spinner, prop ext'n, on hand. Call Wes Silverman, 1-502-245-9479, 410 Bermuda Way, Louisville, KY, 40243, for further details.

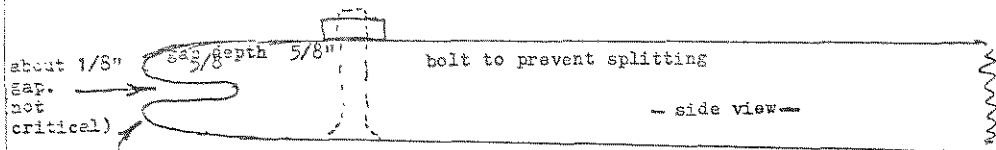
If you have plans for sale we must have the serial number or we cannot carry the ad. If you have an airplane for sale you should furnish the plans with it. If you have parts, please specify who made them. Please keep all such notices as brief as possible.

That's it for this time, gents. Plz excuse my taking so long to get it out and plz excz my terrible typing. You can recognize me at OSH as the one whose index fingers are worn down to the first knuckle.

You guys just sitting and looking at your plans, I'd like to know why you're not building yet. Maybe the M.A.S. can help you get under way. Let us know.



MINI-BRAKE: This is a full size tracing of one of them I've made, using maple stock. Stock size was 8" long and I made it 1.5" wide at the upper end of the handle, tapering down to about 5/8" wide at the tip. 3/4" stock thickness gave adequate strength without splitting.



Round these edges to prevent marking alum.

USING THE MINI-BRAKE TO ADJUST FLANGE ANGLES OF RIBS, ETC. CAN ALSO BE USED TO BEND SKIN OVER THE TANK.

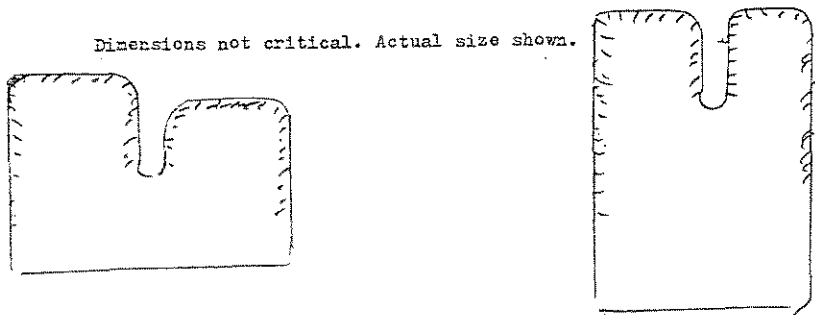
Use your free hand to maintain considerable pressure to hold rib tightly against bench as you bend flange with other hand, much like a big brake hold down wing clamps stock down tightly.

At this area

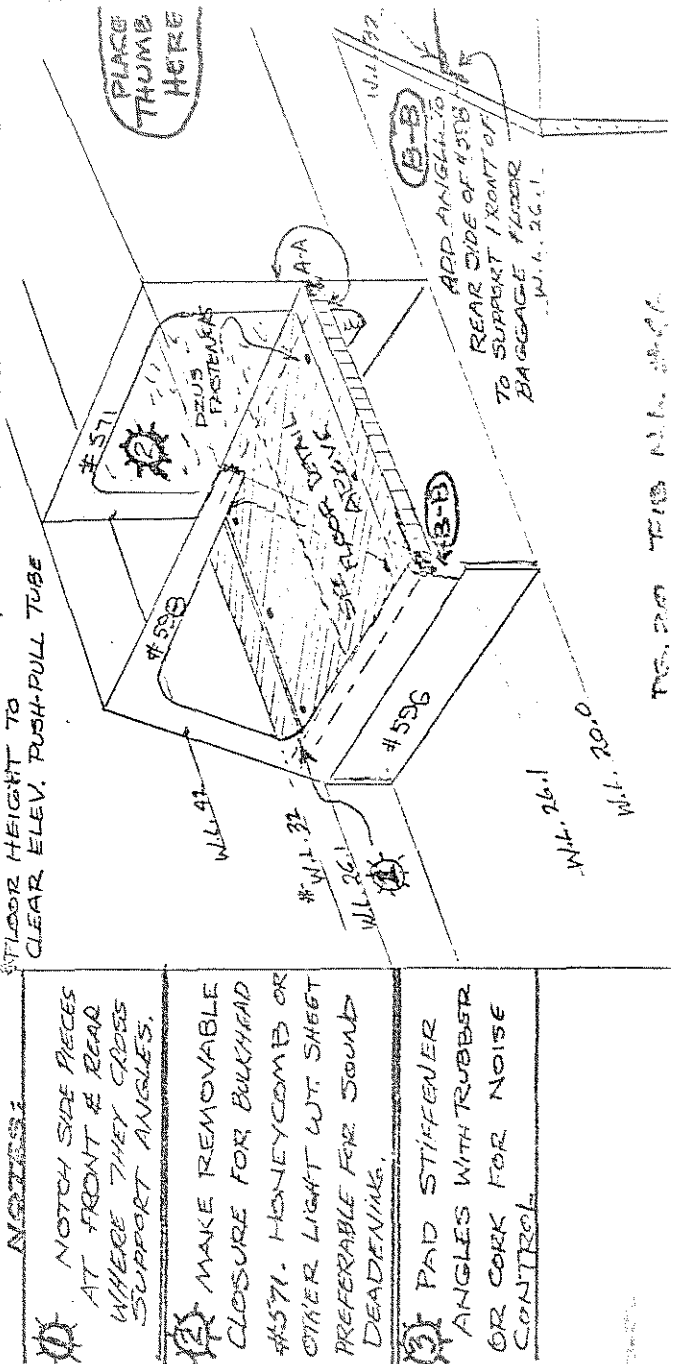
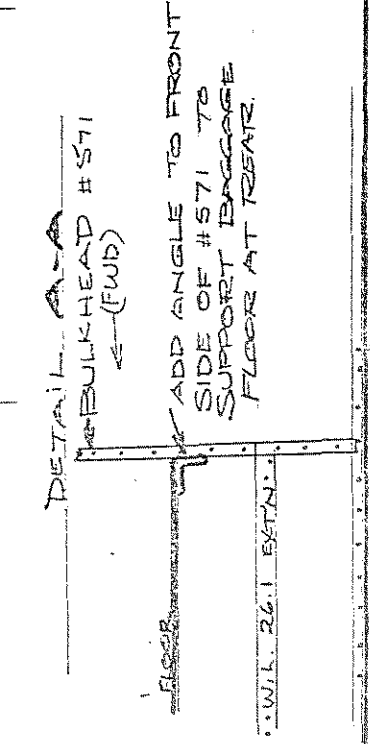
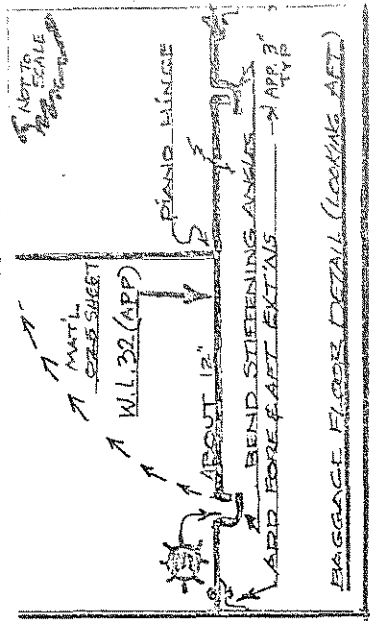


TRACINGS OF A COUPLE OF JOGGLE FORKS I'VE USED:
"Break" all edges and round corners to prevent marking stock.

Dimensions not critical. Actual size shown.



P. S. I just found out that Ken Knowles is selling his first T-18, now that he's flying the wide body with the convertible wing and new airfoil. The airplane has the folding wing and standard fuselage. John Thorp did one of his superb conversions on the engine, making it a D engine of 135-140 hp by using D-2 pistons and using the big crankshaft and valves. Don't know if on it, but I think about 400 hrs. I believe Ken is asking \$14,000 for it.



- ① NOTCH SIDE PIECES AT FRONT & REAR WHERE THEY CAPS SUPPORT ANGLES.
- ② MAKE REMOVABLE CLOSURE FOR BULKHEAD #571. HONEYCOMB OR OTHER LIGHT WT SHEET PREFERABLE FOR SOUND DEADENING.
- ③ PAD STIFFENER ANGLES WITH RUBBER OR CORK FOR NOISE CONTROL

W.L. 26.1 EXT.

Wt. 26.1
Wt. 20.0
Wt. 26.1