OSHKOSH '82 is now history and a pleasant memory to the T-18ers that made it there. We had one of the best turnouts of T-18s that we have had in recent years. We had 41 registered by Wednesday and I believe that no more came in after that. Here is a list of those that were registered:

TAIL #	NAME OF OWNER	CITY AND STATE
N78DF	DONALD FRAZIER	NORWALK, CA
N88:8	JOE FORBES •	FRANKLIN PARK, IL
N45381	JACK HAGLE •	ROSWELL, GA
N600HH	HOWARD HENDERSON	KIRKWOOD, MO
N9008Z	STEVE HAWLEY	VALENCIA, CA
N679JB	ANGUS McDONALD •	SEFFNER, FLA
N55P	JACK HULL •	BLUEGRASS, IA
CF-YEI	BOB AFFLECK	HARROW, ONT., CANADA
N18Z	MICHAEL CHARLES •	NESBIT, MS
N199MP	HANK BEAMER •	LOCKPORT, NY
N57JH	JOHN HARDY	NATCHITOCHES, LA
N4PV	BUD VANDERBOS •	ROLLING MEADOWS, IL
N139G	ROBERT GRIFFITH •	HAMPSHIRE, IL
N370G	CHARLES SHUSTER •	PARK RIDGE, IL
N8952	EARL ODY	SAN PEDRO, CA
N3764C	GARY COPELAND •	WILLIAMSBURG, MI
N2287C	HILLS JOHNSON •	AUBURN, IL
N109K	OLIVER SMITH •	DOWNEY, CA
N49PW	ROBERT HUDGINS	FLUSHING, MI
N2111	ERNIE BACSANYI •	NORTHVILLE, MI
N51863	JOHN WALTON	HOUSTON, TX
N18GR	GAR ROOT	CARMICHAEL, CA
NLLGS	GARY GREEN	SAN ANTONIO, TX
N9379	GEORGE LEIDER •	LAKEWOOD, CA
N2NE	NATE EASTMAN	KIMBALL, NB
N13P	KEN POST	RAPID CITY, SD
N27DW	DICK CAVIN	DALLAS, TX
N99KK	KEN KNOWLES	NORCO, CA
N46806	GLENN LAWLER •	AUBURN, AL
N715C	JACK BIGHAM	ANDERSON, CA
N5GL	GAYLE LECOUNT	GEORGETOWN, IL
N2377	ROBERT YOUNG	OAKWOOD, IL
N895B	BAUER-STREATOR	WINONA, MN
N44LS	LEE SKILLMAN	PARKERSBURG, WV
N8812	DON THOMSEN	NORTH HILLS, PA
N18VP	VERNON PEPPARD	DALLAS, TX
N12055	ED BURKE	PITTSBURGH, PA
N3020	CECIL WILLIAMS •	COOPER CITY, FL
N49101	GREG McBRIDE •	RICHMOND, VA
C-GRAF	ROBERT FROEBEL	WEST HILL, ONT., CANADA

We also had an excellent turnout for our annual dinner at Butch's Anchor Inn on Tuesday night, which was again emceed by Lee Skillman. That was at the same time that the terrific thunderstorm and downpour hit Wittman Field and when we came out after the dinner we were more than a little surprised to see all the water standing, etc. Several transient airplanes were blown over by what may have been a small twister, but none of the display airplanes were damaged.

I LEFT OFF TOM BROWN, SUMMERVILLE, S.C., N___ FROM ABOVE LIST. I ALSO BELIEVE DEAN COCHRAN, BROOMFIELD, COLO, N11DC, WAS AGAIN THERE WITH HIS T-18. (OR WAS IT LAST YEAR?)

'82 T-18 FORUM: For some reason EAA HQ failed to designate a slot on the Forum schedule for T-18s, which upset quite a few people. When we complainedabout it we were given a Friday time in the U.L. area. At our Tuesday night dinner we announced that it would be held Wednesday afternoon at the open air auditorium in Ollie's Woods (just south of the antique area). This was a last minute makeshift arrangement and the attendance was a little poor, as might be expected, since we had very little time to pass the word. Hopefully next year we will have a Monday or Tuesday slot.

BAD NEWS DEPARTMENT: FRANCIS RICHARDSON, one of my long time very good friends and a very enthusiastic T-18er from its pin feather days in '62, died in a stall/spin accident in his T-18 on the first leg of his trip to Oshkosh. His oldest son, Danny, also died in the accident. He is survived by his wife and another son.

T-18 ACCIDENT ANALYSIS

Circumstances of the accident, as related by an eye witness (a pilot and the son of the airport manager) at the Neosho, MO, airport: Francis had called in on Unicom and advised his intention of landing there for fuel. Weather was no factor, nor was fuel or engine stoppage. He entered a close left hand downwind at fairly high speed, but somewhat lower than normal pattern altitude (estimated 500' AGL). On his base leg turn he overshot the runway centerline (extended). To correct back to the proper approach line he made a very steep bank (in excess of 60°) at an altitude of not more than 200-300 ft. The airplane stalled in the turn and spun over the top, making two complete turns. Spin rotation was stopped just a few feet before it impacted in an almost vertical attitude. There was no fire. There was no fuselage damage aft of the cockpit.

His airplane (plan serial #1) had a standard fuselage, except for a modified canopy, with forward opening doors. The wing had the standard airfoil, but was the folding wing configuration. He had about 75 hours on the airplane and the engine and had had no engine or flight problems. This was Francis' 2nd T-18 and he had flown the first one over 300 hrs. when he lost it in what was either a departure stall or a violent little dust devil. Francis went with me when I flew my T-18 out to Calif. a couple of years back and I had him fly every other leg. On each one of his approachs and landings he had a pattern of overshooting final approach, at too low an altitude, with incorrect rudder and aileron inputs. I talked the matter over with him on the ground after each landing, pointing out the potential lethal results of even a slightly accelerated stall in the turn from base to final, as verified by hundreds of such fatal accidents in nearly every type of airplane ever made. His main problem was that he couldn't accurately project ahead in computing the angle of bank that was required and when to start turning base to final, to accomodate to the conditions of wind, altitude, drift, and speed. I suspect this was very probably the reason that he made this final turn so low, that possibly he felt he could better judge the situation at a lower altitude and closer in. This is a judgement decision that all of us have to learn by experience and really cannot be taught by an instructor. I always used to teach a new student to start the turn when the landing target spot was midway between the nose and wing tip (an angle of about 45°, more or less) and to start with a steeper bank angle, shallowing it out as required. This was a very mechanical method and in the beginning I even suggested a preselected bank angle to correspond to surface wind velocity. Most people rapidly learned to visualize the invisible track of the airplane ahead and their "computer" soon stored the necessary information for future

decision making and most of them soon learned what adjustments to the bank angle were necessary to fit the real time situation....But I also found that perhaps 10% of these people took much, much longer to really project ahead and a few of them were extremely deficient. I also noticed that these same sub-standard ones badly mis-handled rudder, aileron, and speed coordination in this final turn, even tho' their coordination was acceptable in level flight turns. To me this indicated they had one too many "balls to be juggled" at that time, thus overloading their computer. What has really surprised me over the years is that many experienced pilots carry those same bad habits right on. I've had experienced co-pilots on the airline that show a sub-standard ability to project ahead on entering the final approach course from base or downwind (in the airline business it's REALLY a no-no to overshoot final and have to make a bank in excess of 20°). In such cases I've often wondered whether the fault lies with incompetent or sloppy primary instructors or whether a certain per cent of pilots are genetically unable to handle multiple judgement calls in that segment of flight.

ANALYSIS - CONCLUSION

In any case the purpose of this discussion is not to be critcal of Francis or anyone else, but to call attention to a potentially lethal situation for new pilots on the T-18 (and also for those that might tend to get a little careless,too). This can and does happen in any other type of airplane, but high performance airplanes like the T-18 have different characteristics than the run of the mill factory built. First of all the pre-stall buffet is either minimal or practically minimal in most of the T-18s I've flown and that's why John Thorp has recommended the installation of stall strips on the wing leading edge....to induce a more complete stall at the wing root before it spreads out towards the tips, thus sending more rough air back to hit the stabilator and warn the pilot. I've talked to builders that have tried them with widely varying results. Admittedly it takes trial and error to get them located perfectly, but don't get discouraged. Let's be aware that there is only one thing that ever stalls an airplane....excessive angle of attack...pulling the stick back too much for the conditions of the moment. Very rarely will we ever stall an airplane straight ahead on the final approach(unless it is flared too high). It's the accidental stall in a turn....the accelerated stall.... that's the killer. If the rudder or aileron control is being misused when the airplane is stalled in a turn the airplane will spin. The direction of the spin will depend on which wing stalls first. To avoid a spin it follows that we should not stall the airplane, but in order to have a trained reaction to avoid a spin out of the stall it follows that we should really know what causes one wing to stall first and trigger the auto-rotation. Give yourself an honest little quiz and see if you really know — or are you just guessing?

ANALYSIS OF INADVERTENT STALL/SPINS

Let's take a hypothetical case: The airplane is in a steep left bank, turning from base to final. The pilot has let his speed decay in the turn and now he attempts to unbank, using aileron alone (or mostly aileron alone) and he has applied the opposite aileron control rapidly and very strongly. Since the airplane is now very close to the critical (stalling) angle of attack, which wing will now stall and which way will the airplane spin? What will his ball/bank indicator be telling him when he has applied full opposite aileron? I'm sure that 99% of you know the correct answers, but how many of you had to stop and think about it a few moments? Any one of us can get rusty, but that"s one situation we should stay super-sharp on. In the case of the T-18 you remembered that there is a differential throw built in that causes the up aileron to move more than the down one

but with full deflection the down aileron will cause more drag than it increases lift. The increased effective camber will trigger flow separation and the aileron drag will tend to slow that wing up and speed up the high wing. Result? Left wing stalls and it will autorotate to the left. As that wing (1)moved backward the ball bank would show you the same thing as if you were holding left rudder...it would be on the far right side of the cage. In other words a skid, which in itself is a speed losing maneuver.

Now ask yourself what else might have happened as the airplane began to unbank? Remember when you were practicing steep turns and as you rolled out what happened to the nose? Unless you applied forward stick the nose would pitch up sharply as the wings shed their G load. If the airplane was already close to the stall angle of attack that little extra pitch up could do it. Right?

Now suppose a pilot is making a perfectly coordinated turn and the skid ball is in the center, but his entry airspeed for the turn was too low for his weight, the degree of bank, and the number of G's he has pulled for the particular angle of bank. In order to pull X no. of G's he has had to pull back on the stick and increase the angle of attack. If he exceeds the critical angle of attack the airplane will enter an accelerated stall (trying to force the wing to carry more load than it is capable of at that moment). Now...which way will the airplane spin?.. Clue: Go out and stall your airplane with one wing say 10° higher than the other and see which wing will fall at the moment of stall. If there no yaw at that moment it will fall off toward the high wing. Try it with 20°, then 30°, then 40° bank and see how much more rapidly it will roll as the bank increases. The answer to the above question is that, yes, the airplane will spin over the top in the direction of the high wing. Of course if you experiment with any of the above (which you probably did during your test period) common sense would dictate you be well above 3000 ft. AGL, be prepared to spin and recover promptly with throttle closed. Don't let your speed get out of hand on recovery, but be very gentle and don't horse out of the spin recovery into a high speed stall or bend the wings, etc. Also avoid the tendency to pick up the low wing with aileron.

STALLS IN A TURN

One other thought on the subject: The SPAN loading of the T-18 is on the high side. This isn't too worthy of consideration until you increase the angle of attack, such as in a climb, a glide, or a turn, and then it hurts. As this angle of attack increases more and more lifting energy is siphoned off by the wing tip vortex. More of the high pressure air on the underside of the wing escapes towards the wing tips and the result is the same as if some giant had taken a pair of scissors and clipped off the outer few feet of each wing, and it loses a large amount of its potential lift. To compensate for the suddenly increased sink rate from this loss of lift the pilot either has to increase his speed (thus generating more new lift) or increase his angle of attack. Well, you know what also happens when you increase the angle of attack to get more lift. The drag also increases, so you are in an ever increasing condition where the airplane loses speed at a rapid rate.

SPAN LOADING

I've heard new T-18 pilots comment on how puzzled they were that the T-18 would lose speed so rapidly in a steep* mentally comparing it to other airplanes they had flown.....particularly those with a much lower span loading. The subject of span loading doesn't often come up in the average bull session, so many pilots aren't really too well versed on the ifs and ands I guess. At any rate, be aware of the limitations as you start to enter a steep turn. If you don't have the airspeed you need

* TURN

for a comfortable safety margin, don't be timid about getting the power in firmly. If you've waited a little too long to start your base/final turn and it's apparent you'll have to do something drastic to get back in the approach slot, why that's an excellent time to roll out and go around the pattern and do it right the next time. Besides, that's good PR if you give the ground bound troops a good low level fly-by in the process!

UPDATE ON BACK ISSUES OF THE NEWSLETTER: Those of you that have missed part or all of some back issues of newsletters #45 through #55 will be happy to know that there is no longer a problem. It has taken quite a lot of work to get all master copies updated and offset printing plates made, but now the job is done and in a few days I will have a complete set of 500 of each one of these back issues.

The actual printing and collating of these 10,000 sheets appeared to be an immediate impossibility up until a couple of weeks ago, when one of our local T-18ers, Vern Peppard came to the rescue. I had counted on using our chapter offset press to print them, but it has been down for repair and parts replacement, so I turned to bids from a local printery for the job. The bill would have wiped out our treasury, so I began to think I'd simply have to pull the plug on the project and say, "I'm sorry fellows, but-----", when Vern came to the rescue. One of his businesses has an in house printing facility that serves all his various business interests and needless to say it's very busy at all times, but they are going to squeeze us in sometime in the next few days. The plant also has an automatic collator and this, too, will solve a major labor problem we've had in the past. Past issues have taken myself, my wife, and two grandaughters the better part of a day to collate, staple, put in the envelope, apply address labels, zip code bundle, etc.,so you can see that doing ten newsletters would just about eat up two weeks (even if I could corral my grandaughters for that long, which I can't, as they now live in another town).All I can say is, "Vern, you're a lifesaver and I know I speak for all of you when I say we're deeply grateful for your offer"

IF time permits I'll go back thru the stack of requests for back issues that I've filed and I'll mail them with this issue. I've always got a half dozen irons in the fire, so I may run out of time between now and then. If your requested back issues don't arrive with this issue I would appreciate it if you would send me a postcard requesting back issues X & X, etc (not a letter, please) and on Jan. 25th I'll put all back issues in the mail. That same day I'll mail you a postcard that will advise that X & X have been mailed, so if you don't receive them in 14 days go to your post office and make some waves. About 10% of our mailings are not delivered by the PO and this gets to be a BIG problem.Putting the NLs in the envelops has helped some, but this is extra expense and work and adds up to a lot of unnecessary correspondence and telephone calls. With all the other activities I'm up to my eyeballs in, I simply can't keep up. Half the time I can't even answer the stamped & self addressed requests and for this I apologize, but I have to put first things first.Hopefully the situation will be easier now.

MORE ON BUILDING THE CONVERTIBLE WING: Recently I was talking to John Walton in Houston and we were discussing his progress on the CW he was building to replace the standard wing he's now flying with. He brought up a problem he'd encountered in aligning the 213 and 311 bellcrank brackets for match drilling. I was on the way to California when I talked to John and when I got to Los Angeles I visited both Ken Knowles and Chris Fast and talked the problem over with them. Back home I had occasion to talk to John Kleber and he ,too, had run up against this problem. The next few pages will identify the problem and present different ways to solve it.

JOHN WALTON'S SOLUTION TO BELLCRANK ALIGNMENT ON CW

EXCERPTS FROM JOHN WALTON'S LETTER RE THE ALIGNMENT PROBLEM:

Dear Dick,

Enclosed are a few assembly pictures of the inner wing. This is a pretty obvious operation , so I didn't know what to take except a midway shot of the assembly. There is one operation, tho', which I think is important and I have a few pictures of it enclosed. Call it, for want of a better label, "AILERON CONTROL SYSTEM BELLCRANK ALIGNMENT".

The plans locate the aileron control bellcranks precisely. The bell=crank brackets have detailed hole locations and centers for the ¼" (AN4) bell crank pivot bolt. Before proceeding with the final riveting of the inner wing and any assembly of the outer wing I feel it is wise to mock up the interface arrangement. The purpose of this is to assure oneself that the INNER and the OUTER bellcranks are located in such a way with respect to each other that they interface properly.

I found that when I clecoed my parts together that I did NOT quite have a concentric alignment at the pivots. After making a 1/8" x 1/4" bushing for each bellcrank pivot I could install the bellcranks and actually see the effects of this slightly misaligned condition. What did happen was that the bellcranks interfaced fairly well in the approximately middle 1/3rd of their arc, but at each extreme 1/3 they were either loose (play) or binding in such a manner that even with beefed up reinforcement of the rib that it could be sprung. Such a condition in a finished aircraft would set it up for a metal fatigue occurrence I would think.

Let me describe how I set up this bench test (so to speak): The inner wing was partially riveted, but with the top skin still clecoed.The outer wing spar and a dummy (or the real thing) rear spar fitting were bolted (pinned) in place. The inner rib of the outer wing was also clecoed in place and 2 triangles of .032"(measuring about 8 or 9 in. in each direction) were clecoed in place on both top and bottom (to act as the skins for this operation). Obviously these triangles were transfer punched from the actual wing skins, so that they would pick up around 8 rivet holes in each direction.

A 1/2" hole was made in the overhang of the top skin of the INNER wing (where the skin continues outboard of the outermost rib of the inner wing) This hole was just eyeball located to be about in line with expected projected center of the bellcrank pivots. The 1/2" size hole gives plenty of room for a drill bit down thru it.

I found that my outer wing centers were displaced about .050" from the inner. In addition, the two sets of fittings were too close together. There was virtually no clearance between the heads of the two bolts, and without correction (.110) the arms pushed each other in an AXIAL direction (I may have made a slight error in locating the fittings on the ribs ....working from (knowles) pre-formed ribs as I did, all of the reference dimensions have to be "backed" (?) in). In any event, I displaced my fittings slightly (.110) and replaced the 3/4 X 3/4" reinforcements which already had 1/8" holes. Unfortunately they were in the wrong locations. This was a simple correction to make, tho'.....

The result of all this hassling was that I finally got done with the right side (10 hrs.), my bellcranks interfaced snugly and smoothly thru-out their entire travel. Having "gone to school" on the right side, I was able to take my acquired knowledge and complete the left side in 2 hrs.

The most important thing is that when I put the outer wing together I will know exactly what is the relationship and behavior of these bellcranks. This would be very difficult to do with the outer wing also together. However, because I am a belt & suspenders type, I will very probably check it all out again before riveting down that upper skin on the outer panel...just to be sure.....(End of comment on his CW).

See JOHN KLEBER'S METHOD ON PG. 4A

Now here is JOHN KLEBER'S approach to the same problem:

CONVERTIBLE WING: DRILLING THE 213 and 311 BELLCRANK BRACKETS IN-LINE.

Several builders have expressed difficulty in drilling the 213 and 311 bellcrank brackets. In order to prevent binding of the bellcranks, these holes must be located very accurately and drilled perfectly in line.

One method of drilling these holes in-line is to drill through the top wing skin, and both sets of brackets, all in one operation. This method, however, leaves a ¼" (or ⅛") hole in the wing skins. There is another way of accurately drilling these brackets which eliminates the hole in the wing skin. It takes a little longer to do this process, but the end result is worth it.

The following process is accomplished AFTER the center wings and outer wings have been completely assembled (riveted) with the exception of the 310 and 210 ribs. These ribs must not be riveted in place yet!

1. Assemble rib 210 complete with 213-1 & -2 brackets.
2. Drill (on drill press) 213-1 & -2 bellcrank holes. To prevent brackets from flexing during drilling, fit a piece of wood snugly between brackets.
3. Rivet 210 ribs in place to complete the center wing assembly..
4. Cleco 310 rib assembly in place in outer wing panel.
5. Now you need a ¼" dia. rod with a sharp point machined on the end. Total length 2½".
6. Place this ¼" rod in 210 bellcrank bracket holes, point facing up. Make sure rod can turn and move up and down freely in bracket holes.
7. Wrap about 6 feet of heavy thread around rod. Leave some extra thread extending forward.
8. Attach outer wing panel to center wing. PIN securely in place at ALL THREE POINTS.
9. Now you're ready to mark the hole center on the 311-2 bracket. Slide a table knife under the ¼" rod. Lift till point of rod touches 311-2 bracket. Now pull the string to spin the rod.
10. Detach outer wing panel. Remove 310 rib.
11. Center-punch 311-2 bracket where marked. Using a snug-fitting piece of wood between 311-1 & -2 brackets, drill (on drill press) bellcrank holes.
12. Install bellcranks. Pivots should now be perfectly aligned.
13. GOOD LUCK. ANY QUESTIONS CALL JOHN KLEBER 405-728-1650.

(Pretty slick little idea for a rotating center punch, John)

CW BELLCRANK ALT. MOUNT - IOWA 1 PAGE

MORE ON 213 & 311 BELLCRANK ALIGNMENT ~~~~~ INFO SOLICITED FOR N.L.

MORE ON THE 213 and 311 BELLCRANK ALIGNMENT PROBLEM: I recently made a trip to California and while I was out there I visited with both Ken and Gerri Knowles and also with Chris and Wanda Fast. We went by Chino Airport, where Ken keeps his wide body, convertible wing T-18 and Ken showed me how he had handled the alignment problem. He had basically done the same thing as John Walton had, drilling the 1/2" holes in the skin overhang of the center wing, on both the top and the bottom skin. He recommends the procedure because of its simplicity and its contribution to accuracy.

When I went by Chris' house I got to inspect another CW he was in the process of building and sure enough, he, too, had done the same thing that Ken and John had done.

I think Lou Sunderland has now completed his folding wing, but I have not had a chance to check with him on how he handled this operation. How about the rest of you out there that have built the CW? How did YOU do it? Even if you also did the same thing, we'd appreciate it if you would drop us a note about it.In fact, it would be most interesting to know just how many of you have already built the folding wing or are in the process. The CW is a whole new ball game in several areas and we all need to know what problems have cropped up and how they have been taken care of.....so if you'd take pen in hand and run off some notes on your experiences, a lot of fellow builders out there will be very, very grateful. I have literally hundreds of letters on file that say in essence, "I couldn't have built the T-18 if I hadn't had the newsletters to refer to", so your experience, in combination with all the others, has become a very valuable thing. Please do your part. Remember there are a lot of people out there that have never had an occasion to learn some of the simplest things that you take for granted.

A majority of the T-18 builders and owners have told me that they do appreciate that putting out the newsletter is a big job and they have thanked both Lou and I for our efforts and both of us appreciate your thoughts in this respect,but the very best way to thank us is to show us your individual support by sending in a how-to-do article. If we don't continue to have a running flow of information the T-18 Newsletter will cease to function....at least as an advisory for builders. Probably we will eventually transition to a T-18 Owners Society, as we already have quite a few owners that were not the original builder and certainly the present percentage of these will increase in the future.Again, I ask that you make an effort to contribute SOMETHING soon (like now, before it slips your mind) !

ALT. WING GAP COVER (CW)

WING GAP COVER ON CW: Chris Fast is using a different method of closing the gap between inner and outer wing skins on the new CW he is building. Plans call for a riveted assembly, consisting of two nose ribs and a narrow section of skin attached to them, with the skin overlapping both inner and outer wing skins, with the unit held on by a single screw thru the leading edge. Chris' method is the same as many have previously used on the standard wing, in which a strip of skin is wrapped from the trailing edge around the leading edge back to the trailing edge and is secured and tightened with a bolt/turnbuckle sort of set up. This strip also overlaps the inner and outer wing skins. Chris feels that while this method requires you get down underneath the wing to remove or install the gap cover and also takes a few seconds longer to remove or install it that it eliminates the somewhat tricky fitting of the skin overlap aft of the main spar (as per plans). Here is another one of those cases that you take your choice on how to do something. There are merits to both points of view. About all I can add would be the thought that while on a cross country and to share a buddie's hangar for the night dictated that you fold a wing or wings that the plans method would be a little less hassle.

TO NEW T-18 OWNERS: Even tho' you have bought your T-18 and didn't build it yourself, we'd like to hear from you, too. Here's why:There are always a number of people that buy their plans, build their airplane and fly it for a little while and sell it for one reason or another, but no one has ever heard from them since they first bought their plans.Even tho' the airplane has been inspected, annualled, and flown for years and a lot of hours, it may or may not contain modifications or construction errors that could potentially be expensive to correct..or perhaps even dangerous. Since FAA people and A & Ps that have looked at the airplane aren't REALLY knowledgable about the T-18 design, it's essential that YOU should have a complete set of plans and newsletters and become very familiar with their contents. One of the most important things should know is whether the stabilator has been modified in accordance with Mr. Thorp's very strong recommendations. (A homebuilt designer cannot issue a mandatory directive to modify or inspect and repair some part that has any legal "teeth" to require conformance. He can only advise, request, recommend, or even plead with owners or builders to comply with his advice...nor can the FAA require such compliance).Mr. Thorp has emphatically stated that ALL T-18 stabilators should have the complete modification for safety, regardless of the power plant or cruising speed.Do you know how to inspect yours for pre-flight? What about systems? Have you a wiring diagram of your electrical system? Have you ever traced each and every wire in it or gone over it in detail with a competent A & P? What about the fuel system? And the exhaust system, including carb and cabin heat muffs? How about the engine control system? And flight control systems? Or the induction system? Has your pitot/static system been checked out...and have you verified your indicated airspeed by accurate check over a measured course? What about your seat belts and shoulder harnesses, Canopy fit and condition? Don't forget your engine baffles either. What prop do you have? Has it been resonance tested and documented? Some models are VERY dangerous. Have you REALLY examined your brake system in detail? Are they adequate for hard, emergency braking? Have you had the wheels and brakes off to dye check them for cracks, clean and re-grease wheel bearings, etc? How does it fly? Have you checked flap and aileron rigging? Have your engine instruments been bench checked and calibrated?

As you can see, that's quite a list, but be aware that serious incidents and accidents have been documented for each and every one of of the items listed above. All these and many other items have been discussed in past newsletters.

Some of the new owners have taken older "plain Jane" T-18s and have refurbished them with new paint and upholstery, making them objects of real beauty. Some have done extensive modification or replacement of components and systems, changed power plants, etc. Some of these things are needed improvements, but some could be ill-advised, too. In any case it would be of value if you'd sit down and list all the specs and performance figures on your airplane, the changes you've made, your experiences and impressions of how it flies, how it's equipped, etc., who you bought it from, when it was built, etc. Some of the new owners have made some significant performance gains by cleaning up a series of little things and certainly these items and the performance gains from each would be of general interest....so you see, you can be a contributor, too. Just don't put it off, tho', for if you're like I am you'll forget it if u do.

So, PLEASE.....LET'S HEAR FROM YOU SOON

TO NEW T-18 OWNERS, NON-BUILDERS

SPECIALIZED INDUCTION SYSTEM ON O-360-A3A

BY STEVE HAWLEY

The following report from STEVE HAWLEY is very well done and we fully appreciate the time and effort he made to present such a fine example of the sort of thing we need more of. Steve has always been exceptionally generous in passing on his building experiences, etc.

Dick Cavin
10529 Somerton
Dallas, Texas 75229

Dear Dick,

As I promised at Oshkosh, here is some information on the induction system on N9008Z.

During a visit to John Thorps shop in early 1972, I saw several all metal cowelings hanging from the rafters. I asked John if any were for sale, they were and I bought one. I built a plywood box for it and stored it away. Later a Lycoming O-360-A3A was purchased and installed. The MA-4-5 carburetor was installed and I was dismayed at the thought of cutting up my beautiful coweling. In desperation I called Marvel-Schebler and asked if there were any alternatives to the MA-4-5. They said not for that particular engine but they had produced a horizontal carburetor for another 180 HP engine. It was called an HA-6 and used on various Grumman American and Beechcraft airplanes. An aircraft salvage company was contacted and a horizonal carburetor ordered. I suppose the time spent fitting the thing and making it work added several months to the project but what is two months in seven years!? Enclosed are some drawings with notes that will probably answer some questions.

The elbow was purchased from an oilwell supply company and is a ¼" wall short radius 90°, 2½" ID mild steel gas pipe elbow. The two bosses welded on each end are .125, 4130 plate. They are arc welded, continuous on the inside and between the attachment holes on the outside. The short adapter between the carb. and the air box is a piece of mild steel exhaust pipe with .90 x 4130 plate gas welded. The air box itself is fabricated from .090 x 6061T3 plate and connected at the corners with 3/4 x 3/4 x 1/16 2024T4 angle. This method provides a nearly perfectly square box with sharp 90° internal corners. Ball bearing assemblies are rivited to the sides and carry the split shaft with the butterfly plate rivited solid. A connected box was bent up out of .025 2024T3 and rivited on to provide an inlet at the bottom for the hot air. An assembly to hold the dry air filter was fabricated out of mild steel and installed on the top. An aluminum "can" of .025 2024T3 was rolled and the edges rivited to provide an air cleaner plenum. The top two pieces were layed up with fiber glass using blocks of styrofoam for a mold. The path of the air is very smooth and I doubt very much if there is any significant efficiency loss due to the induction system. The entire system has been 100% trouble free to date (325 hrs.). I am turning a fixed pitch metal prop.(68" x 86"). This system precludes the use of a constant speed because the air cleaner is mounted directly in the way of where the prop govenor should mount in the accessory case. The system is very good for checking and changing air filter elements. Four ¼" cap screws removed between the carb. and the adapter tube allows the entire air box and filter assembly to drop out. It is about a 30 minute job to change the filter which I do every 100 hrs.

STEVE HAWLEY (CONT'D)

An interesting point is that the HA-6 carb is a float type carb., but still has to have about 2.5 psi to run above 1000 rpm. Therefore a mechanical fuel pump with with an electric boost pump as backup is installed. Sure am glad I installed the electric backup pump. The mechanical pump failed on the return trip from Oshkosh. A new one was installed in Alburqurque with no further problems. (It sure does get quiet when she quits.)

Some information you might find interesting. The airplane was started in Nov. 1972 in Crescent City California. During the next 7 years I and my family (The T-18 was considered part of the family) moved 6 times in 4 states. They are from Crescent City to:

1. San Jose CA
2. Lompoc CA
3. Valencia CA
4. Buena Vista CO
5. Aberdeen Mississippi
6. Skiatook, Oklahoma

The airplane was finally flown in Skiatook, OK on Sept. 1, 1979. I flew it myself and had to hold about 10 - 12 lb forward pressure on the stick even with full down trim rolled in. After about 30 minutes both arms were tired so I landed and figured out the problem. The angle on the 3/8" trim arm was changed and it has flown hands off ever since.

On long cross country trips I cruise at 2250 rpm, 175 mph (true) and burn 8.0 gal/hr. With that kind of performance and economy, I don't figure a constant speed prop would help much.

My wife and I really enjoy the "long legs" the T-18" gives us.

Very Truly Yours,

Steve Hawley

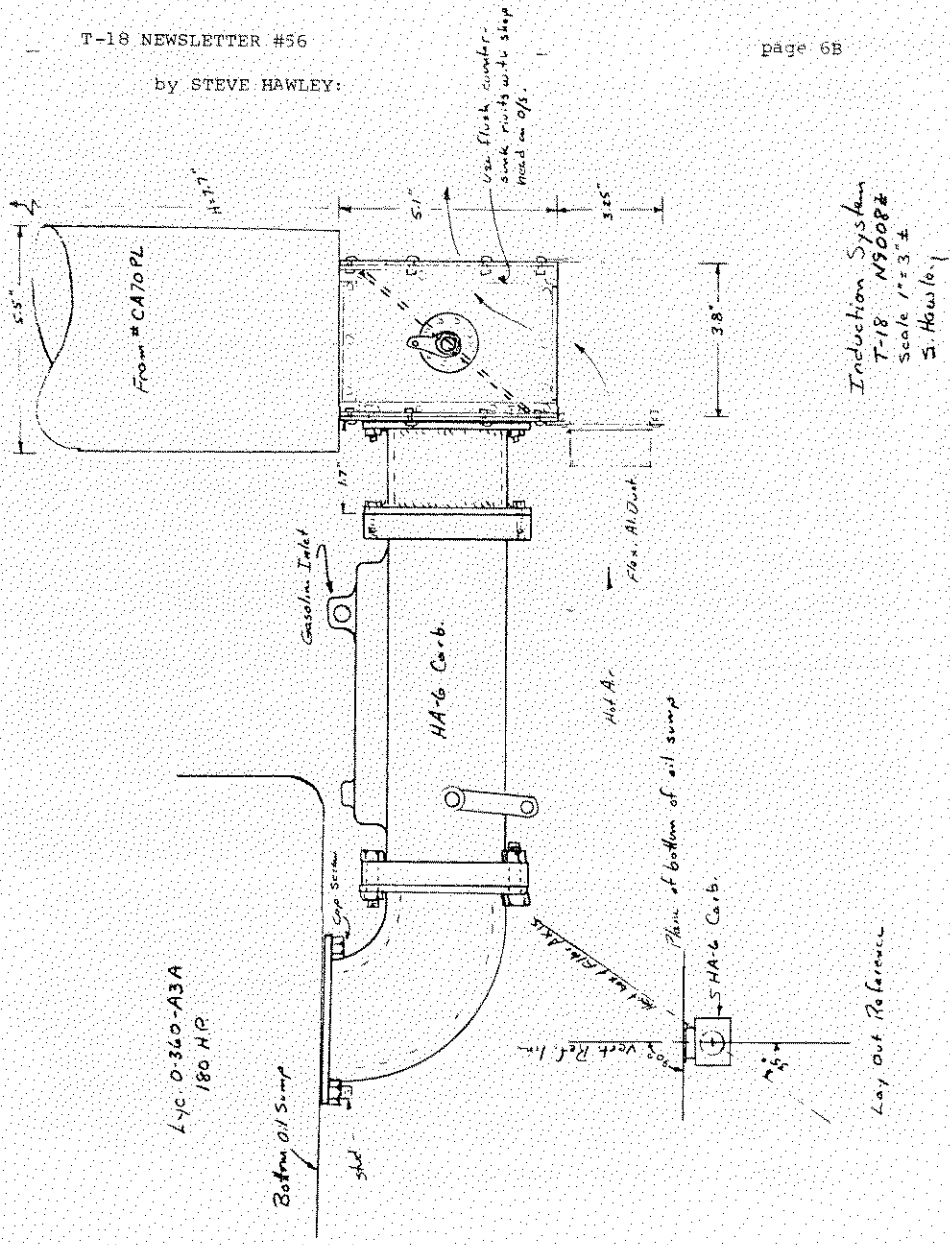
Steve Hawley
2515B Ave. Ignacio
Valencia, CA 91355

CORRECTION OF TYPO - TRIM PROBLEM ON FIRST FLIGHT

Thanks again, Steve, for the above. We really appreciate it!

(See drawing of Steve's system on page 6B

by STEVE HAWLEY:



Here's still another excellent report from TOM KERNS, who is an engineer for Bell Helicopter here and now has another excellent T-18:

Tom Kerns
October 28, 1982
4218 Ticino Valley Dr.
Arlington, Texas 76016

Dick Gavin
10529 Somerton
Dallas Texas

Dear Dick;

Thank you for your support and advice on my first flight Sept. 3. It was a great comfort to have had the opportunity to fly your airplane before testing mine, and to discuss the T-18's flying characteristics.

I will not send a performance summary yet as I have only begún measuring and calibrating. My airplane is a "stock" T-18 with standard wing, canopy, gear length, and fuselage. My cowl is fiberglass from Ken Knowles, the engine is an O-290 D-2, and I swing a Cassidy Pacesetter 200 68 x 63. Empty weight without Paint or upholstery is 845 pounds. I made numerous detail changes in the airplane with an eye on cruise perfomance, and I am pleased!

Enclosed are write ups of some of my construction details that would be of use to other builders, with the understanding that it is the builders responsibility to determine the impact on safety for his particular airplane if these construction details are incorporated.

WING ALIGNMENT METHOD

Wing Alignment Ihave seen some beautifully built T-18's with awful roll trim problems. Two airplanes in particular had wings that were aligned and drilled in beautiful steel jigs, yet they do not fly straight. I believe the distortion is due to inadequate support during the riveting process.

To eliminate wing twist in my airplane I built a jig table that held the wings in alignment during both the drilling and riveting phases. The jig table was built from a 4' by 4' piece of 3/4" particle board braced diagonally underneath with well seasoned 2X6 fir. The braces Were carefully planed true to assure a flat table surface. The wing panels rest on the table with C-clamps securing the outer edges of the lower skin to the table. A 4 foot spanwise spacer block of appropriate height and taper supports the wing below the main spar, and a taller spanwise spacer supports the leading edge about 5 inches aft of the nose.

The key to this table is drilling 1.5" diameter holes in the table top at positions corresponding to every second or third rivet in the lower wing surface. The holes allow clearance for clecos during the initial alignment, and during the riveting process the holes allow driving of every second or third rivet in each bay with the wing clamped down flat. After driving every third rivet in a bay, the wing may be lifted off the table and remaining rivets for that bay are driven without fear of a shift in alignment. Clamp the wing back on the jig and rivet the next bay, remove to drive remaining rivets, etc.

TOM KERNS (CONT'D)

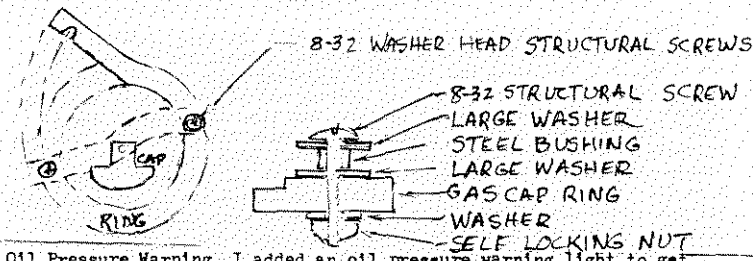
If the table and spacers are built true, a wing panel clamped to them is sure to be straight.

I built my wings with matched hole tooling except that I did not drill the holes from the upper wing skins into the main and rear spars. This left the wings free to twist after being clecoed together. The wings were clecoed, claped to the table for alignment, and the spar holes were drilled thru.

GAS CAP RETENTION

Gas Cap Retention The expanding rubber gas caps most of us use can be blown out by overpressure in a relativly minor impact. Positive mechanical retention is required and the lightweight gas cap doors on most airplanes are not adequate load bearing structures.

My solution was to install a swinging arm of 0.10" X 5/8 " 2024 t-3 supported by 8-32 structural screws tapped into the gas cap outer ring. The arm piviots on one screw and slides under the head of the opposite screw, locking the cap in place. A block attatched to the inner face of the gas cap door drops down behind the arm to prevent the arm from swinging open in flight. The block also insures that the swinging arm must be latched before the gas cap door can be closed.



OIL PRESSURE WARNING

Oil Pressure Warning I added an oil pressure warning light to get my attention if the oil pressure should sag, and realized the added benifit that if I leave the airplane without turning my master switch off, the oil pressure light glows as a reminder. Standard automotive oil pressure switches are 1/8" pipe thread and trigger at about 10 PSI. I installed one at the foreward top end of my engine case by removing the 1/8" pipe thread plug which closes an oil capillary acess hole used in the manufacture of the engine. I ran 12 volts from a circuit breaker to the warning light, and from the light to the sensor.

COWL MOD

Cowl removal Removal of the standard T-18 lower cowl can be difficult because of the need to slide foreward to clear the landing gear cuffs before dropping downward. I solved this problem by sawing off the aft 6" of my lower cowl and inserting a 6" metal extension on the lower fuselage with 6-32 screws. The cowl attatches to this extension with camloks.

BRAKE LINES

Brake Lines When I priced the Aeroquip lines and fittings to plumb my brake system, I felt a strong temptation to sell my airplane as it sat. There is an alternative! Followers of Burt Ruttan have been using 3/16" Nylaflow plastic tubing with the associated brass fittings to plumb their brakes. I installed it in my airplane and have not had any trouble in 16 hours of taxi and flight testing with OAT as high as 105 degrees.

TOM KORNS (CONT'D)

BRAKE SYSTEM

TO hook up my brakes with a remote resevoir, I used 8 90 deg. elbows, 6 straight connectors, an AN917-1D tee to split the resovoir supply to two systems, two AN916-1D elbows for thru-firewall fittings, and about 15 feet of 3/16" Nylaflow tubing. My 1982 Aircraft Spruce & Specialty catalog lists this at $33.00.

I made thru-firewall fittings by riveting a .090" alumimum plate 1.0" in diameter to the firewall. A hole is drilled in the center of the plate, threaded with a 1/8" pipe thread tap, and a 90 degree Nylaflow elbowis screwed into the tapped hole. Enough threads extend through the firewall to pick up an AN916 elbow or an AN917 tee,

FUEL LINES

Fuel Lines I spent several hours trying to find a satisfactory layout for my fuel system, so here is a description to save someone else the trouble. I used Aeroquip 601-6 lines and 816-6D fittings for my system. Both lines foreward of the firewall are covered with Aeroquip AE102-12 fire sleves using Tinnerman A3122-10-1J (NAS 397-10) clamp at each end. I use a standard metal bowl gascolator. My tank outlet is a welded AN816 flange with a 3" brass finger filter screwed into it. A AN822- B 90 degree elbow hooks to a line approximatly 11.5" long wich runs foreward and to the right, arcing back to the left and joining a 90 degree elbow which screws into the top of the fuel valve. The arc gives some extra length so that a shifting of structure in a crash will not strain the fuel line fittings.

FUEL VALVE

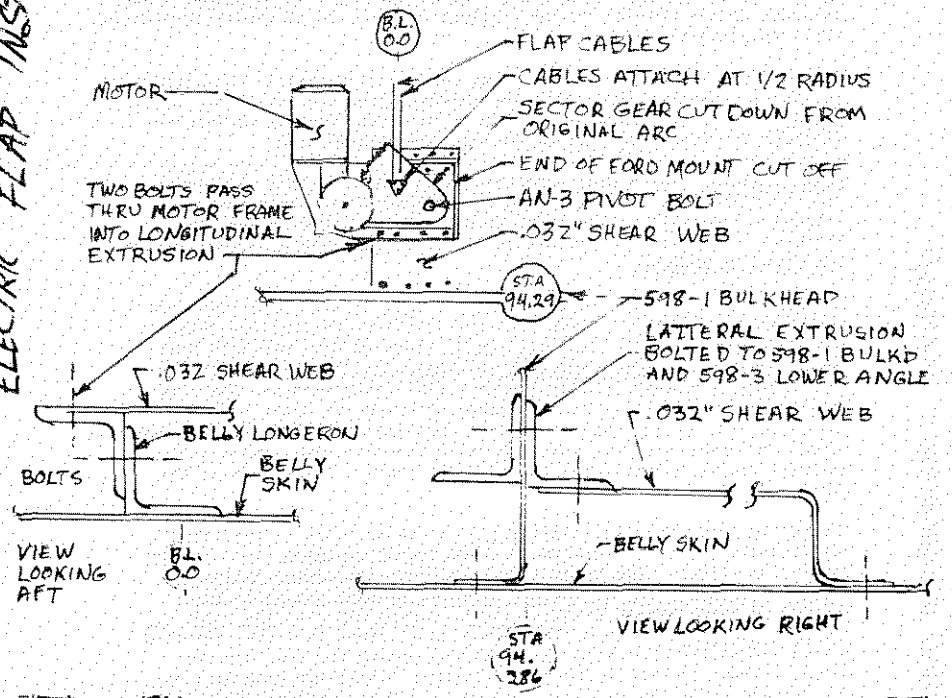
The fuel valve is mounted on the firewall with the inlet pointed up, valve shaft aft, and the outlet face pressed against the firewall (W.L 27.7, BL. ~1.5 The valve has two 3/16" mounting holes in its flange, I bolted the valve to the firewall by passing AN3 bolts foreward thru the flange, thru appropriate length spacers, and thru the firewall and a .010" reinforcement plate. A AN822 elbow threads into the valve from the foreward side of the firewall and a 15." fuel line runs from the elbow toward the right of the airplane, doubling back and downward to mate a AN-816 nipple at the gascolator inlet. The gascolator is centered below the fuel valve axis and strapped to the landing gear cross member with two Adell clamps and an appropriate steel bracket. The gascolator outlet has a AN-822 90 degree elbow with a line about 11.3" long connecting to a 90 degree elbow at the carburetor. All lines and fittings drain downward to the gascolator.

FUEL VALVE EXTENSION

How do you reach the fuel valve? Extend it 2 feet and mount below the instrument panel center. A Sears Craftsman 1/4" drive universal socket will slip nicely onto the 1/4" square shaft of the fuel valve. Drill a 1/8" hole thru the universal and valve shaft for a roll pin or cotter key to keep it from slipping off. Slip the socket end of the universal inside a piece of 1/2" X .032" wall tube left over from building the aileron controls. Drill thru the tube and universal for two 1/8" roll pins to hold the socket and tube together. I ran the tube to a bracket on the bottom of my instrument panel and installed a handle cut from 1/4" plate stock. The handle is horizontal and unobtrusive with the fuel on, and hangs down vertically for the "off" position.

ELECTRIC FLAP INSTALLATION

Electric flaps My airplane has electric flaps powered by a Ford window operating mechanism (similar to Bob Dials). My mechanism is from a 1976 full size ford, newer motors are probably similar. Flap travel from 0 degrees to 30 degrees takes 2 seconds at 110 MPH. The attatched sketch shows actuator geometry. Attatching the flap cables at 1/2 of the sector gear radius provides the motor with a 2 to 1 mechanical advantage and causes the sector gear piviot to share 1/2 of the flight loads. My sector gear retains 19 teeth (20 notches) to provide 30 degrees flap travel. No limit switches are required, I let the motor stall when it runs out of sector gear teeth just as in the automotive installation. I replaced the self tapping screws with aircraft bolts, and I modified the peened sector gear piviot by drilling it for a 3/16" AN bolt. What remained of the original piviot was retained as a bushing. The motor lies aft of frame 598 on a horizontal .032" shear web which is supported by two 3/4 X 3/4" X .062" extrusions. One extrusion runs fore and aft, bolted to the center belly longeron and the other bolts to the aft face of the bulkhead which holds the wing aft attatch fittings (bolted thru to the existing latteral extrusion). The center aft pulley brackets are mounted at a shallower angle to line up with the flap motor.



Thanks [redacted] for your very thorough and excellent descriptions.

THANKS A MILLION, TOM, THESE THINGS MAKE IT EASIER FOR THE NEXT GUY

TRIM SYSTEM CHECK PROCEDURE

TRIM SYSTEM CHECK BEFORE FIRST FLIGHT

By Lu Sunderland

Rigging checks should be made on every T-18 before its first test flight.

Today I made the first test flight on Jim Hockenbrock's O290-D powered T-18 at Lewistown, PA., my childhood hometown. Before the first flight I did some taxi tests and short lift-offs. Everything felt quite good including the trim stick forces so I took it up to 3000 feet and checked it out under cruise and high speed conditions. Everything was quite satisfactory, the engine ran well and the aileron trim had sufficient range to trim it in roll. The pitch trim however, ran out of travel and it took considerable forward stick pressure at full throttle.

After landing we put a bubble protractor on the horizontal tail and discovered that with the pitch trim at neutral and with the horizontal tail tab perfectly aligned with the horizontal tail chord line, it had an angle of incidence with WL42 of 10 degrees, trailing edge up. According to the drawing, this angle should be only five degrees trailing edge up. We removed the horizontal tail tab arms, heated them with a torch and removed some of the bend to make the system agree with the drawing. Then on the next flight the pitch trim had adequate travel.

Here is the procedure for checking the rigging of the T-18 trim system:

1. Turn the pitch trim wheel in a nose down direction until it hits the stop. Then put a mark on the trim wheel and turn it in the opposite direction, counting the number of revolutions until it hits the opposite stop. According to the print, the travel should be five revolutions if there is a 1:1 gear ratio between the wheel and the jack screw.

2. Divide the total turns by 2 and reverse the wheel this amount, thus setting the system at neutral.

3. Align the horizontal tail tab with the trailing edge of the tail tip.

4. With the tail wheel elevated to make the WL42 level, using a bubble protractor, measure the angle the horizontal tail chord line makes with the horizontal. This angle should be five degrees trailing edge up. If it is not possible to determine the chord line of the horizontal tail from the mold line on the tail tip, cut out a template from hard cardboard or plywood which will fit over the tail and establish a reference line.

The rigging of ailerons and flaps should also be checked before a first flight although their positioning mainly affects drag performance.

TRIM SYSTEM CHECK

TRIM SYSTEM CHECK BEFORE FIRST FLIGHT (cont'd)
-2-

Have someone hold the trailing edge of one aileron in alignment with the wing tip while you check the opposite aileron for alignment. Adjust push rods until all trailing edges are in alignment and check that the stick is in the verticle position in roll. Use a carpenter's level or a bubble protractor for this check. Make certain that the fuselage is in a level position before any adjustments are made.

The bottom surface of the flaps should make a straight line with the bottom surface of the aft portion of the wing. It is quite common for builders to have a problem with flap alignment because of flap leading edge interference with the wing rear spar. This is due to the difficulty in forming the flap skin leading edge radius exactly according to the drawing. That is why I recommended in past newsletters that the final drilling of flap pivot holes in the horns be done after flap and wing assembly. If the flap trailing edge needs to be raised for proper alignment after the pivot holes have been drilled, a small amount can be gained by massaging the flap leading edge with a mallet, especially where it might interfer with rivet heads.

The main disadvantage of flying with dropped flaps is that it adds drag.

-END-

OIL COOLING

OIL COOLING

(By Lu Sunderland)

Jim Hockenbrock's T-18 is equipped with a large size Corvair oil cooler in the nose bowl under the left front cylinder. Today was rather warm with the temperature about 90 degrees. On a climb to 3000 feet, the oil temperature would rapidly climb to red line of 250 degrees F. Flow through the cooler was regulated by a .090 inch orifice in the oil line. When I first flew my T-18 with the same oil cooler arrangement, I also had a cooling problem until I drilled the orifice out to a .125 inch diameter. Now I have no cooling problems. The oil temperature rarely goes over 200 degrees F. The oil pressure on my GPU engine never falls below safe operating limits with the full flow cooling.

We all owe Lou a huge debt of gratitude for his years of outstanding work on the T-18 newsletter and tech articles in Sport Aviation. Thanks again, Lou, and also thanks for your efforts in the Christian education field, too. We DO appreciate ALL the things you have done for your fellow man!

The following pages are from a letter from John Kleber and with this and his previous N.L. contributions it's obvious we owe John our most sincere thanks and praise for his time and effort expended in our behalf. As you might suspect, his workmanship is as meticulous as his reports.

September 9, 1982

Dear Dick,

Enclosed please find two of the three articles I said I would send you. The third article, the one on forming the 2 inch radius on the flaps, is not yet completed. Ken Knowles is sending me some flap test strips so I can provide builders with procedures specifying exact figures and dimensions. I will complete the article as soon as I receive the test strips---hopefully soon enough to make the next newsletter. (Not in time for #56, but we'll really be be looking forward to it in #57. That's a tough subject. Ed.)

Please include the following add in the newsletter:

T-18C Convertible Wing FOR SALE. New airfoil. All parts and interior chromated. Removeable Shabel wing tips. Unpainted. $3,950. Call John Kleber, Days: 1-405-686-2428 or Nights: 1-405-728-1650. (WING NOW FLYING)

(fits standard fuselage)

WING FOR SALE

Reference our phone conversation on the price of building a folding wing--- checking the latest Ken Knowles catalog it takes about $3,400 to complete the T-18C wing including tips, hardware, and aileron control system. This would make my wing a good deal for someone wanting to speed up their project-- And being just $500 over cost, might save a builder some money in the long run.

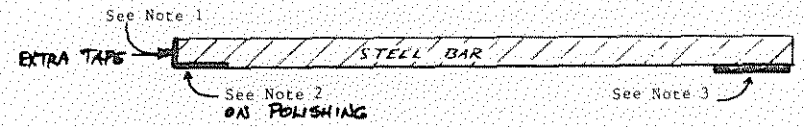
Looking forward to seeing you October 2. Will call you closer to that time to make final arrangements.

Sincerely,

John Kleber

A K.I.S.S. IDEA: by John Kleber

SIMPLE BUCKING BAR: Here's how to turn your wife (if she's willing) or a friend into an expert rivet bucker in just 5 minutes. The secret is in the bar, made from 3/4"X 2" cold rolled steel. Mine is 15½" long and here's how it looks:



Note: 1. Tape the entire bar with duct tape to prevent scratching your aluminum parts. Put extra tape on the front end of the bar where most contact will occur.

2. Remove the first 3/4" of tape from bottom of bar. Polish a smooth face, 3/4" X 2" on bottom front of bar to set rivets. The smoother the better.

3. Corrugated cardboard (about 3/16" total thickness) is taped to bottom aft end of bar.

BUCKING BAR (SUPER TIP)

Now here's how it works: Workpiece is supported horizontally on work table. Holes to be riveted extend off the edge of the table. Bucking bar is positioned perpendicular to the rib or beam to be riveted. The polished face is positioned over a rivet hole with the padded end of the bar resting on the skin. Since the bar supports itself squarely over the rivet, the bucker's job consists merely of applying slight downward pressure and holding the bar from sliding sideways or backwards. The rivet is then inserted up into the hole and driven. Thus, the riveter has his rivet gun and PSI's working for him, and the bucker has gravity helping him. This results in nicely formed rivet shop heads, less skin deforming from the rivet set, rapid progress, less risk of riveting accidents (bar slipping off rivet, or bar being dropped on skin), and a bucker who will not get a sore arm.

I use this bar to buck the following items: all interior ribs and beams to wings, rudder, flaps, ailerons, horizontal tail, and fin. Try it and see how easy riveting can be even in those tight spots.

This looks like a real gem of a shop tip, gents. Take particular note that it makes a pretty good rivet bucker out of an unskilled one. Also note that the one driving the rivets is sitting down on the floor, with his rivet gun pointed straight up. (That's the reason for extending the workpiece out over the edge of the work bench). The bucking bar size isn't cast in stone. The idea is to have enough weight operating on the end of an arm to give enough hammering action to upset the rivet head.

COMMENTS SOLICITED FROM USERS

Please note the following: For some of you that can't find the time to build on your T-18, John is offering his services building a most difficult part at a modest price for his labor.

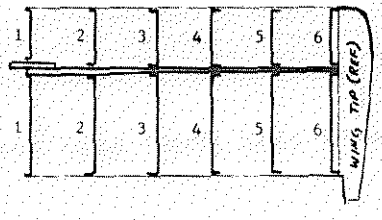
T-18 Rudder Assemblies. Complete and ready to install. All interior parts chromated. High quality workmanship. $210.00. Order yours today and save time on your project. Write or call: John Kleber, 11209 St. Charles Ave., Oklahoma City, OK 73132. 405-728-1650.

Suggested Riveting Sequence: T-18C Outer Wing Panels: by John Kleber

1. Cleco the following items in place: inner & outer skins, nose ribs 1, 3, 4, & 6, main beam (314-1), and rear beam (314-2).
2. Check for zero twist.
3. Rivet main beam full length, top and bottom, less rib attach holes.
4. Uncleco and remove rear beam.
5. Insert rear ribs 3 & 4 and cleco to bottom skin only.
6. Reinsert rear beam. Cleco in place to bottom skin only. Rivet full length bottom only, less rib attach holes.
7. Cleco rear ribs 3 & 4 and rear beam to top skin.
8. Check for zero twist.
9. Rivet rear ribs 3 & 4 to top and bottom skins and rear beam.
10. Remove nose ribs 1 & 6.
11. Rivet nose ribs 3 & 4 complete. Don't forget rivets through main beam to rear ribs.
12. Cleco in place nose and rear ribs 2 & 5. Rivet completely.
13. Cleco in place nose and rear ribs 1 & 6. Rivet completely.
14. Rivet top skin to rear beam.

NOTES: 1. Rib numbering system used in above sequence correlates only to below drawing.
2. All rib and beam sub-assemblies must be completed before beginning this riveting sequence.
3. Installation of any electrical cables and/or pitot/static lines must be incorporated into the above sequence.

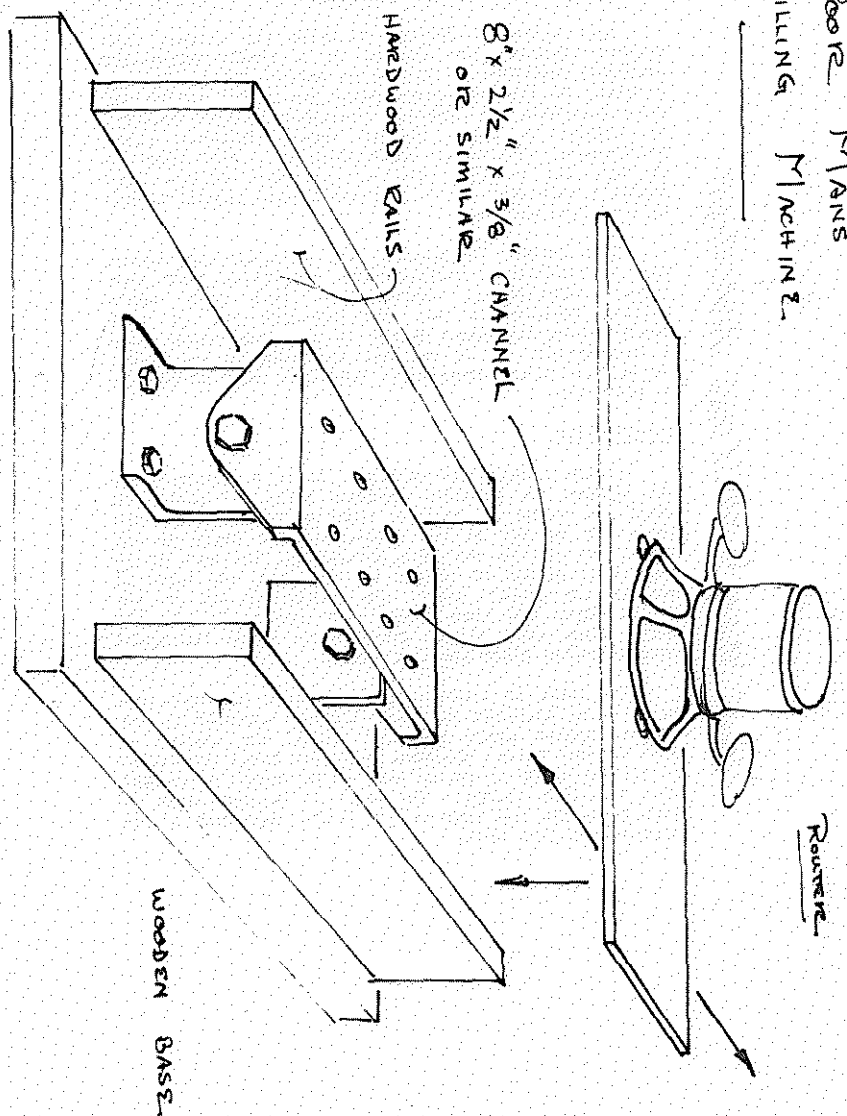
RIGHT WING PANEL



-END-

RIVETING SEQUENCE T-18CW OUTER PANEL

FROM PETE BECK
(SEE WRITE UP PAGES 12A & 12B)



The following is from Pete Beck, 8712 Queen Elizabeth Blvd., Annadale, VA. 22003, who has N102PB back in the air again after extensive mods:

POOR MAN'S MILLING MACHINE

THE POOR MAN'S
MILLING MACHINE

Last winter I decided to build the Cricket from scratch. Because the Cricket is a finely engineered airplane, designed in France to metric specifications, a number of aluminum plate parts are either called out at a thickness not commonly available in this country, or require a flat, shallow taper. Reducing plate thicknesses, cutting an angle shim, or a flat taper is no task for a file, even if you have triceps like Popeye's, and most of us just can't gain regular access to a milling machine.

Jack Barbour of Hampton, VA, a friend long famous for his precision craftsmanship supporting NASA wind tunnel experiments, demonstrated this poor man's milling machine to me. The business end of this build-it-in-a-few-hours device is a common router with a carbide bit. It is suitable for aluminum and brass, as well as other machineable materials such as micarta or phenolics.

CONSTRUCTION

Figure 1 shows the machine. It is a tilting table set between two parallel hardwood rails. A board, to which the router is mounted, rides on these rails. The table can be set at any angle, and the depth of the router bit can be set very accurately. The work to be tapered or planed is clamped to the table, the table is set to the proper angle, the router is set to the proper depth and then passed back and forth over the work, using only finger pressure to guide the board mounted router along the side rails.

The table is constructed of a piece of eight inch or so wide aluminum or steel channel, mounted to two support angles using two 3/8" bolts. The channel is 3/8" or more thick. Threaded holes are bored and tapped in the table top to permit work to be dogged or clamped with bolt-down clamps. The table is mounted about an inch below the top edge of the rails, depending on the thickness of your work.

USE

The table is set with a protractor or other means to the angle required by the work.

The carbide router bit should be used. It should be set deeper and deeper with successive cuts until the piece is the proper thickness. Single cuts should not exceed .030". Simply guide the router assembly resting on the parallel rails with your fingers, making successive passes over the work, like an end mill, until the desired area has been planed. This does not require extreme pressure or force, since the carbide bit does all the work. As long as the cuts are shallow, the bit will not grab.

Jack maintains that any aluminum can be milled in this way. He claims that he has even shaved the heads of steel hold-down screws occassionally, and the bit seems to take it in stride. He doesn't feel though, that he would want to mill whole pieces of steel in this way. 2024 and 7075 aluminum alloys mill beautifully and draw-file to a nice finish. If you are cutting 6061 aluminum, use tallow on the bit to avoid overheating and spauling the metal.

If you have a router, this is truly an inexpensive and highly effective way to shape some of those odd-ball plate pieces.

-end-

Thanks, Pete, for the info and the drawing. Looks like a very simple and efficient tool that would be very useful.

Incidentally, Jack Barbour, that Pete mentioned has built three T-18 airframes that are essentially complete (hullwise), but lack engines, instruments, etc. Pete says his workmanship is of the highest quality, too. Jack has two of the airframes for sale and they are priced very modestly. This might be just what one of you guys in the DC area might want. I don't have further details or Jack's address, but if you are interested you could write to Jack ~~c/o Pete~~ and he will forward to him, or you could call Pete at (703) 578-0484 for Jack's no. (I believe both airframes are "standard", as per plans).

T-18S FOR SALE

JACK BARBOUR'S ADDRESS: 1659 OLD BUCKROE RD, HAMPTON, VA, 23664

Pete also is preparing a most excellent article on props that will soon be available.

Like Pete, I, too, succombed to the lure of the little Cri-Cri and have one of them going together. Like the T-18, it's a finely engineered bird and the plans (in metric) are superb. M. Colomban, the designer, is an engineer for Aerospatiale and worked on the Concorde. (He doesn't use the xyz system, tho').

I THINK THE AIRFRAMES ABOVE PRICED ABOUT $7000-$8000 RANGE

FUEL PUMP PROBLEMS ON INJECTED ENGINE: The following letter is from EARL ODY, 28903 Gunter Rd., San Pedro, CA, 90732

Dear Dick, I remember that you were particularly interested in the fuel problems in my T-18 that led to my engine out landing at Gary, Ind. airport. Since several people have expressed an interest, I have written a commentary on the incident, had it duplicated, and am mailing a copy to you.

I really do appreciate your interest and concern, Dick- not only the incident in which I was involved in, but over all T-18s and all pilots.

I am enclosing a contribution to the T-18 Newsletter fund. Keep up the good work, Dick! Best wishes, Earl Ody. Commentary follows:

Thorp T-18, N8952 has been flying for 11 years and 1500 hours and is equipped with TWO Weldon Electric Fuel Pumps in parallel with each other and both in series with with the engine driven fuel pump. The engine is an IO-320, which requires 16-26 lbs./in. sq. fuel pressure. Ideally it should be 21-25 lbs./sq. in. (the engine will stall at 13 lbs./sq. in.). I have always flown the airplane with one of the electric pumps on AT ALL TIMES, since the engine driven pump would NOT maintain sufficient fuel pressure.

It should be noted that the Weldon Electric fuel pumps are approved for continous duty and whether or not they are free flow bypass pumps is optional. BOTH of my pumps were of the by-pass type.

During our trip East in July, August,1982, both electric pumps gave out at different times. On Sunday, July 25,we replaced the two pumps with a rebuilt Weldon electric pump in Cedar Rapids, IA. This electric pump was placed in series with the engine driven pump. Five days later we suffered a loss of fuel pressure over Lake Michigan, the engine stopped, and we glided to a landing at Gary, IN, airport. (Whew !) While in Gary we had a new engine driven fuel pump installed and a rebuilt Weldon electric fuel pump installed. At this point we installed the single electric pump in PARALLEL with the engine pump and found that the engine driven pump would maintain sufficient pressure for flight and the electric pump would be needed only for starting, take-off, and landing.

We departed Gary on Thurs., Aug. 12, for Bartlesville, OK, with a fuel stop in St. Louis, MO. Upon arrival in Bartlesville, we found that our electric pump was pulling 15-17 amps and popping fuses as fast as replaced

Between Friday, Aug. 13, and Mon., Aug. 16, numerous corrections were discussed, but the decision was made NOT to fly until a satisfactory elctric fuel pump was functioning. Since I had a collection of electric fuel pumps by this time, I matched a functional pump with a functional motor and had a system that worked. I flew to Calif. on Tues., Aug. 10, using only the engine driven pump in flight and the electric pump for starting, take-off, and landing.

An analysis and some conclusions:

I believe I could have flown for the first eleven years with only the engine driven pump IF the fuel was not passing through one of the elect. pumps, although both electric pumps were the by-pass type. I believe enough resistance was offered to the flow of fuel that it affected the the supply to the engine driven pump.

On our trip East both electric pumps simply wore out. Upon returning home I found the motor on one pump was good(That is the motor that brought me home from Okla.), but the pump section failed. The mechanic in Cedar Rapids took my other pump as a core. I am trying to get the pump back, as well as the $290 that I spent for a rebuilt pump that lasted only five days).

EARL ODY STORY ON FUEL

FUEL PUMPS

(cont'd, EARL ODY)

I believe our engine failure over Lake Michigan was caused by the motor quitting on the electric pump installed at Cedar Rapids, that it was NOT a bypass pump, so the fuel supply to the engine pump and to the engine was terminated . We put 12 volts to this pump in Gary and it did not work. I learned several things about the Cedar Rapids pump while in Gary. Weldon has not made this ztyle pump for 11 years, parts are no longer available, and that particular pump was rebuilt on 7/2/75. I did not dissassemble this pump to determine why it failed, as I have since returned it to Cedar Rapids.

I disassembled the rebuilt electric pump installed in Gary upon my return home and found that the motor had a frozen bearing; hence the high current draw and popped fuses.

Altho' it's probably too early to tell, I believe that I now have a workable system with the engine driven pump and the electric pump in parallel with each other I believe that the solution to the problem is one where there MUST be an adequate supply of fuel flowing freely to the engine driven pump. At this point I do not know why Lycoming IO-320 engines (that were suppied to Wing Aircraft where Earl got his) have customarily had these problems.

EARL ODY

P.S. Since writing this commentary I have received a check for $290 from the FBO in Cedar Rapids, the electric fuel pump which they kept, and an apology for their contributions to subsequent problems.

-end report-

That was a superb and well written report, Earl, and one that could certainly save someone from grief. I well remember your telling me of the dead stick landing when you got to OSH and how close you came to not making it back to the field. I meant to ask you at the time what airspeed you used and what your sink rate was at that speed, but it slipped my mind at the time, I guess. I can't remember whether or not your airplane has a constant speed prop or not, but I think it does.It would be interesting to know what the comparative sink rates would be for one with a constant speed prop vs. one with a fixed pitch prop with the engine completely dead. I seem to remember a fatal accident that followed an engine failure (Burbank, I think), in which the airplane went into the approach lights and it was equipped with a constant speed prop. I remember discussing this with John and speculating on the possbility of using a prop that could be feathered for minimum drag. Do any of you with constant speed props have any figures on sink rates with the engine at idle? Or better yet, have any of you switched from a fixed pitch to a constant speed and ahd a chance to record the two different sink rates? It's a pretty good idea to know how far your airplane will glide, what airspeed is optimum, etc. Have you ever given serious thought to whether you would choose a road vs. a field for a forced landing? One our local T-18ers says he will opt for a road, every thing else being equal. With the 21 ft. span you could fit in most roads in pretty good shape and probably would have a better chance of staying right side up with the small wheels we have. I've flown coast to coast via T-18 and I find one of those big interstate highways to stay above when I can, even if it is a few miles farther. Giving yourself an extra break now and then makes the trip more enjoyable and just might pay off someday.

1ST FLITES

MORE FIRST FLIGHTERS: PAUL CARABELLI, 9243 Whitaker, Sepulveda, CA. 91343, a retired exec pilot recently flew his T-18, according to Dan Dudash....KEN BROCK's bird flew for the first time in Oct., according to Chris Fast, who did most of the work for Ken... TONY RUSSELL, 406 Cardinal Drive, Slidell, LA,70458, flew his for the first time in Nov.....TOM KERNS (see page 7A this issue) also joins the T-18 test pilot ranks...JOHN KENTON,16611 126th Place, SE, Renton, WA, 98055, also flew his for the first time about Sept. '82...JIM HOCKENBROCK, Box 361-A, RD #1, Reedsville PA, 17084, also got his in the air this past month or so (see page 9A this issue).

0-290 BAFFLE PATTERNS

BAFFLE PATTERNS: We've sent out an SOS for builders to make baffle patterns that would be available to other builders, but until JIM HOCKENBROCK sent some in the other day the result was a big zero. Jim sent a taped together folder of posterboard, with a complete set of full size patterns for an O-290-G, that were also made of the same posterboard. Each part was labeled, with appropriate note or sketch on it that identified it, where it went, how it was bent, etc. A very excellent way to do it, Jim, and we offer our most sincere thanks to you for an excellent gesture.

I would like to encourage any of you that are making up baffles to pleas make some poster board patterns at the same time when it is easy. Or if you are pulling your engine down, that's also a good time. This is an item we need desparately for new builders. Baffles vary from engine to engine, so if you can send in patterns for any of the O-320 series we can really use them. If one of you Calif. builders wants to do a good turn, John Thorp has a complete set of patterns that can be used to make up a set of the cardboard patterns, but his physical condition won't permit him to make up a set. If one of you could stop in at Lodi for an hour or so and trace around his templates it would be a most valuable thing for anyone that is installing an O-360 engine and using the Thorp cowl (fiberglas or metal) John spent a lot of time engineering this set of baffles for maximum efficiency. If one of you can do, this, please contact John first to check on his availability and also drop me a line to keep me posted to announce in the NL. Whatever costs are involved doing this should be amortized of course and I know many would be happy to do their part in this area.

On the O-290 patterns here, I'll be glad to send you a set. If you will give me a little lead time before you actually need them I'd appreciate it. I'm going to check on having them put on a blue print full size, but if that's too expensive we'll hand trace them. Whatever costs are involved I'll make a note of it and you can reimburse when you receive them.

Again, Jim, we DO appreciate it!

INSTALLING THE #584 FITTINGS

INSTALLING THE #584 FITTINGS ON THE #575 BULKHEAD: One of the problems that worries many builders is installing the #584 fittings with accuracy, as any misalignment (vertically) from one side to the other would be greatly magnified at the tips of the stabilator. There are various ways of doing this and here is one way that RON BOSTIC, 7334 Vallejo, Dallas, TX, 75227, did it on the next two pages. Ron is a new builder and has his fuselage just about finished and is getting things done. He is building the wide body, with the folding wing and new airfoil.

This is a good example of some of the things we need get in the NL. As we have repeatedly said, even tho' someone has previously written up how they made a certain item and another has written up another way to do the same thing....still ANOTHER WAY TO DO IT IS VALUABLE FOR A NEW BUILDER. For one thing, it increases his understanding of the problem and presents solutions, one of which might better suit his ability & equip't. So, again, please sound off on how you solved problem X, etc. PLEASE/

"THANKS", RON

V/A #584 FITTING INSTALLATION — BY RON BOSTICK

In order to assure proper level of the #584 fitting, a center line, B.L.O has to be determined on the #575 Bulkhead.

Using the template center punch at the upper flange (A) and lower flange (B), drawing #1, draw a line between point (A) and point (B) to set a B.L.O Reference Line.

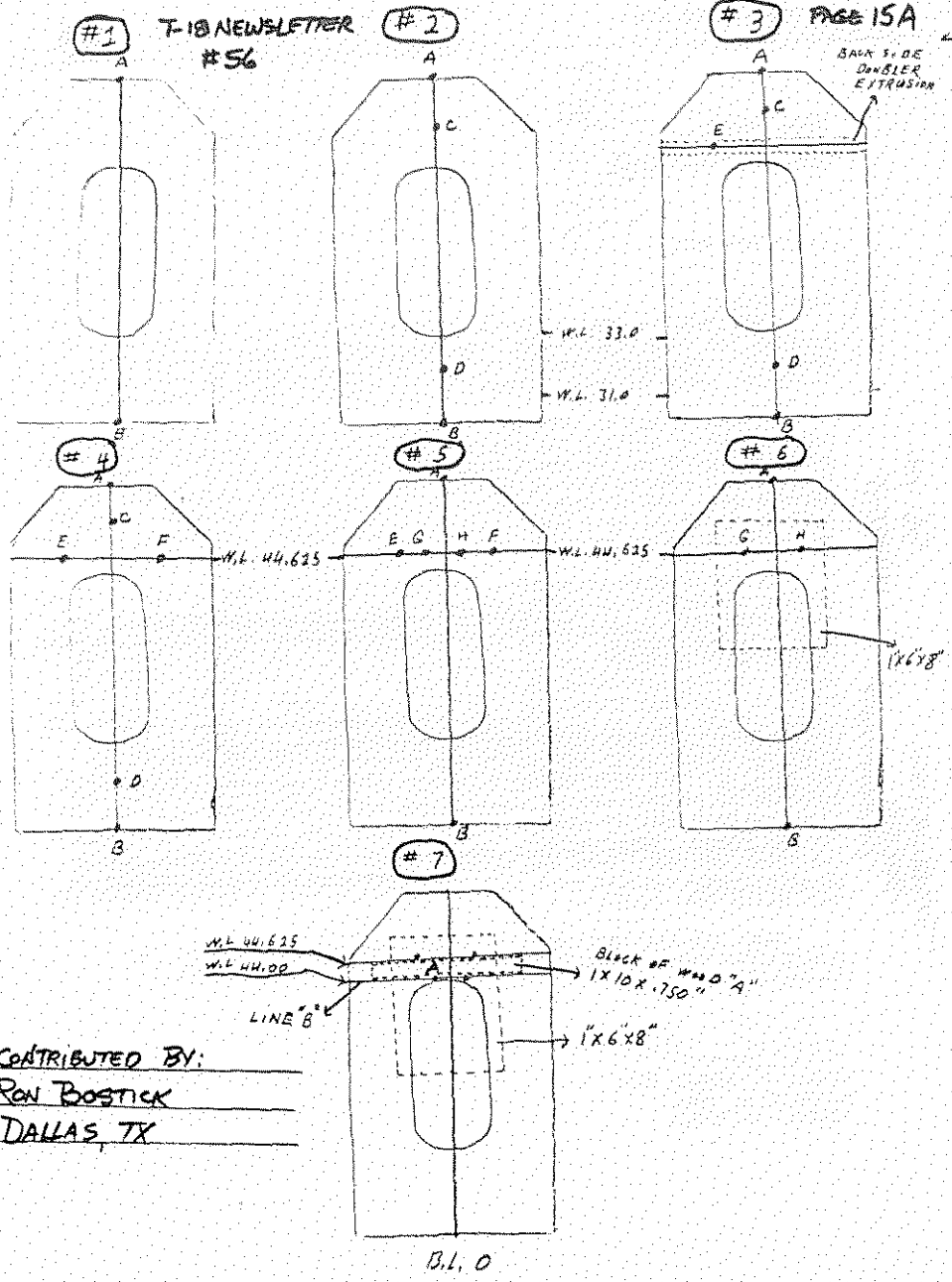
If you can not determine the B.L.O center punch marks at point (A) and point (B) location of the Bulkhead. Place a board on each side of the Bulkhead, measure it with a caliper, divide it by 2, and measure that distance from the outside in. It's best to do this in three areas to assure proper B.L.O when you draw your line.

Select any refernece point on the B.L.O line between W.L. 44 and W.L. 48 (C) also between W.L. 31 and W.L. 33 (D) drawing #2.

Using a compass, locate one of the center punch marks on W.L. 44.625 (E), drawing #3, as determined by the template panel mark for the double extrusion. On one side of the B.L.O only. Measure the distance very accurately, from W.L. 44.625 (E) to compass to the opposite side (F), drawing #4, leaving one tip on point (C), match the distance from point (D) up to point (F) so that this distance is the same as from point (D) to point (E). Mark this point labeled point (F). Now draw a line from point (E) to point (F). This is your level line, W.L. 44.625. At the intersection of the vertical and horizontal line, (A&B crossing E&F), place one point of the compass in the center and measure out .312" on each side of this point on the horizontal line G&H, drawing #5, these are two of eight (8) points on this line for the double extrusion and the #584 fitting. Drill these two points with a #40 drill.

Mount a 2"X6"X8" in a vise vertically, place two finish nails in the top of the 2"X6"X8", 1.875" apart, .937" from B.L.O (make sure the nail's head will fit through the two #40 drilled holes). Drawing #6

Place a small hand level on top of the nails, move the 2"X6"X8" as needed to assure perfect level across the nails. Place the #575 Bulkhead on the two nails, through the two predrilled #40 holes. Now a second line must be determined in order to line the ¼" pivot holes in the fittings with each other. Drawing #7, cut a block of wood any thickness, "A", .750" wide, and place it up against the bottom of the 2nd. nail, now draw a line under the block of wood, "B". On the line B, drill 2 #40 holes, (one on each side of B.L.O). Place 2 nails in these holes and place a hand level on the 2 nails to assure once again, proper level. Nails must extend atleast 1" from the surface of the #575 Bulkhead. Place a ¼" rod across the two nails (check the rod for straightness) double check for proper level by placing the level on the rod. Make any adjustments to assure level by bending the nails, "slowly". Take the #574 fitting and slide one on each end of the rod until they are bucked up against the side of the #575 Bulkhead, clamp the fittings down in place and punch mark all 9 holes in each fitting, remove and drill out with #40 first, place the fitting back on and drill out with #30.



CONTRIBUTED BY:
RON BOSTICK
DALLAS, TX

FRESH AIR DUCTING: The following letter from HARRY WHEELER, 2 Marion Rd., Salem, MA. 01970, and sketches on following page are solutions to one of the persistent problems that occur repeatedly on the T-18 and similar airplanes....that of getting an adequate amount of fresh air into the cockpit for ventilation and cooling. Here is Harry's complete letter:

Dear Dick, As per our phone conversation the other day I'm enclosing a sketch of my FRESH AIR SYSTEM and my ELECTRIC TRIM SYSTEM. Many thanks for your efforts on behalf of us owners and builders. Enclosed also, is a contribution for the fund.

FRESH AIR DUCT

FRESH AIR: The 4" NASA duct and the (2) 1½" eyeball vents (ceiling vents from large airplanes) work very well. A 2nd TEE was put in just above the right rudder pedal with a 1½" hole and a shutoff to direct air over the feet. This did not seem to take away any air from the vents (eyeball), so I'm not sure just how large you could make that vent. The 2" dia. feed thru the firewall is just below the fuel tank and to the outside of the gear leg. The two Tees are made from fiberglas pieces laid up on the right size plastic bottle or cardboard tube. I used polyester resin and glass cloth from the auto repair kits and used wax paper for a parting agent. (Polyester resin shrinks about 6% on cure and this sometimes is a problem to get parts off the mold. A collapsible or two part breakaway mold usually solves this problem...Ed.)

ELECT. TRIM

THE ELECTRIC TRIM shown in the sketch is ideal. The speed is the same as would be found in a production airplane and the unit only weighs a pound or so. The gear box is about 3 x 3½" and it's approximately 4" long plus shaft. There is plenty of torque to turn the trim. The limit switch system shown was used, so as not to have to run wires and switches down to the tail. I called the warehouse that I bought the motor from and they said they had 13 more in stock and they could re-order more.

CANOPY LATCH MOD

CANOPY LATCH: When I opened the latch on my canopy (Thorp type) I found it took a second effort to reposition the latch for closing. I added a small right angle piece of aluminum to the forward right hand corner of the body for the hook to hit against when the latch is undone. This way the hook is repositioned for latching.

AILERON TRIM OK

AILERON TRIM: The system described in the NL using the model airplane servo and a 1½ x 6" tab of balsa and fiberglas construction is one of the best improvements I've made to my airplane. THANKS!

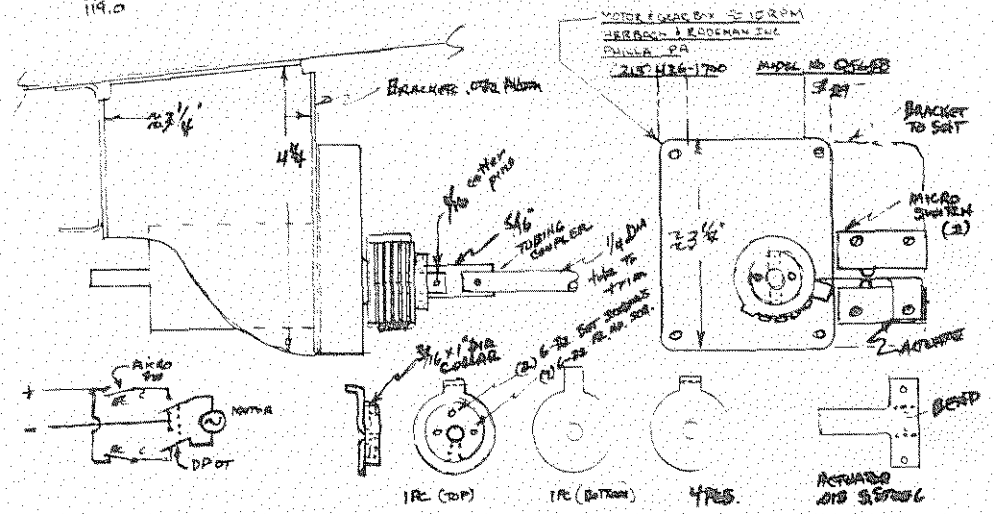
I hope these ideas will be of help to someone else. (You'd better believe they are, Harry) Please use whatever you think is of value. N394AC flys well and often and is always available for rides to prospective builders in this area. Hope we'll soon have a T-18 Air Force in this area of New England.

Sincerely, HARRY WHEELER

ELECTRIC TRIM MOTOR & LIMIT SWITCH

STA 119.0

By HARRY WHEELER

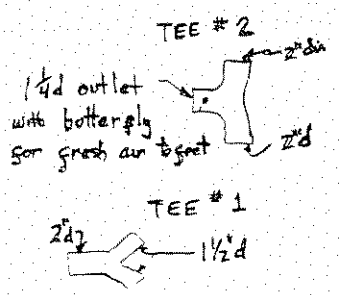


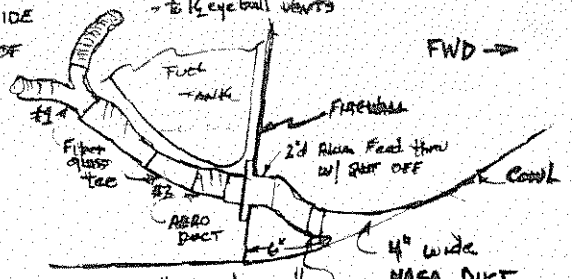
PINS = .050 POINTS TANG IS BENT DOWN AND HITS AGAINST TANG ON DISK BELOW 5.4 TURNS OF SHAFT WILL ACTIVATE SWITCH

FRESH AIR DUCT

4" NASA DUCT IN RIGHT HAND CORNER OF BOTTOM OF COWL

2" DIA. FEED THRU ON RIGHTSIDE JUST BELOW FUEL TANK (OUTSIDE OF GEAR LEG





DICK CAVIN
10529 SOMERTON
DALLAS, TEXAS 75229

AUGUST 7, 1982

RE: PLANS #551

DEAR DICK,

LAST MARCH I SENT A LETTER REQUESTING TO BE PUT ON THE LIST TO RECEIVE THE T-18 NEWSLETTERS. ON REVIEWING OLD NEWS LETTERS THIS WEEK-END I REALIZED I FAILED TO LIST MY PLANS NUMBER SO THAT A PROPER "LINK-UP" COULD BE MADE. SORRY, I FELL ASLEEP UNDER MY AIRPLANE.

FOR AN "I DID IT THIS WAY" I WOULD LIKE TO OFFER MY SOLUTION TO THE PROBLEM OF GETTING TWO STRAIGHT, DIAMETRICALLY OPPOSED RIVET LINES DOWN THE LENGTH OF THE HORIZONTAL TAIL TUBE BEAM (502-3). I CAN'T READ SPIRIT BUBBLES VERY ACCURATELY SO I LET MOTHER NATURE HELP ME IN ANOTHER WAY. THE ATTACHED SKETCH ILLUSTRATES THE PROCEDURE. I'M NOT MUCH OF AN ARTIST SO I HOPE I GOT THE IDEA across. OTHERS IN THE AREA HAVE USED MY "RIG" AND HAVE FOUND IT EASY TO OBTAIN GOOD RESULTS.

S/L ON #502-3

IN THE OPINION DEPARTMENT - IN REVEIWING OLD NEWS LETTERS I FOUND SEVERAL REFERENCES TO REPLACING HIGH SHEAR RIVETS WITH AN-BOLTS, BUT I HAVE NEVER SEEN A CAUTION THAT THE AN-BOLTS SHOULD BE PROPERLY TORQUED WITH A TORQUE WRENCH. I'M A FIRM BELIEVER THAT ALL BOLTS SHOULD BE TORQUED WITH A TORQUE WRENCH AS FEW OF US ARE EXPERIENCED ENOUGH TO GUESS. IN THE WING ATTACHMENT FITTINGS IT IS VERY IMPORTANT THAT ALL BOLTS BE TIGHTENED EVENLY SO THAT ALL BOLTS CARRY AN EVEN SHARE OF THE LOAD. IF ONE BOLT IS SIGNIFICANTLY TIGHTER THAN THE REST IT IS CONCEIVABLE THAT THAT BOLT COULD BE CARRIED TO FAILURE SETTING THE STAGE FOR PROGRESSIVE FAILURE IN THE FITTING OR AT LEAST LOOSENING OF THE FITTING. ALL THIS MAY BE A LITTLE IN THE OVER-KILL CATAGORY BUT TORQUING IS AN EASY WAY TO MINIMIZE ONE MORE UNKNOWN AND PLAY THE SAFE SIDE. WHAT'S MORE IT DOESN'T ADD ANY ADDITIONAL WEIGHT! PAGE 8-15 OF THE EAA MANUAL "SHEET METAL", VOL 2, LISTS THE PROPER TORQUE VALUES. FOR THOSE WHO DON'T HAVE THE MANUAL, 10-32 NUTS SHOULD BE TORQUED TO 25 INCH-POUNDS (BETCHA MOST NUTS TIGHTENED WITHOUT A TORQUE WRENCH ARE HALF AGAIN THAT TIGHT.)

TORQUEING BOLTS IMPORTANT

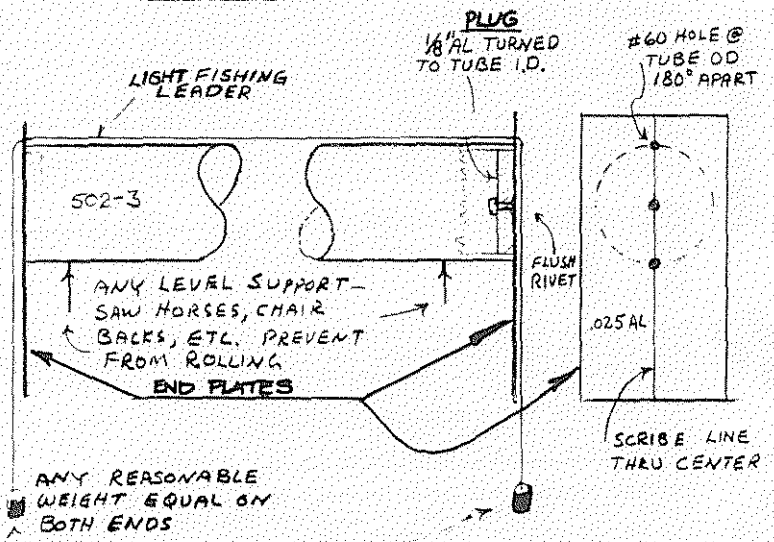
THANK YOU FOR YOUR DEDICATION AND HARD WORK IN GETTING THE NEWSLETTERS OUT. IT IS A VERY IMPORTANT LINK IN THE HOMEBUILT MOVEMENT.

DENELL B. ZANDER #551
13700 S. W. HALL
TIGARD, OR 97223

SCRIBING RIVET LINES ON THE 502-3 TUBE

BY DENELL ZANDER

NO SCALE



ROLL TUBE ON A FLAT SURFACE TO DETECT ANY TUBE BEND (MINE HAD ABOUT .032 IN THE CENTER). I ORIENTED MY TUBE FOR POSITIVE DIHEDRAL. TWIST THE END PLATES UNTIL THE FISH LINE MATCHES THE SCRIBE LINE ON BOTH ENDS. SPRAY THE FISH LINE DOWN ON THE TUBE WITH ZINC CHROMATE OR ANY SUITABLE PAINT (DARKER COLORS SHOW UP THE LINE BETTER). SPRAYING FROM THE ENDS WORKING TOWARD THE CENTER WILL PULL THE FISH LINE DOWN IF IT IS HIGH BECAUSE OF TUBE BEND. AFTER THE PAINT SETS PULL OUT THE FISH LINE, ROTATE THE TUBE 180 DEGREES USING THE BOTTOM HOLE TO ALIGN, CHECK PLUMB LINES WITH SCRIBE LINES AND REPEAT THE SPRAY DOWN.

YOU SHOULD NOW HAVE TWO STRAIGHT LINES AS CLOSE TO THE TUBE DIAMETER AS CAN BE OBTAINED WITHOUT VERY EXPENSIVE EQUIPMENT.

This is another example of a very excellent report (the kind we need more and more of) and we all thank you sincerely, Denell. His solution to this problem forcefully illustrates that there are usually several solutions to each "standard" problem that comes up. Pick out one of the problems you encountered and send in your solution.

T-18 PLANS #569

W.G. AYRES
761 STINSON ST.
INDEPENDENCE, OR
97351

Dear Dick,

While going thru my plans & files recently I found the bills for heat treating my (3 piece) landing gear. Copies enclosed. Also the report of the magnaflux inspection after welding. Note that the date is 1979

Maybe you will find the addresses and phone numbers of interest for the newsletter.

3 piece gear ?

Best regards,
Bill Ayres

P.S. My pal, Mike Barte, whose name is on the bill, took my L.G. parts in with some other work, so there might be a minimum charge in effect that's not reflected in the price shown.
W.A.

THANKS, BILL. DIDN'T HAVE TIME TO RE-TYPE, BUT YOU WRITE PRETTY CLEARLY

SOUTHERN CALIFORNIA ALUMINUM TREATING DIV.
2829 E. Washington Blvd.
Los Angeles, Calif. 90023

Cal-Doran Metallurgical Services, Inc.
2830-50 E. WASHINGTON BLVD., LOS ANGELES, CALIFORNIA 90023 • (213) 261-2121
CAL-DORAN PLANT #2 1804 Cleveland Ave., National City, Calif. 92050 (714) 477-2121

A DIVISION OF Thermo Electron CORPORATION

NOTE: THIS IS OUR SHIPPING, INVOICE, CERTIFICATION, AND SHOP ORDER NUMBER.

9237
No. 9237

L31864

SOLD TO / SHIP TO

MIKE PARTI
8048 LAUREL GROVE
NO. HOOLYWOOD, CALIFORNIA

TESTED & CERTIFIED TO
MAG: MIL-I-6868 E AMND. 1

TAXABLE

OUR TERMS NET 30 DAYS AFTER DATE OF INVOICE

DATE RECEIVED	CUSTOMER ORDER NUMBER	CUSTOMER SHIPPER NUMBER	INVOICE DATE
1-2-79M			1-8-79

QUANTITY	WEIGHT	DESCRIPTION (HEAT TREATING ACCEPTED WITHOUT LIABILITY, SEE REVERSE SIDE)		
3		AIR PLANE LANDING STRUTS (2) 1½" X 4" X 58½" (1) 1¼" X 24½"	Lot tax	35.00 2.10 37.10

PAID CHECK #810 1-8

C.O.D.

4130
HARDEN & TEMPER

OPERATION	SPECIFICATION	MEDIUM	TEMP. °F	TIME	
DEGREASE		V APOR			
AUSTENITIZE		ENDO	1575±25	30 MIN.	16A
QUENCH		OIL			
TEMPER		AIR	775±10	2 HRS.	1A
TEST					

T-18 landing gear legs

WE CERTIFY THAT THE ABOVE LISTED PARTS HAVE BEEN HEAT TREATED IN ACCORDANCE WITH THE ABOVE SPECIFICATIONS

Final Hardness C36-39
Rockwell
100% parts tested

Authorized Signature

CD 121-1 (3-76)

PERFORMANCE NUMBERS

PERFORMANCE: A short note from RIK KELLER, 5446 Connecticut Ave., La Mesa, CA in which he writes that he's still enjoying his T-18, especially on relatively short trips when he compares flying times to driving times. However he says his bird is still going too slow for one with an o-360, and he says he plans to tuft test soon and see if they can track down the problem(s). He submits the following performance figures and we couldn't help but agree that the speeds recorded are indeed much below average. When one goes to track down the speed sapping items it should be a stem to stern examination. The first area to put under the magnifying glass would be to eagle eye each and every item forward of the firewall...the prop, the cowling, the baffles, the exhaust, the intake system, the spinner, and the oil cooler. Of course the engine itself should also be suspect. Airframe-wise I would take a look at the trim system, the CG, canopy fit, cabin air intake and exit, possible air leaks around flaps and ailerons, wing root flow that might require fairing, etc. All gear fairings and alignment of them should also be checked. Rik is aware of the possibilities of all these items, of course, and we will be interested in seeing what he uncovers. Here's his table:

MP	RPM	IAS	OAT	ALT.	TAS	HP
26.5	2700	157	70°C F	3000 MSL	166 mph (?)	166
24.5	2300	145	62° F	4400 MSL	158	135
22.7	2200	140	""	" "	152	117
20.3	2200	127	""	" "	138	99

PROP FOR SALE

Rik's table didn't specify whether A/S was mph or kts. He also didn't say how his IAS had checked out on measured course or whether engine instruments had been verified for accuracy. It probably will be that several items will turn out to be the culprits.
Oh, yes, Rik has a metal prop for sale and will accept any reasonable offer. It is a 67-68, metal, and outside of that I don't know which engine it's for. His home phone is 714/ 466-4762.

FOR SALE

ANOTHER PROJECT FOR SALE: Richard Taylor, RR1, Box 160, Defiance, MO, 63341 (314) 828-5346 has an airframe 80% complete, on the gear, with a 150 hp Lyc engine, 297 SMOH...Sheet metal comp., flush riveted, all fiberglas parts, cowl, tips, wheel pants, tinted canopy & windshield, some instruments, prop ext'n, fuel tank, misc. parts & hardware, comp. set drawings, most parts to complete.....$7500 ..Says he hates to give up, but doesn't have the money to complete.

SWITCHES, AND TRIM MOTORS

ELECTRIC TRIM MOTORS....AND ROCKER SWITCHES: Frome PAUL LEHMAN, 517 N. Clark St., Mayville, WI, 53050 (Home phone 414/387-2285)(after 6pm)
Dear Dick, Just a few lines to let you know I'm still alive. My project is going very good, but slower than I would like it to. I have my fuselage clecoed together, but not riveted together and it's not on the gear yet.
I am sending you some switched to look at and keep if you want them. If any T-18 builder needs some the price is .75¢ ea. in lots of 10 or more. To install these you need a rectangular cut out in the panel .55" XXXXXXXXXX by 1.125 (vertical). You can remove and remount again, too.
I also have some 12 or 24V electric motors such as I gave you at OSH several years ago. The price is $25 ea....Keep your airspeed up. Paul.
Thanks again Paul. The switches look very neat and nice and seem to work very well. They are made by Carling, have an Und.Lab rating of 10 A @ 125 V.A.C.....As to the elec. motors, I'm sure Paul would be glad to fill in details if you'd give him a call some weekend.

THOUGHTS ABOUT WING TANKS

ALTERNATE TANKS (cont'd)
Perhaps some of you can think of a simpler or better method than what I pitched out. I keep thinking about Lu Sunderland's method of making a main fiberglas tank he detailed in an early newsletter(one thin layer of glass was laid out on a sheet of alum (waxed) and when cured it was flexible enough to wrap around in the tank shape in one piece. Pre-cast tank ends were clecoed in place and bonded. Then more glass was wrapped around the entire tank and ends until desired strength and sealing was assured). This is a good method and perhaps a variation of that method would be better than what I suggested. As for Klegecel and Hysol 9410, Dick Schreder (Schreder Aircraft, Bryan, OH) has been using both products for ribs with a metal skin on his HP series sailplanes for several years now, with no problems. He does use a METAL rib at each end of such a structure to close the box and I believe it should be done on a T-18 LE tank, but that would be no problem. You could simply leave a 4" "dry bay" area at each end, so that the metal ribs would not require sealant application. Total fuel capacity would be reduced insignificantly. I'd be interested in hearing your comments or suggestions. If you don't want me to run them in the NL, please specify. I'd like to experiment on slipper tanks the next time I have occasion to build a wing.

Before you go to all this trouble it might be good to weigh all the negative factors, too. Would it be safe to make a complete full fuel overweight landing at the higher stall speed and higher gross wt.?Since the T-18 gear is practically rigid for taxiing purposes, would taxiing over rough surface cause loosening of rivets at the wing attach area? Is the additional cost worth it? How often would you have occasion to use that much extra fuel? Would a baggage area tank be a simpler and cheaper solution? Remember, too, that wing fuel requires the use of electric pumps, with attendant costs and possible reliability factors to consider. Also, be aware that proper fuel management procedures would be necessary to negate the possibility with having to land with one wing tank full and the other empty. How would you indicate fuel quantity from a wing tank? Also, please be very aware that wing tank fuel could radically affect spin recovery characteristics. A recent NASA study showed that the so-called "flywheel effect" was JUST as important to spin recovery as CG location....even more so in some cases! Like anything else, there are pros and cons and YOU will have to make the decision in the end.

T-18 FOR SALE

T-18 for sale: I have practically no details on this one. A new builder, George Copland, Rt. 2, Box 12, Duncan, OK, (405/ 255-8349, evenings) told me that he knew of an older T-18, O-290 powered he thinks, and unpainted, that was at OSH (but apparently unregistered),and was owned by a local ag pilot there in Duncan, who recently passed away. His wife either has it for sale or will soon have it for sale and Geo. says he's quite sure it can be bought on the low side of the market worth. He'll let me know further details when he talks to Mrs. Doolin, the widow. I called Geo. the builder, but actually it's his daughter, Dr. Ann Copland, who is a radiologist, an accomplished pilot, and quite a beautiful young woman. She is building a wide body with the folding wing. Geo. is gathering up parts for her and having a ball studying the plans. He's an engineer in charge of a research division for Halliburton, built a Starduster Too, and flies his own Cessna 180 from their farm air strip near Duncan.

FOR SALE

ALSO FOR SALE: Harlo McKinty, 1310 Idylwild Dr., Lincoln, NB, 68503 (402/ 464-0570) has a pair of .025 outboard wing skins for the folding wing that he will sell for $50 for both. They are the INBOARD skins of the outer wing and are for the new airfoil, are formed to shape and are pre-drilled.

WING FOR SALE

More for sale items: From Jon Walton"s letter (pg. 3B) he made note that he has a spare prop for sale, a 76M, 69" x 72", vibration tested by Santa Monica, has "paper". Wasn't enough pitch for his O-320, but enough for an O-290. Will sell for $400. He also has his present wing (standard) that has 135 hrs. on it at present, no scratches or dings, painted white, VOR antennae in left tip, nav lites and strobes, Cessna heated pitot, wing tip tie downs, complete with flaps, ailerons, controls....that will be coming off the airplane (also standard width) in January or in Feb. of '83 and it will be for sale at that time when his new folding wing is installed. He hasn't set a price as yet, until he has a fix on what his total cost will be on the CW, but it will be reasonable. John's address is 5726 Boyce Springs Dr., Houston, TX, 77066 (713/440-8093 eve.).

This sort of deal is good for all concerned. There are still a goodly number of people that have trouble finding time to build and a lot of them have nearly completed fuselages, so this is a natural for helping those people get in the air much sooner. In John's case, I can attest to its excellent flying qualities.It trims out perfectly level and has a very well behaved stall, and if you saw it at OSH this year you know his workmanship is impeccable. So if one of you gents want to get your T-18 airborne before you tangle your whiskers in the stick, here's your chance. You can still build a wing at your leisure and then sell this one later if you want a CW later.

OUTER WING FUEL

COMMENTS ON OUTER WING FUEL TANKAGE ON THE CW: Recently John told me that he did not use the inner bay of his outer wing for fuel in the L.E., as this would have given him more fuel and range than he ever would have any reasonable occasion to use. He also saved himself a considerable amount of work, as each of the circular access panels on the bottom side of the leading edge has 88 parts! This includes rivets, nut plates , etc., but it involves considerable time and effort per each.
I agree with his thoughts on the extra fuel. Personally, I feel an extra 10 to 15 gals. would give me all the range I could use (and stand). I believe 3-3½ hrs. is about the max I could sit in a T-18...even with seats of Harlo McKinty's "Temperfoam". Let's face it...the T-18 IS cramped in both first class and tourists section and when you spend an 8 hr. day in one you're ready to quit. I'm always ready to get out and stretch my legs after a couple of hours if I have a passenger, but then I don't have the Temperfoam seats like John does (yet). John really sings the praises of the Temperfoam cushions. It took us 4 days to get back from OSH this year, due to wx, and every time we'd tie up for the nite he'd tell me how rested he was...and wouldn't even trade airplanes with a tired ole broken down airline pilot with an aching butt!

TEMPER-FOAM

THOUGHTS ON ALTERNATE FUEL TANKS

THOUGHTSON ALTERNATE METHOD FOR FUEL IN WING L.E.: In view of the extra work involved in the integral tank method,I keep coming back to the idea of a shaped leading edge "slipper tank". This would be shaped to fit the interior of the leading edge of the wing and could be made of alum and welded, with an appropriate interior baffling....or what might be much easier; to use the already bent skin as a female mold, laying up fiberglas in the "mold" and after cure Klegecel (closed cell, structural foam, that's impervious to hydrocarbons) nose ribs would be inserted at about 4" spacing for baffling and bonded with Hysol 9410, which is also impervious to hydrocarbons or colloidal water. After cure a flat strip of Klegecel would be laid on the back end of the Klegecel ribs (pre-shortened on the back side to allow for the foam thickness) and bonded to the ribs. It, too, would be glassed and the glass applied would have to overlap the glass on the front part a sufficient amount to make a leak proof final closure seam. In any case the tank would have to be enough smaller than the LE interior in order to allow tank removal and installation.

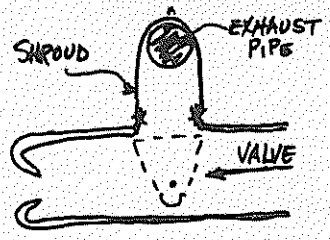
(Harlo McKinty, cont'd)
to match the rib holes from Ken Knowles on the new airfoil. Harlo is putting fuel in the outer wings, so decided to use .032 skins for the inboard sections of the outer wings. Skins have been clecoed to the ribs. He will keep his present outer sections of .025, but here's a real buy for someone.

SPINNER/COWLING MISMATCH

SPINNER/COWLING MISMATCH: CHRIS FAST letter excerpts..."Regarding Harlo McKinty's question on pg. 4B, #54 NL, regarding engine mount sag causing mismatch of spinner/cowling, my T-18 had the O-290G with the 3/4" mounting plate and I washered the lower legs forward to remove the sag a couple of times during the first 200 hrs. while the rubber mounts were new. It never changed after that and is still OK today...so I would say to allow about a 3/16" mismatch between the spinner and cowling when you first set it up. On Ken Brock's ship that I just finished I have left the spinner 1/8" high (it's a 180, with a dynafocal mount)."

Any of the rest of you have any comments?

CARB AIR BOX SEAL: Also from Chris..."On the #751 air box seal, I have the tooling for this and have made many. I don't plan to make any more and I have offered the tooling to John Thorp for $50. However, if he should not take it you are welcome to it. Regarding the hot air intake, it is picked up from the crossover exhaust thusly: See sketch below....



Pretty crude sketch, but you get the idea. It worked fine on mine" Thanks again, Chris. You have contributed so much sage advice and all of us are greatly in your debt....but, please...DON'T STOP THERE! There are still many things hat have not been covered (or done a different way), so if you come across anything that needs to be covered or covered again we'll appreciate it. How about some of you guys out there that come across a problem on how to do something, how about you writing in and say "I'd like to know how to do xxxxx", and I'll pitch the question up to Chris and some of the others that have contributed? Zero in on a SPECIFIC PROBLEM, don't just say,"I had a hard time rigging my ailerons," (or some such). Chris also advised for the troops not to go too far afield on the access cover under the fin, between #575 and #576 bulkheads, as John had warned him this area was stressed, too.

LOOSE RIVETS

PARKER MILLER, 15535 Edenvale, Friendswood, TX, 77546 (713/ 483/1732) writes:"My T-18 had 900 hrs. on it when I took it apart and I was unable to find any damage anywhere except the doublers which connect the center section closure to the wing skin (?). All the rivets there were dangling! I have talked to Bob Dial and he found the same thing on his." Thanks for the info, Parker, as this seems it might be important to pursue this, but I'm not quite sure of the exact area you spoke of. Could you send a sketch and perhaps take a guess what caused the loose rivets? Aerobatics, rough ground taxi, etc.?

Parker also has some for sale items, as follows(may be gone by now):
Good performing prop that was clipped and pitched by Santa Monica Prop Services. It is a 76M, 69" x 72" , and is polished. It has one nick. $375. I also have a used Genave Alpha 300, working good when removed, for $375. I also have a new Genave Alpha 500 (never installed) for $700 and a remote compass for $100.....

NOTICE

NOTICE: I hate to take up NL space to say this, but again, please be aware that our newsletter is presented as a clearing house for ideas, and experiences only, and anyone using the expressed ideas, suggestions, opinions, or experiences, does so at their own risk and discretion and no responsibility or liability is expressed or implied and is without recourse against anyone. This disclaimer not only applies to this issue but also to all past and future newsletter issues.

MAIN BEAM EXTRUSION

MAIN BEAM EXTRUSION: It's been pointed out in the newsletter that the main beam channel extrusion for the center wing has a 1° angle on it so that the shape will more closely conform to the slope of the upper surface of the airfoil. The previous channels didn't have this and it was necessary for the builder to file off this 1°, else it would leave a flat spot on top that would degrade air flow. We had cautioned builders to use a try square on the channel with a light behind it to identify which side had the angle, but recently a builder called me to re-check what he had done. He had mis-interpreted the drawings as saying the "low" side of the channel would be on the rear side. He had already trimmed it and drilled his shear web in and I hated to tell him he had done it wrong, but there was no other way. If the drawings shouldn't be quite clear on the subject, think of it this way: The upper surface of the airfoil is still climbing when it crosses the front side of the spar, so the front side of the spar cap should be lower at the front edge. Well, old .... has a new upper channel from Ken Knowles now, so maybe someone can use the old one on some other kind of airplane someday.

BUILDERS LISTS BY STATE

T-18 BUILDERS LISTED BY STATE (cont'd from NLs #52, 54, & 55):

MASSACHUSETS:
John Cragin, 34 Smith St., Needham, MA, 02192
Harold Wheeler, 2 Marion Road, Salem, MA, 01970

NEVADA:
Donald Derby, 300 E. Tropicana Ave., #10, Las Vegas, NV, 89109
Ron Johnson, 8760 Spearhead Way, Reno, NV, 89506
Oats Tokle, 3483 Skyline Blvd., Reno, 89509
Ferris Williams, 4884 Nettie Ave., Las Vegas, NV, 89110

TENNESEE:
Virgilee Walker, 3324 Homewood, Memphis, TN, 38128
Edward Waldo, 4755 Gwynne Rd., Memphis, TN, 38117
Les Seago, 2773 McCully St., Bartlett, TN, 38134
Gene Sloan, 412 Lillard Rd., Murfreesboro, TN, 37130
John W. Mills, Rt. 1, Box 500, Church Hill, TN, 37642

IDAHO:
Harvey Schumacher, P.O.Box 38, Lewiston, ID, 83501
Clyde Grafe, Rt. 2, Box 40, Weiser, ID, 83672

UTAH:
Howard Andrews, Box 195, Hunting, UT, 84528
Robert Clayton, 1783 Harvard Ave., Salt Lake City, UT, 84108
Frank Ellis, 2632 Foothill Dr., Ogden, UT, 84403

Wm. Nicholson,1096 Eastridge, Sandy, UT, 84070

UNDERWAY = FLYING T-18

BUILDERS LISTS BY STATES (cont'd)

MINNESOTA:

James Borg, 2451 115th Ave. NW, Coon Rapids, MN, 55433
John Holm, 7017 35th Ave., North, Crystal, MN, 55427
Curtis Kreps, 504 Charlotte, Willmar, MN, 56201
Gaylen Lerohl, Rt. 2, Box 29, Sacred Heart, MN, 56285
O. C. Moen, RR 1, Box 221, Ortonville, MN, 56278
James Renneker, 8150 Nicollet Ave., Minneapolis, MN, 55420
D.T.Sherden, 819 15th St. NW, Rochester, MN, 55901
Harold Streater, 68 E. 4th St., Winona, MN, 55987
Glenn Young, 703 Park Ave., Litchfield, MN, 55355
Tom Sandeen, Hector, MN, 55342

NEBRASKA:

Tom Baarsch, 2332 So. 35th Ave., Omaha, NB, 68105
Nate Eastman, 416 W. 2nd St., Kimball, NB, 69145
Harlo McKinty, 1310 Idylwild Ave. Lincoln, NB, 68503
David Petro, Box 1, Benedict, NB, 68316

MISSOURI:

Richard Edgar, 4968 Brockton Way, St. Louis, MO, 63128
Randle Woolaway, Timberline Airpark, Cassville, MO, 65625
Stan Bilotte, Rt. 2, Box 879, Excelsior Springs, MO, 64024
Howard Henderson, 444 Bryan Ave., Kirkwood MO, 63122
Michael Hammock, RR 1, Box 237, St. Charles, MO, 63301
E. J. Laney, 3361 Van Owen, Springfield, MO, 65807
Karl Lipscomb, 100 Grand Ave., Lamar, MO, 64759
Fred Marschel, 211 Juniper, Lees Summit, MO, 64063
Kim Nack, 5152 Auriesville Lane, Hazelwood, MO, 63042

WISCONSIN:

Ron Zimmerman, Rt. 1, Bloomer, WI, 54724
Bob Pernic, 85 Dartmouth, Williams Bay, WI, 53191
Clayton Iverson, 11530 Parkview Lane, Hales Corners, WI, 53130
Lyle McCullough, 1525 Beech Dr., East Troy, WI, 53120
Dwayne Mood, 11208 W. National, #108, West Allis, WI, 53227
Paul Lehman, 517 N. Clark St., Mayville, WI, 53050
Paul Krogh, 27118 Sherwood Forest Dr., Waterford, WI, 53185
Allen Koch, Rt. 2, Campbellsport, WI, 53010

OKLAHOMA:

Lee Reilly, Rt. 3, Box 198A, Wagoner, OK, 74467
John Kleber, 11209 St. Charles Ave., Okla. City, OK, 73132
Harlan Cavin, 2001 E. Steve Owens Blvd., Miami, OK, 74354
Gerald Kinman, 848 N. Robinson, Moore, OK, 73170
Leroy Holt, Box 238 Savanna, OK, 74565
George Copland, Rt. 2, Box 12, Duncan, OK, 73533

CONNECTICUT: (update)

H. E. Combs, Jennings Rd., So. Kent, CT, 06785
[illegible]
Jack Drum, 64 Wade St., Bridgeport, CT, 06604
Donald Warner, 7 Gaylord Dr., Wilton, CT, 06897

BUILDER LISTS BY STATES

NAME UNDERLINED = FLYING T-18

In the next issue we'll start in on the California listings. As you might expect, Calif. builders are the most numerous, by far. We'll also have Texas and some other states as space permits. I'm a super-slow typist and the lists are really time consuming and I get cross eyed after a page or two of them. Will also try to update the lists as new ones come in or some of the others drop out.

I just got a call from Richard Oribe, Rt. 1, Box 30, Bishop, CA, 93514 and he told me he had just recently bought RUDY ADLER's T-18 and that he was delighted with the way it flew and performed. I was very sad to hear of my old friend's deteriorating health, tho'. He said Rudy had suffered three strokes the past year after making a great comeback from his cancer affliction. Our prayers are with Rudy.

NEWSLETTER #56 INDEX: In order to help you locate reference articles more readily I've decided to add an index at the end of each issue. I have also made bold lettering notes in the left margin on the past couple of issues for the same reason.

End NL # 56

Hope your past days with your families have been most happy.

Dick Cavin