

JANUARY 31, 1979

#45

T-18 NEWSLETTER:

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The last T-18 newsletter was published 13 April '76. At that time it was felt that almost all the necessary material for T-18 construction had been covered, so it was decided that the most pressing need was to use the time to condense and update all the previous newsletters.

This had become a necessity, as the original master stencils were getting pretty well worn out after they had served nearly 1300 plan holders so well.

When Lu and I published the first newsletters in 1963 a considerable amount of our efforts were directed towards locating materials and suppliers, tools, etc. A lot of this material has been obsolete for some time, so has been eliminated in the new condensed version.

This gives a small measure of relief to the Sunderland family after 15 years of faithful, unselfish service to fellow T-18 builders. At Oshkosh this year Lu told me he still gets an average of 5 or 6 letters each day from T-18 builders!

To introduce myself to some of you, I'm Dick Cavin (#16). I reluctantly said goodbye to 35 years as a pilot for Braniff International when I reached the Federally mandated retirement age of 60 two years ago. Since then most of my time and effort has been occupied building and flying T-18s and writing the newsletter for EAA Chapter 168.

This has given me time to consider some of the newer aspects of T-18 building that have been used the past few years, so I've volunteered to give Lu a hand on the newsletter for several issues.

Our EAA chapter recently purchased an offset printing press, complete with plate maker, and as we print about 300 newsletters each month (of about 20 pages per issue), we also buy our paper in bulk. We also take advantage of bulk mailing rates, which are only around .08¢ per issue, third class. As editor, I have been given chapter approval to make full use of all these facilities at a very nominal cost, which will cover future maintenance, etc.

All of this translates to the ability to turn out very sharp, readable copy, fully illustrated with pictures, at a very low

cost per issue. The T-18 printing and mailing fund is close to depletion, so we are asking for donations from all of you, as subscribers, to get it off the ground. We are asking for a minimum of \$3.00 per man and hopefully this will take us through around 10 issues if we watch our costs closely.

As in the past, we need your input if we are to maintain the high quality of the newsletter. Remember, an editor has to have "reporters". He can't do it all, so we earnestly solicit your story, as long or short as you care to write. If you type, fine, but if not just sit down and scratch out your description of the subject matter, just like you were talking to a buddy over a cup of coffee. Don't worry about the spelling or punctuation, etc. We'll re-write it if it needs it. Don't consider any item (about the way you solved a problem) as too trivial to mention and don't assume that "everybody knows how to do that"!

There have been a lot of changes take place since the T-18 design left the runway in 1962. In the intervening 16 years the airplane has gradually evolved into a rugged, reliable, high speed vehicle, with a capability that equals or exceeds the finest, most sophisticated factory builds, costing many times more. About 250 have been built to date, with at least that many more somewhere in the construction process. Mandatory changes and "ADs" are remarkably few, certainly a tribute to the design expertise of JOHN THORP. Many of these airplanes are approaching the 2000 hour mark and several are well past that figure. Some of these "high timers" have done most of their flying from rough, unimproved landing areas, which is even more evidence of design excellence. Surely an aggregate total of 100,000 flight hours would be on the conservative side. Even the accidents have shown the T-18 to be very "survivable", as long as it isn't a stall/spin situation.

The rugged "A" frame landing gear and heavy members and attach beams from the seat back forward are mainly responsible for protecting the occupants from serious, or fatal injury. The outward curving shape of the fuselage in that area is also a potent safety factor, as crash researchers have discovered in Ag aircraft accidents.

With the gear acting as a "pylon", with the engine hanging from one side and the rest of the structure from the other, very high G forces on the airframe are greatly softened and slowed up, thus allowing gradual deformation of the structure, the key to survival

of high G impact. The A frame gear's ability to soak up huge amounts of energy before failure also validates its unique role as an effective barrier to prevent the engine from smashing thru the firewall and crushing the cockpit occupants. I know of no other single engine design that has this very valuable safety feature.

The T-18 basic design has given rise to a whole series of modifications, greatly widening its appeal to potential builders. From its starkly simple "plain Jane" beginning we have seen horsepower go from the almost extinct 125 hp. GPU to over 200, with constant speed props added, along with gear fairings, flaps, pressure cowling, canopies, and fuel in the wings. Fixed and retractable tricycle gear versions have appeared and also a couple of retractable conventional gear examples have been built, one of which was a single place. Several 3 place copies have surfaced, too, with jump seat capability to carry a child. Two inches more width at the cockpit is provided in the so-called "wide body" modification, that LU SUNDERLAND initiated. Cockpit comfort has been greatly enhanced with the addition of electric trim and electrically driven flaps, along with moving rudder cables to the outer walls of the fuselages. This allows both forward and rear tunnels to be eliminated, thus eliminating a universal complaint about the very cramped and restrictive leg room area. The 3" dia. aluminum tube between the seats, that encloses the push-pull tube, makes a big difference in comfort at the hip level, too. All these things add up to increased enjoyment of long cross-countries.

The astronomical cost and unavailability of hangar space has been the motivation for LU SUNDERLAND's folding wing design mod and no doubt those factors will mean that more and more builders will be forced to go this route if they are able to justify the increasing fixed costs of airplane ownership. Average hangar rent in metropolitan areas is around \$100/month and that \$1200 per year will buy a good radio, or lots of gasoline, plus pay for insurance each year! If the take-home idea repels you, a very practical alternative presents itself in the sharing of hangar space. In many T hangars just folding one wing of a T-18 would make it fit under any high wing Cessna easily. Four T-18s with both wings folded could share a single T hangar, with room to spare. Maybe 5.

Let's stop and take note of an important fact: All these modifications have added weight, so each of those 86 square feet of

wing has to work harder. Not only does the stall speed increase, but the former aerobatic capability is drastically compromised (or been wiped out)! Fifteen pounds of weight are added by the wing folding.

The light, early day T-18s are known to have good spin recovery characteristics, but be aware that a large "gray" area exists when we depart from the proven norm, so extreme caution should be observed in attempting maneuvers. If you have an overpowering urge to stretch your neck and break a few blood vessels in your eyes and brain, why not be sensible and do it in an airplane that's truly built for it?

As most of you know, new airfoils that are capable of higher lift and less drag are not only on the horizon but are here. MR. THORP is in agreement that we should pursue the testing of these new airfoils with the very worthwhile goal of lowering the stall speed.

AIRFOILS

BILL JOHNSON is an engineer for Boeing (Seattle) and he has done a lot of testing on computer-generated airfoils. He applies a mixture of polyester resin and microballoons to the wing of his T-18 and sculptures the various airfoils to shape. He then goes out and flies the airplane to prove or disprove predicted performance. Not only has he been able to apparently reduce stall speed to slightly over 50 mph I.A.S., but also to fly the airplane at angles of attack as high as 25 degrees. Such an angle for landing wouldn't be of any advantage with the present gear, of course, but it certainly points the way for safer, slower approach speeds. Think what that would mean if you were forced to land in a heavily forested area.

NASA has also been doing their homework on such airfoils and results to date show great promise. The pace of such research is quickening, so the coming year may yield some very tangible benefits. In our next issue we'll publish the coordinates of one of the most promising of these airfoils.

In our little review of T-18 evolution let's look at an important area, that strangely enough hasn't received but a very minimum of publicity: This is the maximum use of Matched Hole Tooling through purchased parts made from master tooling. Practically every part on a T-18 can now be purchased and with the assurance that it will mate with adjacent ones.

I personally believe a lot of people are choosing the Varieze to build for the reason that it not only goes fast, but they believe it can be built by them in a short time. The years have shown that a large number of projects are never finished for the simple reason that they take too much time to build. Family tolerance and enthusiasm reaches the vanishing point when too much time elapses. I think this has been the case with many of the early day T-18 plans purchasers, or else many, many more T-18s would have flown by now. I'm also sure that a considerable number realized (or thought) they were in over their head when they tried to make heads or tails of their plans for the first time.

We now have several "storekeepers" that can supply 99% of the parts you need to build a T-18, either complete or partially fabricated, so a truly giant step forward has been taken. Surprisingly, very little publicity has been given to this phase of homebuilding. Let me give an example of what this really means in time saved.

MATCHED HOLE TOOLING - OUTER WING ASSEMBLY

Last summer I made up an outer wing for the T-18 in a little less than 16 man/hours! Two days work, if you please. A weekend's work as another way of looking at it. Laying out the skin, drilling it, bending it, and dimpling took 3 hrs. 15 min., building the spars and attaching the fittings took 6:45, assembling the ribs, spars, and skin (by drilling skins and spars together) took another 2 hrs. 15 min., and riveting took up another 3 hrs., for a total of 15:15. A very relaxed pace was maintained, too, not a hammer and tongs effort.

The pre-formed ribs, with holes punched, were purchased from KEN KNOWLES. I had previously laid out a wing skin template, so I used it, but the scribed and center punched skin can also be purchased from Ken, so I did not include the time spent making the template. (One of Ken's skin layouts could actually have been done in a little less time).

BENDING WING SKINS

Bending the wing skin is done by clecoing the "false" line of rivet holes on the bottom skin to the line of rivet holes on top of the rear spar. A 2 x 6 was then laid spanwise on the top skin and pressure applied (gradually moving towards the leading edge) until the leading edge radius exactly fits the contour of the ribs at that point. I got lucky and hit it the first time, but it conceivably could take a half hour or so to bend, un-cleco, check for fit, re-cleco, etc. You need to be careful not to over-bend, so "sneaking up" on it is a wise procedure.

Some people have used 2" x 6" longer than the 4' skin width and laid certain thickness wood blocks on the floor underneath the projecting ends of the 2 x 6s, so they act as "stops" to prevent over-bending. It's also good practice to mark the forward edge location of the 2 x 6 each time it's used. This keeps it parallel with the L.E. and locates the pressure point, too. You may possibly need to "shim up" your 2 x 6 in the center, since more bending takes place at the outer two ribs than in the middle two.

When checking the bending of the skin the best procedure is to have the two center nose ribs cleco'd to the front spar, so that the unit can quickly be re-cleco'd to the skin and checked. If skin fit looks okay on the center two then slip the outer two in, cleco, and check them, too.

Again, be cautious. A too sharp leading edge can mean the airplane can be pretty nasty at stall. It can mean you'll have a wicked wing dropper at stall (maybe starting a spin) if you also get a little twist in the panel. I never cease to be amazed at how little "massaging" of the trailing edge of the aileron is required to correct a considerable wing heavy condition. (It's so little that you actually can't see it.)

When FRANCIS RICHARDSON and I joined forces last year to build two sets of folding wings we checked and re-checked our leading edge skin bends about 4 times each panel, being careful to get all 6 skins with matching bends.

MODIFIED MATCHED HOLE TOOLING, WINGS
Francis and I used a jigless method of wing assembly, that I believe is best described as Modified Matched Hole Tooling. All skin holes are pre-drilled and all rivet holes in the ribs are pre punched, too, but no holes are pre-drilled in either the front or rear spars. When all the ribs, skin, and spars are cleco'd together we lay a large level on top of the front spar, carefully leveling it. The level is then placed on the rear spar to compare. When the two readings are identical the wing is square, with no twist. Be aware that you should take care to exactly align the level parallel to the spars to get an accurate reading. At this point clamps are attached to the ends of the spars, holding the skin tightly in position. Now thru the row of spanwise holes in the skin the spars are now drilled and cleco'd.

Prior to drilling the skin, while it is still in the flat condition and has been scribed and center punched, take time to check your hole layout for accuracy. First measure from the lower left corner punch mark to the upper right corner punch mark. Now compare this distance with the measurement from the lower right

corner to the upper left corner. This is sometimes called "X" checking and is a very accurate way to check for squareness. You are actually measuring the hypotenuse of two triangles. They should be equal.

This might be a good time to remind you to check your sheet aluminum in the same manner, if squareness is essential to the part. You cannot safely assume that the edges of the sheet are parallel to each other! Francis and I found at least half of our sheets out of square when we were laying out our folding wing skin templates.

RIVETING WINGS

We found that riveting and bucking on the outer wing panels (standard wing) is easier to do with the panel standing vertical, with one end resting on the floor. The outer folding wing is something else. It takes a really long arm to reach far enough in to buck the #4 rib from the end. You might want to use blind rivets here or get a bucking bar with a long handle. Personally, I'm very reluctant to use Pop rivets anyplace except where the space for a bucking bar is very limited. Without going into greater detail on Pops here, just consider one point: Pops are known to loosen after awhile. Also well known is the fact that a loose rivet will pop paint loose all around it. Ask yourself if it is worth it to spoil a paint job.

SKIN SPLICE

On the folding wing we wrapped the skin chordwise, which requires a skin joint, unless you can find a 6 ft. wide sheet of aluminum. We chose to make a butt joint over one of the ribs, which in turn required a double width flange on that rib. A simple lap joint would have been much quicker - and better, too, but we didn't know that then.

Our double width flange was a separate piece, of .040, riveted to the "web" part of the rib, with rivets spaced about every 1/2". Bend relief cut-outs were made at about the same interval, so obviously it was a time consuming job. The .040 flange did not give the degree of lateral rigidity desired, allowing a slight amount of spanwise "rocking". As a result Francis' out-board skin wound up with a little "oil can" in between the spars adjacent to the splice joint. I lucked out on my wings, but as a result of this experience I would strongly recommend using a lap joint, even tho' it theoretically might not have the eye appeal of the butt joint.

I would further recommend you purchase the big steel attach fittings from KEN KNOWLES, unless you have access to a big metal

cutting bandsaw and have a buddy at a steel company that will cut you off the 6 blanks of the thick 4130 steel plate needed. You'll also need a buddy at the heat treat plant, so that you won't have to pay the minimum heat treat poundage fee.

I further would recommend you buy the entire folding wing package from Ken; skins, ribs, spar stock, push rods, bellcranks, ailerons, flaps and fittings. The total cost really shouldn't rattle your cage. Look at it this way - the folding wing will completely pay for itself in about 2 years! Further, you'll get all of your money back again when you (or your heirs) sell the airplane some-day down the line! Maybe more.

Now if that isn't a truly handsome return on your money, I'd sure like someone to show me another investment (in these days of galloping inflation) that will even begin to approach the handsome dividends of a folding wing. Furthermore, what other investment will let you have that much fun in the meantime, too?

Had you ever really stopped to consider your T-18 in the light of being a good investment? Have you noticed that when T-18s and T-18 projects are advertised in Sport Aviation or Trade-a-plane that they are only advertised one time? I think that pretty well establishes the T-18 as pretty saleable. It's an open secret that all makes of airplanes are appreciating in value at a pretty handsome rate - from 10% to 15% per year the last 2 or 3 years. That rate pretty well parallels the annual increase on new aircraft. Would it shock you to learn that Cessna's 152 trainer carries a price tag of almost \$20,000? And a new Bonanza around \$100,000? Does all that change your viewpoint towards what you are investing in your project? It did mine. When I took note that my savings were shrinking by at least 10% per year, due to inflation, and I was losing 3% in the exchange between the 7% interest received, plus having to pay tax on that 7%, I decided to put my money into T-18 parts, engines, etc. At least I can have a little fun out of things and maybe break even down the line.

Quite a few of the T-18 builders, including Lu and I, were pretty upset with the members of the working aviation press at our last two national conventions, actually the last three. The past three years the aviation press has studiously ignored the fact that there were 45 T-18s there in 1976, 36 of them there in 1977, and 43 were present in 1977. There was much made of the fact that 24 Variezes wre on deck and that does speaks well for Burt Rutan's design, but why the T-18 wasn't accorded the honor due it I don't know. I do know that several T-18 builders left their T-18s at home because they resented the situation the years before.

I will have to say that the press was fair in their coverage of the '77 accident at OSH. It was properly described as a stall type situation that could have happened to any design and that even it would have probably been survivable if the gas cap had not popped out. Anyway that's all negative now and of very little benefit to dwell on our alleged scurvy treatment. On a positive note an annual T-18 (only) Fly-in was brought up frequently at OSH and great enthusiasm was noted. We'd like to have Your opinion on the subject. Please specify if you are an owner, builder, or plans holder, but above all please write us on the subject.

This brings up the subjects of where and when, as well as if. I heard one suggestion that it be held in a different city each year. This sounds like a good idea. The Bonanza and Cessna 172 owners clubs do this I know. Very successfully, too.

Just imagine what a wonderful sight it would be to have say 100 T-18s lined up. Visualize, if you will, a half day of engine installation inspection, where all cowlings would be removed and the entire entourage could inspect oil cooler installations, fuel systems, engine controls, mufflers, heat muffs, air boxes, oil filters, voltage regulators, exhaust ramps, baffling, engine instrument probes, air filters, etc.

Also, wouldn't it be great to list and compare the dozens of different props in such a gathering? The same for instrument panels? Or upholstery? Or radio installations? The variety of paint schemes would be an inspiration to those with projects in the nest, wouldn't it?

A nice touch would be the preparation of a T-18 "scrapbook" or yearbook, complete with pictures of the individual airplanes and the builders, and a detail box that would list equipment, engine, prop, empty weight, performance. Such a book and a memorial plaque for all pilots present would really make a nice souvenir, wouldn't it?

The friendships formed would be one of the greatest benefits. It would be like the "old" days at Rockford, when it was big enough to be interesting and exciting and small enough so that we got to know and socialize with a considerable number of fellow enthusiasts. Lifelong friendships are inevitable by-products of such gatherings.

Events like efficiency flights to nearby towns and other semi-competitive flights could be scheduled. We could have scales on hand to do up-to-date weight and balances, etc. Various workshops could be set up, demonstrating several building operations.

As to where we'd have the T-18 fly-in we obviously wouldn't want to pick a busy airline terminal, but tower controlled airports, with limited airline service isn't a major problem, as I doubt if there is a single no-radio T-18 flying. There are several deactivated Air Force Bases in the midwest that might be selected and the long runways and large ramps and hangars (for protection against thunderstorms) would make them attractive. Adequate motel space would be a must, since camping out probably wouldn't be too popular without facilities prepared in advance.

It would seem that the logical way to select sites would be on a state by state basis, listing the airports and cities that meet a certain determined set of standards.

We could speculate on sites for hours and not get anywhere, so how about you people that live in Iowa, Illinois, Missouri, Kansas, Oklahoma and North Texas - (or any of the states close to the Mississippi river) taking a sharp look at airports and towns in your area and checking them out and sending in the results of your survey? It might be a good excuse to fly or drive somewhere and take the wife on a little trip, hey?

Let's try to choose places that have a minimum of 4000 ft. of runway, with preferably a good crosswind runway, too, and adequate paved parking. Check with the Jr. C of C, a good motel manager, the airport manager, etc. Make note of any local sightseeing points that might be of interest, too.

Weather certainly should be carefully considered. The whole Mississippi Valley is well known as "Tornado Alley" and with good reason. From April thru mid June there are violent squall lines that go as far south as southern Texas. After mid-June the weather moves north and in late July frequently stagnates into static weather fronts of low ceilings and fog in the morning and large areas of thunderstorms in the afternoon, from northern Missouri to the Dakotas on the west and to mid-Illinois and Michigan on the east. (This is usually a problem going to OSU). We can't outguess the weather months in advance, but we might try to give ourselves a break.

Now if you, and you, and you don't at least write in your views on such a fly-in there won't be one! We'll have to assume no one is interested if only 10 or 15 respond, so it certainly wouldn't justify the effort involved.

As an after thought, do you think you would rather fly into OSH to see the airplanes the first day or so and then fly out to say Rockford or somewhere else to the south of OSH for 2, 3 or 4 days? That might be the simple way to get the whole thing off the ground the first year and then we can all get together and shake it all out. Anyway, please write!!

Let's remember that such a fly-in would not only be for the owners of flying T-18's, but also for those that are building and have to come in by car, rented plane, or airline. How about hearing from you builders? What, specifically, would you like to see and do at such a fly-in? What kind of forums or workshops?

Like I said before, that, if you don't write there won't be a fly-in. We'll just have to assume that enough people aren't interested.

BAGGAGE COMPARTMENT

The subject of the baggage area is a little hard to make a decision on in advance and because the important question of aft C.G. is involved it might be a good idea to defer it until the airplane is given a preliminary weight and balance check.

Battery weight and location come into the picture. If your T-18 is powered with a 180 hp. engine and constant speed prop you can be pretty sure of needing weight aft, so your battery will probably go in the bay just aft of the baggage compartment. If this proves to be so, the entire depth of the baggage compartment bay can be used, as long as a tunnel surrounds the push-pull tube and the rudder cables are protected.

I have a wood prop on my airplane and my battery is located in the baggage compartment bay. My remote compass unit and inverter are also in this bay, so a baggage floor is a must.

In order to have access to the units under the floor a folding baggage floor was used. A fore and aft piano hinge forms the dividing line of the fold of unequal size segments. The size of the quick fold-up door is determined by the space above, forward, and behind. The smaller door segment will easily flop up and over the other for quick access to the battery, or if access is desired in the entire compartment the entire floor can be easily removed by loosening the dzus flush fasteners. (See sketch.) Take note of an additional angle ~~mounted back to back with the rear carry thru spar~~. A baggage floor support "ledge" must be provided on all four sides. The ones on the side are joggled, so that the floor is flush with all "ledges".



Don't forget to insulate your floor and skins in the baggage area and to close off Bulkhead #571 with a removable rear wall for the baggage compartment. If you have some .016 or .020 sheet laying around, bend up some angles for stiffeners and pop rivet them on the back side of the light weight sheet closure. This will prevent the baggage area from being an effective sounding board for magnified noises in the tail cone area.

COCKPIT CLUTTER

I don't have a radio speaker in my airplane and my microphone and earphone jacks are on the far left side of the dash panel. I normally use a Telex Mark II feather weight microphone/headset combo, with a push-to-talk switch attached to the switch with a wrap around velcro fastener. This leaves both hands free at all times. I despise the big, heavy "pillow" type of headsets. I like to leave my right ear uncovered to hear the passenger's conversation, along with engine sounds. I've been used to this for years and I can hear the radio loud and clear via the little piece of hollow plastic spaghetti and ball shaped "nipple" that sticks in my left ear. I recommend this set up, but in case you prefer the heavier, bulky headphones, Telex also makes a double headset type with a fixed dynamic mike. My unit has an "electret" mike with claimed superior noise canceling qualities.

I was recently giving PAUL KIRIK some left side time and to free him from distraction I used the radio. This cross-cockpit mess of cords made me wish for a mike/headphone jack on the right side, too. Like so many things, it would be pretty easy to do before installing in the airplane. I've seen a couple of T-18s with the headphone jack behind the seat on the deck and this looks like a good way to reduce cockpit clutter.

You might also look into wiring an intercom set up into your comm system. Easy, clear communication with your passenger without yelling is a definite plus.

On the subject of clutter, had you thought about one of the newer Alcor dual cyl. head and EGT gauges? In these days of low lead 100 gas, it has been proven to be very essential to lean the engine in a proper and precise manner to avoid the plug and valve problems, that are a definite problem with the fuel used now. The cost of the dual instrument is about the same as two separate instruments, but you save some instrument panel space and weight.

PANEL PLANNING

While you are building your T-18 are you doing some definite planning on your instrument panel? First of all you should really do some serious soul searching to determine whether you will ever make a practice of flying on "wet" IFR, making VOR and ILS approaches, or if your flying will primarily be VFR.

If you are going to go the full IFR route you are looking at probably 25-30 lbs. of extra weight (utilizing 2 to 3 sq. ft. of your 86 sq. foot wing and raising the stalling speed) and adding a considerable amount of cost and complexity. You should (must?) have fail-safe, back up or dualization for all systems and radios. A separate battery should back up alternator failure, etc. In case of power loss, would you have a sufficient electrical back up for the vacuum instruments lost or vice versa? Are you prepared for the required maintenance cost of periodically validating instrument accuracy?

Perhaps you simply want to have your own "airliner", with a well equipped cockpit to enjoy and maybe practice with now and then. Well fun and pleasure is the name of the game and so if you are aware of the weight and dollar cost, have at it.

If IFR is your cup of tea, take a look at the basic airline "T" panel adapted as a standard instrument arrangement long ago. I'll publish a typical layout and plumbing and electrical diagram if there is sufficient interest.

I can promise you that you'll like the way your airplane flies much better if you don't heavy it up. My T-18 weighs 927# empty and the empty CG falls at 20% M.A.C. It's a minimum equipped airplane but I can safely approach at 80-90 mph, it stalls at 60-62 IAS, it will true out 200 mph, it gets off in about 800 ft. loaded, has a 1500 ft./min. climb with a Cassidy 68-66 (71) wood prop and is powered with an O-320 B2B 160 boss engine. My radio is a Genave Alpha 200B and I have a remote compass with peanut inverter, no gyro instruments, except electric turn and bank, which runs off the same inverter that powers the compass and cyl. head temp. I do have an Alcor EGT and feel that joint use of the EGT and CHT are pretty worth while to properly lean as per AVCO bulletins.

TCP

I regularly add TCP to the 100 LL fuel as a bulwark against valve and plug troubles that plague so many nowadays.

I'm pretty interested in preventing troubles in that area, as last year after my return from OSH my GPU swallowed a valve (on

the left rear cyl.) on my 1st takeoff after returning. Luckily I had another airport 2 miles straight ahead and had just enough power left to stagger in. The fuel was 100 LL and I had run out of TCP.

You may have heard that the Embry-Riddle flight school in Florida put TCP in half of their trainers and that half had no problems, but the other half had valve and plug troubles galore on the 100 LL. Results were definitely conclusive.

Because our printing set up is different from previous newsletters we won't be doing drawings that are adjacent to the printed copy. Sheets of photos and descriptive drawings will be added at the end of the newsletter, so if you need to refer to "Fig. 1" etc., just turn to the photo or drawing pages.

I've already prepared an outline for the next newsletter, which will be published and mailed just after the holidays, so that there will hopefully be fewer mail foul-ups than during the holiday rush.

FUTURE NEWSLETTER SUBJECTS

Here are some of the subjects to be covered: Gas tank installation on the Wide Body; Filler cap door and flush filler neck; Scupper drain provisions; Access plate for fuel quantity sender unit; Heat muff and muffler design and installation; Placement and design of newer instrument panels, that allow room for radio installation in the panel ahead of the tank; Suggested IFR instrument groupings; Designee observations on running of battery cables, size and type, location and types of solenoids to be used; Location and design of cabin heat valve; New developments in baffling and air flow control inside the cowling; Location of accessories on the firewall and proper attachment procedures; Additional methods of fitting spinners; Comments on dash frame modification and stiffeners; Alternate seat design and attachment; Some pointers on upholstery installation; Comments and sketches on removable access plates and doors for the battery area, above the tank, tail area, bottom skin, forward floor, outer wing fittings, and tool access to the #522 fittings; Additional comments on N.L. #34 re the alignment of stick, stabilator, and trim tab; Designee cautions on seat belts and shoulder harness; Comments on airspeed calibration necessity for flutter prevention and related material; Reprints of Sport Aviation articles on flutter; Info on new brake line material, and comments on routing of brake lines; Complete commentary on improving cockpit room by removal of forward and rear tunnels (covering the installation of electric trim, electric flap actuation, rudder cable relocation); Ultra light weight electric aileron and rudder trim; and some observations on fitting of canopies.



In addition, we'll try to cover some of the unique problems relating to building the folding wing.

I solicit your comments on any of the articles we publish, including any criticisms (constructive or otherwise). I especially ask you to contribute any construction tips, submit even rough, freehand sketches, accounts of problems you encountered and how solved (or not solved), flight test reports, weight and balance reports, wiring diagrams, good sources of equipment or materials, etc.

We would also like as many good, sharp black and white pictures of your cockpit, cowling, engine installation, etc., as you can manage. Polaroid black and white are usually not sharp enough for good reprint and color pictures lose detail when converted to black and white. Don't write on the back of pix, as this will often show thru on reprint.

We would like to begin a complete "roguess gallery" of all completed T-18s and their builders. It would be a nice way to record your accomplishment and an excellent way for builders to become better acquainted with others. It would also enable new builders to get ideas on paint schemes and many other items. Please include pertinent details on the ship (i.e. date flown, hours to date, engine hp., prop pitch, empty weight, performance figures, etc.)

This wraps it for now, amigos. Please send comments and other material to me at P. O. Box 168, Addison, TX, 75001.

For the present, send your donation checks (\$3.00 min.) to Lu or me, but make them payable only to "T-18 Mutual Aid Society".

Best wishes,

Dick Cavin

It's your newsletter. Be a part of it.

Our newsletter was written just before Xmas, but it was decided to delay printing and mailing until January, so that our 3rd class mailing wouldn't get fouled up with heavy holiday mailings. We got a further delay in early January when our offset press developed the hiccups. As it stands now, we hope that this issue will be in your hands in mid-February.

We have also run a circulation notice in Sport Aviation, and we hope to get the resumption of the newsletter in their Chapter Notice section.

WING RIVETING SEQUENCE

In the meantime I had an occasion to build up another outer wing panel (st'd) and I again timed the various operations with nearly identical times I reported earlier in the newsletter, so it seems that a weekend per outer panel might be at least a bench mark to use in estimating time needed. I did record our riveting sequence, which follows below.

1. Cleco #2 and #3 nose ribs to front spar and then cleco the ribs and spar to the skin.
2. Rivet #2 and #3 nose ribs to skin.
3. Rivet front spar to skin, top and bottom.
4. Rivet #2 and #3 rear ribs to the #2 and #3 nose ribs (thru spar web).
5. Rivet BOTTOM flanges of #2 and #3 rear ribs to skin.
6. Cleco in rear spar and rivet entire bottom flange to skin.
7. Rivet #2 and #3 rear ribs to rear spar.
8. Rivet spar doublers to rear spar and aileron hinges.
9. Rivet top flange of #2 and #3 rear ribs to skin.
10. Insert #1 and #4 nose ribs and rivet to skin.
11. Insert #1 and #4 rear ribs and rivet to skin.
12. Rivet #1 and #4 front and rear ribs together thru spar web & fitting.
13. Final closure: Rivet entire top flange of rear spar to skin.
14. Stand back and admire your work while trying to remember if you might have left a couple of clecos inside.

In the above example, #1 rib is the most inboard rib and #4 is the most outboard one.

Our sincere thanks to Mrs. Peggy Cutler for typing our copy this month. I write about 30 pages of legal size longhand copy each month for our chapter 168 newsletter and Peggy diligently wades thru all that verbiage and turns it into impeccably typed copy (not like this page, which I plead guilty to).

I would appreciate it if you guys would feed the kitty promptly, as I'm footing the bill for this first issue and with over 1300 plans holders of record the printing and mailing costs for this issue will be in excess of \$330 to \$370. When you send your check would be a good time to send me a little story about your T-18 and some black and white pictures, too.

P.S. The baggage compartment drawing wasn't suitable for reproduction and will be re-drawn and included in the next newsletter. In the meantime if there is some subject you'd like to see developed please let me know.

DICK