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YIPPEE!!! IT FINALLY FLEW!

On March 25, I had my final inspection and the FAA inspector couldn't find a single thing wrong. After the inspection, the inspector said he liked the T-18 so much he thought he would build one. I spent most of the afternoon buttoning everything up and installing the gap covers.

Then the big moment came to start taxi tests. The day was warm and cloudless, very unusual for March, and there wasn't a breath of air moving. I had already spent several evenings doing low speed taxi tests and was beginning to get the feel for this very nimble little ship. I also had had the good fortune of spending about a half hour the previous week flying Bill Johnson's T-18 in Seattle, although I didn't handle it on the ground. Bill had given me some good advice about handling the T-18. He said, "Don't try to pick the tail up until it is ready to fly. Use 1/2 flap on the first landing and 3-point it. This keeps the tail on the ground the maximum amount of time and thus gives better control."

But I wasn't ready to fly yet. I wanted to take it easy and not repeat some of the near catastrophies most of the other T-18ers have had on first flight. John said that close calls are the rule rather than the exception and recommended a couple of hours in a T-6 or, as second choice, a Swift. Since we have no T-6's around, I got several hours in Paul Schriebmaier's Swift shooting landings during the previous several weeks. Even with this experience and most of my recent flying done in tailwheel airplanes while towing gliders, I was still a bit apprehensive after hearing about how tricky a high performance plane like the T-18 was on ground handling. So I taxied out resolved to spend a lot of time doing taxi tests before trying a flight.

One of the first big surprises was the complete lack of torque effects when full power was applied during taxiing. The offset in the engine is just right and makes right rudder on take-off unnecessary.

On the first run I kept the tail on the ground and the speed below an indicated 50. The steering was very easy and responsive until power was cut, then it was a bit more difficult without the prop wash on the rudder, but still very quick on the response. On the second run I kept the tail down as well as the speed but a bump at the intersection bounced me into the air a few inches. I just held the nose steady and it settled back without any consequence or directional problem. This gave me more confidence so I picked up the tail at about 50 on my next run but still keeping the power way back. I was able to lift it off a few inches at a time and finally fly nearly the length of the runway with the wheels just kissing the pavement occasionally. After this I knew I was ready, but just for good measure I made a few more runs. Then I was ready to go.

But remembering the many first flights which end up in trouble due to fuel starvation I decided to make one more test. I held the brakes and applied full throttle for several minutes without any apparent hesitation. I figured this would be enough to get a fair amount of altitude. So with another mag check and carb heat check I was ready to go.

This time I gave her full power and left it on. In a very short distance I was indicating 50 so I applied a little forward pressure. Then it began to feel light so I lifted it off at just over 60 indicated. I held it down until it had a good solid feel and then let it have its reign; I already knew the airspeed was reading low so I didn't trust it. The rate of climb was phenominal - especially for an old J-3 and SkyCoupe pilot. By the time I got to the end of the runway and crossed the river I had a comfortable bit of space under my wheels. The rate of climb held steady at 1500 fpm. At 4500 I leveled off and started cranking in trim. There was just barely enough roll trim to hold up the left wing.

I was disappointed to find that the maximum rpm in level flight with my 67-63 prop was only 2450 and I could indicate only 140. I knew one or both had to be off because my calibrated ear said I was going close to mach 1.

Since the best check on airspeed is a stall, I did stalls both without and with half flaps. Just as I pulled up to do the first stall, I heard a cracking sound coming, I was sure, from the engine. It was only faint at first and I tried to ignore it. But it got worse with each stall and I began to wish I were on the ground. Then I felt a clunk on the side of the fuselage and I knew what was wrong. The little rubber molding along the wing fuselage juncture had come loose and was slapping against the skin. Whew! what a relief.

Then I tried one more high speed run. Just as I got it really wound up the engine started to run rough. I quickly pulled on carb heat and reduced throttle and everything was fine. I was sure it was carburetor ice but I decided I'd rather be on the ground anyway.

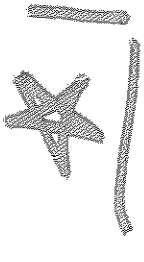
On the approach I was surprised that the tail started to buffet when 1/2 flaps were applied. It didn't seem to be serious so I left them on. I leveled off a few inches from the runway and held it there to bleed off speed. It touched down in a perfect 3-point landing. The roll out kept me busy but I had no trouble since all the taxiing had me pretty well accoustomed to it.

When I taxied up to the ramp I was a little weak, but managed to crawl out to let the spectators see the interior. I was relieved to see that the rubber molding had really been making the noise. No use trying to explain the feeling of satisfaction after a successful first flight. You'll just have to hurry up and finish your bird and see for yourself.

Some cement took care of the molding and I was pleased to find no buffeting with flaps on the second flight. The gas tank breather tube stuck down below the fuselage about an inch and was cut off straight. I figured this might have caused a suction in the tank which made the fuel flow too low so after talking to John Thorp I cut off the tube so it would get ram air into it. Since then I have had no problem.

A check with a strobe lite showed that my tach was reading 100 rpm low. On a later flight I found the airspeed was 30 mph low. I had checked the instrument before installing it so figured it was a plumbing problem. Sure enough, the pitot line was leaking. John told me how to make a simple leak check on the lines. Just slip a rubber hose over the pitot probe and pinch it off until the indicator reads 100 mph. Hold it and if the speed bleeds off you have a leak. The same check can be made on the static line.

I now have five hours on my ship and all the little bugs have been ironed out. I find it very easy to land 3-point with flaps. My tapered gear is just perfect. It is fine for sod strips also. Now that I've ridden in T-18's with longer gear, I much prefer the over-the-nose ground visibility with standard gear.



Stalls - John says he now has a perfect fix for taming down the stall. He tried a wing leading edge fillet at the fuselage juncture but claimed it didn't do much good. Now he has added a spoiler to the leading edge of each wing about midway out the center wing. It is a 4" long 1/2 x 1/2 angle attached just above the chord line about at the stagnation point. This stalls the inner wing first and prevents the sudden drop-off on a wing experienced by most T-18's.

Painting and Finishing - A good paint job begins with the proper preparation of the surface.

In order to get paint to adhere to aluminum it is necessary to roughen up that nice mirror like surface to give the paint and primer something to cling to. Although zinc chromate provides a mild etching effect to aluminum, it is much safer to use a separate etching treatment. The military

specification process is to first apply alodine and then zinc chromate. Kent Hergus told where to get alodine kits in a previous newsletter.

The alodine process is quite simple. First you brush on an acid cleaner to get rid of all the oil and grease. After a few minutes you rinse with water and then brush on the alodine. After five more minutes you rinse again with water. The alodine not only etches the surface but also leaves a gold colored oxide. The alodine alone gives good corrosion resistance.

Now you are ready for the zinc chromate primer. Zinc chromate makes an excellent primer because the chromate ions prevent the cancerous corrosion process from taking place. The important thing to remember when applying the primer is that it should be applied with as thin a coat as possible while still covering the surface completely. You should be able to read the lettering on the aluminum through the primer. If it is too thick it may chip off since it is quite brittle. A good test for zinc chromate primer is to try to scrape it off with your fingernail after it has dried for several days. If it comes off, you did something wrong and had better start over. This will happen especially if the surface had oil or grease on it.

It is possible to obtain zinc chromate at a local paint store but it is unlikely that you will be able to get aircraft quality primer. To be on the safe side, you should order good primer from one of the aircraft supply houses. I once bought some at the Sherwin Williams store which took overnight to dry. The aircraft type dries in a few minutes. You will need a gallon especially if you use it inside and out. Alclad aluminum is fairly corrosion resistant but it takes little effort to prime the entire inside of the skins and I recommend it. To provide extra insurance that the paint and primer won't peel, some builders rub the entire metal surface lightly with number 400 wet-or-dry paper before doing anything else.

If you used pop rivets, it will be necessary to first fill the holes in the rivet stems. The FAA in this district doesn't object to the use of pop rivets, but they do require that they be properly sealed. If this is not done, water entering the holes soon rusts the steel mandrel and before long even the monel rivets begin to corrode. To seal the rivets, first put a drop of zinc chromate down each rivet to help make it corrosion and rust proof. The holes are then filled with a two-part epoxy auto body putty available at any auto supply store.

If you used flush pop rivets you might want to cover the rivet heads and a small adjacent area with the putty. Use a piece of hard rubber for applying the putty. Be sure to spread it thin. With a little practice you can make it smooth enough to require practically no sanding. After it sets up wet sand with #220 paper and a wooden block. Go over again with the putty until all recesses are filled. Care should be taken not to sand through the primer.

After filling is complete, spray two or three coats of auto primer-surfacer over the areas around rivet heads. Use the laquer type primer or it will take overnight to dry. It costs about $2. per quart and one quart is more than you need. It comes in red or grey. The grey is easiest to cover if you plan on using a light color paint. This primer wet sands nicely and permits you to really get a nice smooth surface.

After the surface is washed and dried wipe thoroughly with a clean cloth to remove all dust. Then go over all surfaces with a tack cloth. This is a specially treated cloth, available at a paint store, which is used to remove all specs of dust and lint. Now you are ready to spray on the paint.

There are two general types of paint to choose from, enamel or laquer. Enamel is generally more durable but it is much more difficult to apply and is nearly impossible to touch up without re-spraying an entire panel. Laquer dries very rapidly so isn't so likely to get blemishes due to dust. Enamel must be applied in a spray booth with exhaust ventilating fans and filters. Laquer can be applied almost anywhere. Laquer has the nice characteristic

that permits you to sand and polish out dust specs and runs or make patches without respraying an entire wing or fuselage..

You have a choice of three types of enamel. The regular auto enamel is of good quality and always available in case you need to match it in the future for repairs. Aircraft quality enamel dries faster and is therefore not quite as tricky to apply. Ford now uses an enamel which has the same qualities as laquer. This is what our local body shop recommends.

If you have no experience with spray painting, be prepared for some surprises. Unless you are an expert, don't choose a metalic paint. It looks great but is exceedingly difficult to apply. Also, be certain to buy exactly the same type reducer (thinner) as is specified on the paint can. The wrong thinner may cause curdling of the paint. I learned all of the above the hard way - after redoing the aluminum parts on my SkyCoupe at least four times.

If you get a run in enamel wait about a week and then sand it out right down to the bare metal. Then re-do the whole panel. Don't apply masking tape in less than a week or the enamel may pull off when removing the tape.

Choosing a paint scheme is always a big problem. The paint scheme will either make or break your airplane's appearance. You can have perfect workmanship but a lousy paint scheme can make the spectators turn up their noses. Here are some good general rules to follow.

1. Solid colors with no trim seldom are appealing.
2. Pin stripes make the scheme no matter what else you do. They are extra work but very eye-catching.
3. Don't clutter up the design with too many strips or it will look confusing.
4. The airplane is viewed most while sitting on the ground in that attitude.
5. Exhaust and oil streaks show up worst on a white fuselage bottom. Why not try a dark color there?
6. Lines intersecting or running through the numbers look confusing. Place numbers on a plain background. Break stripes and continue after the numbers.
7. Wrinkles in the skin show up less with white paint. Black is the worst.

Some ideas for paint schemes are included in the attached figures.

When applying masking tape before painting numbers or designs over existing coats, it is very important to rub the edge of the tape down very carefully. But, no matter how hard you rub, paint will still seep back under the tape. This can be prevented on a doped surface by first applying a little clear dope to seal the edges of the tape. With enamel this run-under can be alleviated in two ways. One way is to first spray on a light coat of the base paint to seal the tape. But then you must wait a long time for it to dry. Another way is to mist on a little enamel and let it get tacky. Don't make it a heavy enough coat to soak under the tape. Then when you put on a full cat it won't seep under. But, I haven't found a way to prevent it completely. So when you pull the tape off your carefully painted airplane, don't faint if there are many hairline projections of paint along what is supposed to be a straight edge.

If this does occur, don't despair. I've found a way to fix it up with only a little extra work. First you must pull off the tape at just the right time. Wait about 1 hour but not more than 2. The enamel should be dry enough so it won't smear but still slightly pliable. Extreme caution should be exercised in removing the tape or it will peal off the edges of the new paint. Don't pull straight out or cause the tape to bend through a large angle while removing it. The very best way is to grip the tape firmly and pull it as if you were trying to stretch it using a back and forth sideways motion and keeping your hand near the surface. This causes the tape to shear loose from the enamel and won't lift it.

Now after the tape is removed, remove any paint that seeped under the tape by scraping with a piece of plastic. Use a piece about 2" x 2" and 0.030" thick, With a little practice you can slide the plastic toward the paint line and scrape off any unwanted enamel. The loose enamel will look like a burr along the new paint border. Don't try to remove it. Several days later you can rub these burrs off with a wet cloth. The scraping operation won't mark the underneath layer of enamel if a flexible piece of plastic is used. Now you can see why you can't let the tape on until the next day. The paint would be too dry to remove.

If you get specs of dirt in your enamel, let them dry 30 days before trying to rub them out with rubbing compound. Some people are using the new acryllic paint which can be rubbed out like laquer. Anyone know if it will hold up like enamel?

Wing Ribs - It is amazing to see the great amount of trouble people will go to in order to keep from trying to make ribs, the simple way. There is nothing on the T-18 that is easier to make; you at least should have the courage to try. If you can't make all the ribs in a couple of evenings, then you didn't read and follow instructions.

Serial Numbers - Please! Please! always use your plans serial number when writing to me about anything. You can't imagine how many hours I spend leafing through the list of 600 builders looking for numbers. It is too much of a job to try to keep an alphabetical file up to date so please try to remember to write down your number on all correspondence. Also, always use ZIP codes. Our post office won't accept the Newsletters if they don't have a ZIP code. Many of you don't even know your ZIP when I ask for it over the phone. When you omit it I have to dig through another big directory to find it.

Remember if you write to me for something and don't get an answer within a reasonable time, don't get mad, just write again. It is easy to get an unanswered letter erroneously placed among the hundreds I have on file.

Bill Johnson - Bill added generous fillets at the wing fuselage junction and at the same time reduced the exit area of the cowling checks. He says these combined modifications increased speed 12 mph at 2200 rpm and 8 mph at 2600 rpm. The fairing started at the leading edge with no radius and built up to a 2" radius at the main spar. The radius remained constant to the trailing edge and faded away against the fuselage. The fairing was made of fiberglas and secured to fuselage with 12 pop rivets. Be sure to seal the flap-fuselage gap.

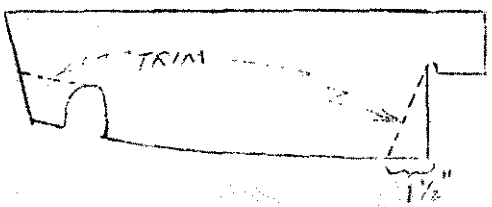
He has a constant speed prop with prop extension on a 160 hp engine. If there is enough interest, I can print his drawing of his prop extension. Top speed level flight is 189 mph with no wheel fairings. Cruise at 5000 ft., 2300 rpm, 22.5 inches MP is 168 mph TAS at 8.1 gal/hr. Maximum climbout corrected to sea level standard day is 2800 fpm. Pull-up from 200 mph gives 5,000 fpm for 2000 feet. Sounds exciting! When empty, his airplane needed something like 9 lbs force on the tail to keep it from nosing over. He added 15 lb of lead in the tail. With the 4-1/2 inch longer gear legs the wheels were moved back and the extra weight of the constant speed prop didn't help any. Bill is building a new wing and putting retractable gear on his bird. He also is designing a 4-place all-metal ship for a friend.

Newsletters - Due to a real push to get my T-18 in the air last year I published only 4 newsletters. But I was lucky at that since my wife claims I was away nearly as much as I was home. I had three rather long trips to Europe alone. Now that I've finally got the ole bird flying, I hope to put out Newsletters more often so send in your tips.

For you new builders' information, I put out the T-18 Newsletter on a somewhat irregular basis to pass on building tips, material sources etc. I have extra copies of the first 25 issues which you can obtain for $2. Also, I had reprints made of the T-18 building instructions that appeared in SPORT AVIATION which you can also obtain for $2. Future newsletters are also $2. Sounds like I should get rich but I don't keep any of this money. It all goes for publishing and mailing costs. In return I only request that you builders send in tips which might be of help to others. Many of your fellows who have your ships flying owe me some flight reports. I usually hear about first flights second-handed.

Rivets - John Thorp warned that AN rivets should not be returned to the completely soft condition by annealing but rather should be returned to the 17 S hardness or else thrown away.

Forward Tunnel - There are two modifications which should be made to the forward tunnel. First, the forward and aft edges should be cut off as shown to facilitate installation. The present design is nearly impossible to install after the fuel tank is installed - especially if you have any upholstery on the firewall and a shut-off valve under the tank. I trimmed mine off like this:



Second, the trim wheel robs precious space from an already narrow space for your legs. It could be put on the passenger's side of the tunnel or redesign for a center-tunnel mounting. After all, the pilot's seat will be occupied far more than the passenger's.

If I had it to do over, I'd also round off the forward tunnel as well as the aft tunnel.

Vacuum Regulators - If you plan to use vacuum driven gyro instruments, you will need a regulator. Spencer Aircraft, Dallas Avenue, Seattle, Wash. has about 10 of the nice small regulators (which ACI sells for $25.) These are $12.50 brand new. B&F, OakLawn, Ill. has eight of the larger regulators for $8. each. Those who act fast can get some real bargains.

The directional gyro and horizontal both require 4 inches of vacuum while the turn and bank uses 2 inches. These regulators regulate to 4 inches and have a bleed th ough an orifice to provide a 2-inch source also. All gyros can be driven by one regulator.

A directional gyro is a "must" instrument for cross country flying and is also an excellent safety instrument in case you accidentally get into a cloud. You can't get into a graveyard spiral if you use a DG. A turn-bank is a good emergency device since it can't tumble but you will rarely use it. If you choose to use only one, instal a DG. The best vacuum source is an engine-driven pump but they are very expensive. An externally mounted 4-inch venturi will slow up a T-18 6 or 7 mph according to John Thorp. Has anyone had success in mounting a 4" venturi inside the cowling? Turn-banks have been driven successfully with intake manifold pressure. Has anyone successfully driven a DG this way?

Canopy Lock - Don Carter has installed a key operated lock in the side of the fuselage just aft of the seat. It drives a plunger which engages a hole in the canopy frame. This location is convenient for it allows you to push forward on the rear edge of the canopy while turning the key and thus close it tightly.

Spinners - The plans specify that the spinner be heat treated to 6061-T4 condition. To minimize warping, heat treat before making the cut-outs. The

aft spinner bulkhead can be inserted to help prevent warping. Don't use cad plated screws, for this will cause embrittlement of the aluminum around the hole, according to my heat treat man. Aluminum rivets stuck in the holes will do the job.

Here is an easy way to fit your spinner.
1. Drill the six holes in the bulkheads for the prop attachment bolts. The most accurate way to do this is first make a drill fixture. 2. Cut prop clearance holes in spinner. To do this, first make cardboard template to fit your prop (they are all different). Then attach bulkheads and prop to prop extension. Cut and try until you have a nice fit leaving about 1/8 inch clearance. If you don't leave adequate clearance, the spinner may touch the prop and wear a groove in it. No need to mention the consequences of this. Note that the print has a screw hole directly under the trailing edge of the propeller. This requires a little projection of the spinner at this point. This little projection will cause you a great amount of headaches since it prevents the spinner from sliding straight over the prop. So cut it off. There is no need for it anyway. Just relocate the screw hole.

My front bulkhead wouldn't fit into the spinner quite far enough so I had to persuade it a little. I expect that all those obtained through John Tonzer have this problem. The center of the bulkhead had to be buldged forward about 1/8 inch. I sawed a hole, slightly smaller than the OD of the bulkhead, in a piece of 1/4" plywood. I placed the bulkhead over this hole and with a short piece of 2x4 placed across the center of the bulkhead, I hammered on the 2x4 until the desired amount of reforming was obtained. It really wasn't difficult, but it had me worried for a while. 3. Mark the spinner for the bulkhead attachment screws and drill #30 holes in spinner. 4. Draw a line around the forward bulkhead flange for screw location. 5. Slide spinner over prop and clamp to rear bulkhead flange with c clamps. Prop should be mounted on engine for this step. Erect a stick alongside the spinner so it nearly touches. With plugs out of engine, rotate prop to check for wobble of the spinner. It is important to first track the propeller so both blades pass a reference point within about 1/16 inch. 6. Adjust spinner for tracking and drill #30 holes in aft bulkhead for screws. Install cleces as you go. 7. Re-check tracking and drill screw holes in front bulkhead. Observe the pencil line on the front bulkhead to make sure it is aligned properly before drilling. With this technique, you can make sure that your spinner will track within a few thousanths of an inch. Obviously, if you have a dial indicator, you can use it. 8. Re-drill holes for #8 screws, remove bulkheads and install plate nuts.

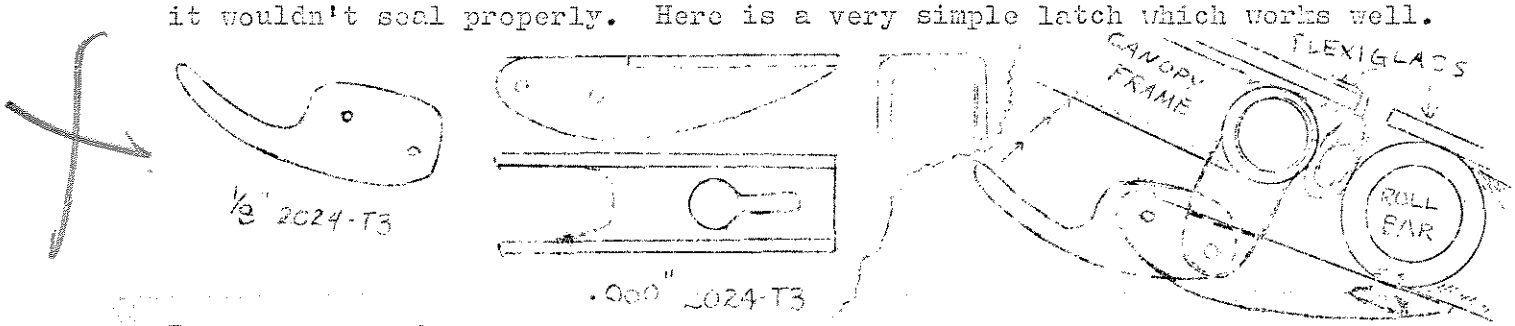
Lee Hamlyn used flush screws for attaching his spinner but the holes worked oversize and he nearly lost his spinner. Since then he installed a new spinner with non-flush screws and has had no further trouble.

You might want to refer to Newsletter No. 16 to see how Bob Kaergaard fitted his spinner.

Soundproofing - If you don't do anything else to sound-proof your airplane, I strongly recommend that you use aluminum sticky backed acoustic tape. This stuff is as expensive as pure gold but it is worth more than gold in sound isolation effectiveness. A layer of it on the firewall makes the firewall sound like a piece of rubber when you tap it. After you see how effective it is you will probably use it on all cockpit interior skin surfaces. A diagonal or X on each panel does wonders but a solid covering is needed on the firewall and floor at least. Any automotive finishers supply store has it in 3" x 20 yard rolls for $9. We priced it from the 3M factory for $50. per 6" x 60 yard roll. But here is good news. Aircraft Specialty Co., Box 404, Fullerton, Calif, has the same rolls surplus for only $12.50 each. This is enough for several airplanes so it is a real bargain.

Don't delay or you'll be sorry. A Bell engineer told me they had trouble with the large amount of sonic energy in the plane of the fans on the X-22 causing cracks in the structure. They found from one of their German engineers that the soundproofing they spray on VW firewalls is one of the most efficient materials known for this purpose. They tried this and had no more problems. Anyone know where to buy it? Polyurethane foam is light-weight and also does a good job. I'm not too impressed with fiberglass. With a 1 inch layer cemented on a panel of skin you can rub your hand over the outside of the skin and the sound seems just as loud as on a panel with no insulation. I think the fiberglass needs to be very fine and tightly packed to be effective. Any experts on this subject?

Someone told me that an expert from Cessna told him that much of the noise in light planes comes from air leaking out of the cabin. If you have been in a T-18 whose canopy seal leaked, you will probably agree. John says that a canopy latch is not needed because if everything fits right, the suction on the canopy should hold it forward and seal it. However, I think a latch is necessary. Ron Zimmerman had no latch on his at Rockford and it had to be held forward while accelerating down the runway and then in flight it wouldn't seal properly. Here is a very simple latch which works well.



The canopy needs a better seal along the bottom. Lift on the canopy causes the frame to deflect sufficiently to raise the neopreme seal up off the deck. This can be alleviated by making a finger shaped hold-down which engages a fitting on the rear of the canopy frame as the canopy is closed. I made a different type of canopy seal. I upholstered the rear deck beneath the canopy with a 1/2" layer of polyurethane foam covered with plastic upholstery material. At the periphery, where it touched the canopy I left a large bulk as shown on Page 9.
A 1/2" wide .025 strip is contact cemented inside the folded plastic. The upholstery is secured with pop rivets, through the deck and this strip. The canopy presses against the bulb and makes a good seal. I haven't found a good way to seal along the forward rails. Any ideas? This job is easier if the forward rails are flush with the forward corner of the aft deck or slightly higher. If they are slightly lower than the deck you are in trouble because the deck will interfere with any seal material you put on the canopy.

Does anyone know a good way to seal the flap control tube slots?

Aluminum Types - One of the most popular questions among T-18 builders is "Can I substitute Type X for Type Y aluminum called for on the plans?" In most cases the question can be answered by referring to a handbook on the strength of aluminum materials. In general, if the material under consideration is stronger than that specified, it can be substituted safely. In fact, this is about the only substitution rule John Thorp will endorse. Certain parts are designed, however, with stiffness rather than strength being the limiting factor. Since 6061 and 2024 have the same modulus of elasticity, John said it is alright to use 6061 for the engine mount ring, but this is the only case he has permitted.

A number of questions arise about the various hardness numbers, like if T4 can be used instead of T6. My heat treat friend tells me that T4 eventually ends up at T6 anyway with sageing so it doesn't make much

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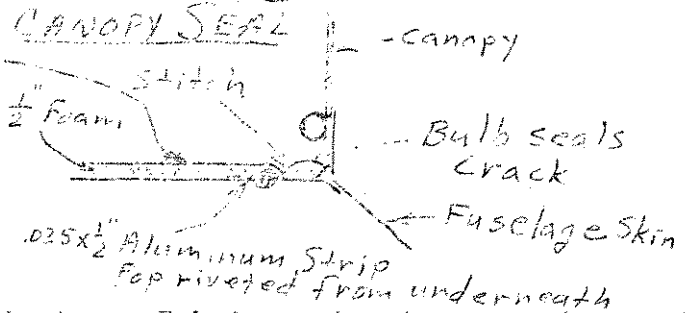
difference. The various numbers like 2024 T375 which indicate that they were work hardened are ok also. Make sure you don't substitute 6061 in such places as main spar caps, horizontal tail spar, or main spar fittings for this could cause serious problems.

Type	Yield	Ultimate
5052-O	25,000	
2014-T6	55,000	63,000
2024-T3	42,000	64,000
2024-T6	50,000	64,000
6061-T4	16,000	30,000
6061-T6	35,000	42,000
7075-T6	60,000	77,000



Visit with Bob Hammer, Bellevue, Washington - Bob is a structures engineer at Boeing having worked on many of the Boeing airplanes including the 747 and SST, developing advanced structures. His latest job is project engineer on the development of techniques which would permit the building of a rivetless airplane - a light weight version of the 747, if you can imagine such a thing. He assures me it won't be another BD. His T-18 is quite standard except that his gear is tapered and split in the middle like mine. He used monel pop rivets throughout and also used an epoxy adhesive on all joints. Bob ran quite extensive pull tests on simple riveted lap joints and found that with .025 material the base metal always failed before the rivet. The base metal failed sooner with pop rivets than with AN's in this type of test which is more of a tension test than shear since the joint twists under load. With the bonded pop riveted joint, the entire test strip failed but the rivet remained in place. Bob does not contend that pop rivets are not strong enough alone, he just feels that the bonding gives him something extra. (I forgot to ask him how he would get the joints apart if he needed to make repairs - a not too inappropriate question considering the number of T-18's getting bent these days.)

Bob has one of the new one-peice vacuum formed canopies and it looked real fine.

He is designing a wing spar fabricated from bent-up sheet bonded and riveted togehter in place of extrusions. The rivets are used to apply clamping pressure during curing.

Red Line - John Thorp has temporarily reduced the red-line speed to 180 until a recent accident has been investigated. In a 180 hp T-18 which had been previously operating at a gorss weight as high as 1800 lbs and observed to exceed the 228 redline, the horizontal tail spar tube failed at the inboard rib. There was no evidence of a reversal of stresses as in the case of flutter. There may have been a cause unrelated to the aircraft design, but John is having a very expensive analysis run on the T-18 tail and says that a new tail design may result. The tail is ok for the 125 hp models but he does recommend drilling out the 1/8" rivets in the 509 and 510 fittings and replacing with 5/32 stainless, monel or cad plated steel pop rivets. If you haven't built your tail you should hold up until the plans are revised.

John strongly recommends no extensive modifications to the T-18, substitution of materials or use of higher than 180 hp engines.

Spring Steel Landing Gear Drawings: Ron Zimmerman now has the drawings completed for the landing gear used on his T-18 #117-M18117 as seen at the 1967 Rockford Fly-In. The main gear uses a special shortened "A" frame into which round tapered spring steel legs (Talwind type) plug in. It is 100% interchangeable with the #515 gear so the installation hardware and engine mount require no change. The tail gear again uses a round tapered

steel spring which extends the wheel more than 7 inches farther back. The drawings are now available for $8. postpaid USA for both the main and tail gear from ZENCO Plastics, 7714 Colfax Ave. So., Minneapolis, Minn., 55423. The cost of building this gear will be higher than the $515 gear but the end result will be worth it. If you expect your gross weight to exceed 1450-1475 lbs larger diameter springs could be used. This would requir different mounting hardware and a modification of the engine mount. Ron can mark the changes necessary on the drawing for those wanting to use the larger spring if they indicate their desire on their order.

Ron Zimmerman - "I am still furnishing prop extensions with drive lugs for $60. which includes Zyglo inspection (as before) and postage USA. As of this date I have four regular and 1 shot-peened ($75.) ready to be shipped. In the future I will not try to keep shot-peened extensions "on the shelf". I will attempt to keep ahead of the regular ones.

"I can also modify the extension to fit the 180 hp Lyc. as I did for John Thorp's personal T-18 and Lyle Fleming's T-18. This modification cost is $15. extra. Shot-peen for either kind is $15. extra. When it is necessary to reanodize after modifying or shot-peen an extra $5. will be charged.

Rudder Hinge Stock - Allan Lurie, Peoria High School, 1615 W. North St., Peoria, Ill., 61604 has eight pieces of rudder hinge angle for $1. each.

New Canopies - I would like to announce in your T-18 Newsletter a new source of T-18 canopies and windshields (From Glen L. Breitsprecher, 18415 2nd Ave. So., Seattle, Wash., 98148, Phone 206 CHerry 2-0322) - I've spent the last eleven months developing and testing, and we're finally ready to produce. I vacuum-form the canopy into a female mold; mine is pulled completely into the mold, using a forming grease to prevent mark-off. My canopies are exactly per John Thorp's loft lines as I could possibly make. The optics are excellemtn, as good or better than a free-blown bubble. Bob Hammer has the first canopy fitted to his T-18 and said it fits perfectly. I will produce windshields and canopies in colorless (clear) or green or gray tinted. The price list is as follows:

Canopy and windshield (untrimmed) Plexiglas green 2111 or Plexiglass gray 2064 - $135., Canopy only (untrimmed) - $120., Canopy and windshield (untrimmed) Plexiglas colorless (clear) - $130., Canopy only (untrimmed) - $115., Shipping - Annealing box (no return) - $13.50. All prices are F.O.B., Seattle, Wash. Make Checks or money orders payable to: Gee Bee at the above address.

Ron Zimmerman, 1915 McKinley St. N.E., Minneapolis, Minn. 55418 - "Last October my T-18 was damaged while attempting an unscheduled landing on a road. The cause developed from poor judgment by the pilot followed by an electrical equipment failure. I was demonstrating the gliding characteristics to my passenger. An attempt was made to restart the engine with the starter. It turned through two compression strokes and ceased responding. When I realized the starter was hopeless (later found a poor connection inside the non-aircraft battery) I droped the nose to gain speed for an airstart. I was a little shy of enough speed when I ran out of sky.

I lined up with a road below without any traffic. Just before touching down the landing gear caught some unseen power lines. The contact with the wires was very gentle and I didn't feel any stall.

The plane hit the ground just off the road with the wings level and about 5 degrees nose down. I estimate the speed at 50 mph. The main gear spring steel legs (tailwind type) bent back to where the wheels dented the wing skin and bent one nose rib. Teh tail came up as the plane bounced once, overturned, and came to a stop. Personal injury was taken care of with one Band-aid -- Thanks to luck and SHOULDER HARNESSES.

Most of the damage (and expense) was done from stopping bottom side up. The windshield, canopy and frame, fin, rudder were totaled. The fiberglas cowl and wing tips were broken. The wing now has two new rear spars, three nose and 1 center ribs, all new skin, and a repair on one outter main spar. The damage to the fuselage can be described as "widely scattered minor damage".

I used an aluminum windshield frame and it worked real good keeping our heads off the ground and in place (thank you Rudy Adler). Its slight bends have been straightened and will be used again.

The spring steel landing gear legs were annealed, straightened and re-hardened. The modified "A" frame was OK except one spring socket hole was stretched a few thousandths out of round. All L.G. parts passed Magnaflux inspection and will be used again. I am very satisfied with this L.G.

My T-18 was 95% pop riveted (monel). A few AD rivets sheared off but NOT ONE POP RIVET FAILED. Some pop rivets pulled out but because other parts ripped, broke, or pulled off. I am putting things back together with "pops".

Wing skins were duplicated by flattening the L.E. radius and removing a few wrinkles from the "old" skins.

This incident proved to me (the hard way) that the T-18 is a very tough design. The only thing wrong with it is it is so good that one can become overconfident.

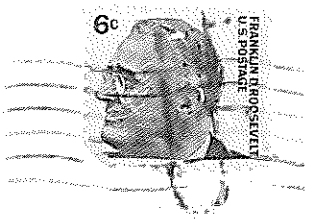
I should have it flying again this summer. Changes include relocated and larger cowl flaps, wing landing lights, and possibly Hoernier Type wing tips (sharp edge).

Suggestions for using pop rivets -before original assembly of my T-18 John Foy recommended to dip the pop rivets into zinc chromate primer just before squeezing to reduce the possibility of electrolysis between dissimilar metals. This alone might be worth the effort but there are added benefits. If removal of the rivet is necessary the chromate tends to keep the rivet from spinning while drilling out. Even more important the wet chromate lubricates the mandrel so the rivet pulls up tighter before the mandrel "pops". Be sure to wipe off any excess chromate on the outside before it dries. The hole diameters should be kept within the rivet mfg. tolerances (.128-.132"). Pops can't expand to fill an oversize or untrue hole like a driven solid aluminum rivet can. It has been my experience that dimpling a 1/8" hole in .025 sheet results in a hole diameter of about .140". All holes I used flush head "MR" rivets started out 3/32" diameter. They were then dimpled and reamed on assembly to .128" diameter."

Templates - A complete set of skin templates for the entire airplane have now been made from John Thorp's originals. These will be sent to me shortly. The fuselage templates will be at Howard Warren's address at 4302 Estabrook., Flint, Michigan, 48506 until mid-April. Then they will be at Robert L. Nevarra's, 530 S. Lincoln Dr., Parkridge, Ill., 60068. From there to Harry E. Rantser, 126 Robin Lane, Huntsville, Ala., 35802. If you want to use the templates and live nearby you could probably use them when they are in these locations.

More on flight test experiences next month.

Note From The Secretary: You should see his T-18 go - it is really a bute!



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