

OSHKOSH - 1970 - Everyone who attended the Fly-In at Oshkosh seemed to have the usual good time and was amazed that such an involved event could be moved to a new location so smoothly. There were 13 T-18's there this year belonging to: John Wallace; Springer Jones, Ed Baker, Jim Reed, Atlanta Chapter, Ron Zimmerman, Larry Larcom, Dick Walen, Al Neunteuffel, Tom Miller, Lionel Ribodezux, Bernard Thalman, and Bob Goodwin. I managed to cut my camping trip to California short and spend a few days at Oshkosh but without my T-18. John Therp was unable to attend and asked me to hold the engine and T-18 forums.

This year's crop of T-18's brought some interesting variations. John Wallace had the first of the highly modified version being built by the Tiger Club from Lockheed, Marietta, Georgia. He says there are about seven more in that group still actively working on their projects. John got started just two years ago after all the changes had been made. He certainly built his airplane in short order but didn't cut any corners for it has excellent workmanship. The most outstanding feature about it is that it is undoubtedly the quietest T-18 I've flown. I attribute this to the shape of the canopy, although it is just a guess. He has the firewall and floorboards well insulated so engine and exhaust noises are almost undistinguishable, but there just isn't any of the usual rushing air noise around the canopy. Many of the T-18's at Oshkosh had canopies so well sealed that I nearly roasted, but none was as quiet as this. The canopy and windshield are a free-blown bubble without the flat area in the middle. I don't necessarily prefer the bubble because it cuts down on valuable head room on the sides, but it sure is quiet. The aft deck under the canopy was also modified making it parallel with the waterlines and with a hole giving baggage compartment access from the top somewhat like mine.

The fuselage forward of the wing had the lower corners rounded off. A smaller diameter spinner was used with a new shaped cowling. Wing tips were the droop type. He said he thought the tips improved low speed aileron control but he had no direct comparison since he hadn't flown in another T-18. When I flew in it I slowed it down to stall speed and, sure enough, it did have good aileron control through stall. Of course, the standard model also had good control except in the ones which drop off on one wing so it is hard to say how much difference there really is. With a 150 hp engine, it would only indicate 170 mph, which is less than my 125 will do, so there is no way to tell whether the tips help speed or not. John and his wife are justifiably proud of their airplane and use it extensively for cross country flying.

The Atlanta EAA Chapter had a tricycle gear T-18 there with a totally different canopy. I didn't get to talk with the pilot and didn't see it fly so could only inspect it externally. The two main gear legs were of tapered round spring steel which came out at the forward corners of the fuselage where the standard gear comes out, but at a much different (swept back) angle. They were quite long. Couldn't see how the nose gear was anchored. The cockpit was partly covered and had side doors somewhat like an Emerald. How about a report fellows?

Jim Reed had pictures of the propeller blade failure which caused the accident in Maryland. He said that the prop had been sent back to Sensewich once for straightening and then, after being bent a second time, had been straightened over a car bumper. For this reason, it would be difficult to draw meaningful conclusions from the incident.

Dick Whalen won the Russ Basye Memorial Award with his 135 hp model. It was completely flush riveted and the rivets were filled so well you couldn't tell where they were. He claimed the fastest speed for under 180 hp but hadn't calibrated his airspeed, 190 mph max indicated in hot weather and near 200 in cold weather. We went up and checked the airspeed over six miles of section lines, both directions. While indicating 180 we averaged 176, so it was fairly

close. He has a 68 x 70 prop from a 76 EMM blank. It will get 2800 rpm max. He has a Ratray cowling with exit on the bottom and closed sides. Its shape gave sufficient pitch-up moment to require changing the linkage in the trim system. He is now replacing his cowling with one which exits on the sides.

Bob Goodwin found a way to keep his canopy down tight. He ran a large tube from the deck under canopy to an outlet under the fuselage. This sucks air out of the cockpit and he says it keeps the canopy down in back. He suggests we publish a list of do's and don'ts for builders and is going to send in a list for a starter. For instance, he bought a 180 hp engine with oil cooler and one impulse mag with a dynafocal engine mount. "Do plan to use a manifold pressure gauge and do plan to get checked out properly or have someone else test fly your T-18." On his 180 he can get 205 mph maximum.

Bernard Thalman says he moved his wheels forward and downward with extender blocks which work out well.

After riding in a number of T-18's, I can give some pointers which might be of help.

Noise level varies greatly from one to another. Those with only a rug on the floorboards had the greatest amount of exhaust noise. Pack in lots of insulation and use an extra floorboard of light weight material. I used 1/4" Philippine mahogany. Firewall insulation is next in importance. Use tape on the firewall, then insulation and upholstery. Don't leave any holes for noise to get through. A tight canopy seal makes for low noise from air movement. Nearly everybody had a good seal, but this makes other problems.

No one seems to have solved the problem of getting a good supply of fresh air. I never realized how serious this problem was since my canopy leaks enough to make my cabin comfortable even in summer. But when I rode in others with a good seal, I found how uncomfortable it could be. So, put in a good fresh air source with vents which direct the air near the passengers' faces. DON'T bring cool air through the engine compartment for it turns out to be hot air by the time it passes through the ducts. Callibie Wood just cut a hole in the center bottom windshield and put in a little door type vent. Don't expect to get air on the fuselage sides because of the engine cooling exits. I haven't seen a real good arrangement yet.

Those with radio slung under the panel are almost impossible for me to ride in even as a passenger unless the stick is removed. On some, I couldn't move the stick toward the center of the airplane even one degree with my knee in the way. I'm 6' 3" so my knees just barely clear the bottom of the panel. A short person has no problem for his legs stretch out down low. If you expect to have anything but short passengers, don't hang anything under the panel.

My other big problem is with the tunnel. Unless I remove my wallet from my hip pocket, I hang up on the tunnel and can't even slide down far enough to touch the seat, and it's not because I have a fat wallet since it usually contains little more than some T-18 pictures. With the tunnel rounded off it is much more comfortable.

Over-the-nose visibility varies quite a bit. The worst ones are those with free blown canopies which don't conform to the plans and cut off head room. Then, even with a standard canopy, if the seat isn't high enough, I can't see over the instrument panel without stretching my neck. This is why I like the extra 3/4" on the windshield frame. With this, the T-18 has more than ample forward visibility.

ENGINE FORUM - The engine forum had as participants Lock York, Aircraft Sales Manager for Continental Motors; Dick Scheffler, Regional Service Manager for Continental; Dick White, Franklin Sales and Service, and I acted as Moderator.

Mr. York first gave a description of the new Tierra series of engines and how a manufacturer goes about certificating an engine. In case anyone was wondering why EAA hasn't developed a line of engines for the homebuilder, this new series is costing Continental about 25 million dollars. They won't be out until next year. The object of producing the new engine is to improve the horsepower to weight ratio and reduce costs. It has a 2 to 1 gear reduction to the propeller shaft, giving attendant benefits to both propeller and engine efficiency. It is particularly smooth running. Geared engines are normally rough in torsion, but the Tierra engines have eliminated the need for torsional dampers through the use of a quill shaft drive. It has a hydraulic drive coupling for high speeds and it locks up for low speed operation. Tension bolts hold the cylinder heads to the cylinders. They tried to design a standard exhaust system but the first seven applications took seven different exhaust systems. Heads are common for all engines and cylinders are interchangeable. It uses a new Bendix 4-pole magneto due to the high crankshaft speeds. The 4-pole mag turns at only half the speed of a 2-pole mag. The number of cold starts has a far greater effect on engine life than does engine speed. The worst possible service is a ten minute run once a week.

Automobile engines get much easier treatment than do aircraft engines. An auto engine spends its average life at only 3% power while an aircraft engine runs at 75% power. A Cadillac running at 75% power would be travelling 128 mph. A 125,000 mile Cadillac would have wear and tear comparable to a Bonanza with 1000 hours. Red line is not critical on the O-200 engine. At one time they thought 3100 rpm was max. due to valve float but it was raced at 3800 rpm with no problems.

The oil companies are planning to discontinue 80 octane gasoline soon and supply only the 100 octane lead free type. Shell claims it won't hurt any engine. Continental now has an O-320 under test to determine if there are any detrimental affects other than cost. They warn that you should not advance the spark any with 100 octane. On automotive gasolines, here is the straight scoop. The problem with using automotive gasoline in airplanes is that aviation fuel vaporizes at no greater than seven pounds per square inch pressure whereas some automotive gasolines can vaporize at as high as 18 psi. They must have to use that along the Dead Sea since sea level pressure is 14.7 psi. Anyway, that is the explanation Lock York gave.

Dick Scheffler gave answers to the most frequently asked questions. If you have any question about overhaul manuals, parts manuals, etc., write to Continental Motors, for their free list of publications.

Can an alternator be substituted for a generator? Yes, an alternator is lighter and can be used on any engine down to the C-75. The Mooney Mite even used a generator on the C-65.

All pal nuts can be left off cylinder hold down bolts. Nuts will never come off under vibration without them.

Scores at top of cylinders are cold start scores. They result from no oil at the top of the piston. Don't run an engine at 1800 rpm right away after starting. The cylinder becomes distorted at first due to the top being hotter. They are ground with the top smaller, to compensate for the temperature gradient. Until the engine becomes heated, the top ring might break due to the ring motion from cylinder taper. (Cont. in next issue.)

PERFORMANCE ON 135 hp - (#336) - Dick Walen, 2719 1/2 Powhattan, Toledo, Ohio,
A3606 - I don't have too much to report about so I'll try and relate some performance figures and statistics about my last long cross country. From Toledo Express Airport non-stop to Fulton Airport (New York) = 435 miles in 2 hr. & 15 min = 193 mph GS and 19.3 gal. Return trip, Fulton, NY to National Airport, Toledo = 411 miles in 2 hr., 45 min = 149 mph GS and 23.6 gal. Total trip = 846 miles in

#336 PERFORMANCE cont.

5 hr. = 169 MPH both ways and 8.6 gal per hour at 2450 = 19.7 miles per gallon. All that on 135 hp. I sure am pleased.

George Rattray and I are working on a new streamlined cowl which should prove to be a little cleaner than the one I have now. It will have side outlets for air exhaust. We can clean up and flatten the belly of the cowl. I'm looking for a DM hub prop which is about 10 pounds lighter than mine and I want to go to about 72" or 74" of pitch. Most of my flying is cross-country and I think I can use the extra pitch. Now I can turn 2750 with 70" pitch in the hot summer and 2800 in the winter. I will sacrifice my climb but I think it's worth it don't you? Still haven't got my oil problem solved yet. I think my separator from the vacuum pump is the culprit. Will run the line through the gear fairing and exhaust it at the wheel. I'm getting tired of scrubbing the oil off the belly. Have 75 hours on her now and my landings are getting better - still a bounce now and then though. If I can help any fellow T-18 builder locally - Ohio, Michigan area, let me know. Be happy to fly in and give a ride on weekends.

BELT AND SUSPENDERS - Many homebuilders seem to follow the same philosophy as the guy who wore both belt and suspenders to be double safe. They feel that if they can make a part stronger than is called for on the plans, they'll do it. It is most discouraging to see the results of this practice. I first ran into this when I built the Sky Coupe. The fellow who helped make the fiberglass nose piece put four layers of cloth in it instead of the two that I had requested. I asked why and he said, "To make it stronger". This would no doubt be quite helpful if you planned to run into a lot of brick walls but it sure didn't help the rate-of-climb any. It seems that almost every modification anyone makes to a T-18 part is in this category.

Tonight I inspected a T-18 which had recently changed hands. The parts were 90% complete and assembly was 50% complete. The original builder had worked for about 7 years and finally got discouraged and sold out. It was clear what had happened to discourage the builder. Most was a result of not following plans or building instructions. Here are some examples. Large gussets were added to the bottom corners of all fuselage frames. Then large amounts of epoxy were poured around each frame corner. The frame back of the seat was made with a 2" wide flange all around. The supports under the aft canopy rails were made to extend completely between two frames and had 1" wide flanges. The frame back of the baggage compartment had a solid piece of .025 riveted across it with a jillion pop rivets, completely closing off access to the aft fuselage. A number of 1"x 1" angles were riveted to this sheet and around the baggage compartment for supports and stiffeners. It seems I've spent more hours inside my tail than in the cockpit - looking for pitot leaks, troubleshooting omni co-ax cable, replacing tail springs, etc, so it certainly can't be sealed off.

An angle was hung from the seat to the tail down the middle of the fuselage to support the pitot static tubes. An aluminum sheet cradle had been riveted between the fuel tank supports. Heavy coil spring seat frames had been built up from automotive parts. Without upholstery the back was about 4" thick. In addition to the heavy steel bottom seat frame, underneath it was a 3/4" plywood bottom. An A-frame for Zimmerman type main gear had been arc welded (strictly illegal) and the welds had been built up by successive re-welds until the bead was as much as 1" wide. The fuselage had been flush riveted with a mixture of pop and AN rivets. There were a number of oversize brazier head pop rivets around the top firewall flange. All rivet holes had been drilled and dimpled undersize to be drilled out later. This is a good safe procedure to prevent cracks, but it sure causes a lot of extra work and it is not necessary.

Don't ever reuse piston rings once the cylinders have been removed because the rings will never return to the exact original position, no matter how few hours they have on them. New rings will seat only if the cylinder walls have had the glaze well broken and non-detergent oil, and no STP, are used for the first 25 hours. Never remove top spark plugs unless the piston is at top dead center, on the compression stroke. Cracked loose carbon may otherwise get under a valve seat, later burn itself fast and bye-bye valve. This advice was learned the hard way, through experience, so take all of it seriously.

If you are lucky enough to find a GPU, thoroughly overhaul it, treat it right, and enjoy many happy hours of flying.

BILL JOHNSON'S PROGRESS - I just had a visit with Bill Johnson and saw the parts for his retractable gear modification. It is coming along slowly, as anyone who has tried this type of project will tell you. Of course, Bill has the usual amount of distractions for he is also building a cottage on the seashore. The fuselage is now completed except for the fairing around the wheels. The castings which pivot the main gear legs are machined and attached to the main spars. He is now adding all the little stiffeners and gussets to the center section to transmit the very high torsion stresses caused by the far forward location of the wheels. To see the angle the gear leg makes with the ground, draw a line from a point about two inches forward of the center of the main spar to the center of the axle. The wheels need to be this far forward to keep the aircraft from nosing over on the ground. The legs are made of the same tubing as the standard gear with a 1.25" tube inside a 1.5" tube. He hopes the bending of the leg will give adequate softness and thus does not use oleos. He intends to sell plans and the two main gear castings after the design is flight tested.

PEDRO (PETE) D. GONZALEZ (#380), 1318 Server Dr., Colo. Springs, Colo. 80910 - Tail sections, wings, and fuselage FAA approved. Need to close up stabilator on ends plus vibration mods. Have new spar installed. Fiberglass fuel tank and instrument panel completed. Nothing ahead of the firewall except purchased gear. Have 125 Lyc from a Tripacer, but will disassemble and balance and overhaul before using. Have wheels and brake assembly from a Colt which may be slightly heavy but will allow rough field landings. Axle presents a problem due to its larger diameter which will make it hard to bolt to the purchased gear. Will think on a solution later when it's time to put gear on. Am now installing a new Omni antenna and the wiring in the fuselage so I can close it up. I have a Cardinal Lyc 150 prop cut and twisted to 67 dia, 67 pitch. A friend, Col. Rick Loeffler, is using it on his Pazmany which is on temporary airworthiness. He has a 290 GPU and is getting 133 mph TAS at 8,000'. Field elev. at Meadow Lake is 6880 feet and he has no trouble getting airborne with himself and a 185 lb.-me-essential crew member.

There was some trouble with the trim for the servo-tab due to the unavailability of a satisfactory cable for the bends. Any cable I used would unravel somewhat in one direction. I discovered that a heavy duty truck speedometer cable of .177 dia. worked very satisfactory, not only for the sharp bends but to carry all the way from the cockpit to the rear to bulkhead A-576. This speedometer cable has the advantage of having each twist opposite to the preceding, therefore having no tendency to unravel. Using this cable, I was able to do away with terminal 719 by using a piece of 1/4" 4130 tubing drilled out with a 3/16 bit which allowed the cable to slip in nicely for swaging while the OD of the tubing fit the 715-2 and 715-3 fittings exactly which minimized the lathe work. I also drilled a 1/4" hole in tunnel 505 directly above the roll pin on front of the 715-3 fitting which allowed easy removal of the pin for removing the A-504 tunnel when access to the rudder cables at front is desired. The speedometer cable was purchased from the local International Harvester Truck Store at retail of 75 cents /foot. I

purchased mine wholesale for 58 cents /foot. I didn't like the sag of this cable between bulkheads so I purchased some low pressure 3/8" dia nylon fuel line and used it for a housing from the rear of the tunnel 505 to the support bracket on bulkhead 574 (actually about 6 inches past bulkhead 574). Ten feet of this purchased at the local plastics outlet at 39 cents /foot was sufficient. NOTE: 13' of the .177 speedometer cable sufficed for my needs. Another possible tip. I had difficulty placing and removing the bolts that bolt the main spar to the bulkhead at station 70.0 so I drilled 1" holes in station 76.5 bulkhead so that a wrench, socket and extension, could reach across to the bolt from under the seat - after removing the seat, of course.

BERNARD J. THALMAN (#86) - 2912 Old Glenview Rd., Wilmette, Ill., 60091 - No. 86 flew open cockpit in 1968 for some 60 hours until it got too cold in November. I then brought it home complete with ten field mice, (those recessed tie-downs are great for mice.) to do a little work on it. The little work has only taken two years. It included installing a canopy (IAS without was 135), wheel pants (I'm tired of washing the mud off), cowling replaced, tip lights added, rear deck cut down, new seats, electric trim, radio, etc., etc. I hope to have it back in the air soon, just a little painting left.

PAINTING TIP: For nice sharp lines use 3M low tack tape ("Paklon" Flim Tape 682), sign painters use it and it's great. No need to spray a coat of clear as with masking tape.

The first trouble I ran into with the T-18 was the engine as the engine would go sour as the fuel got low or the speed increased. It turned out that the fuel tank vent was not turned into the airstream enough to pressure the tank. Same trouble as listed in an old Newsletter. I built the regular landing gear as per prints and found ground handling very nice, but I didn't heat treat the gear and after one 5G landing the gear spread 1". It has since been pulled back into shape with a Blachawk tool and heat treated in Chicago. Cost- \$28.

My electric trim is nothing more than a Grimes light motor mounted on the second last bulkhead with a flat plate of .090 and the flex shaft moved to the motor spur gear. A fuel gauge sending unit and gauge act as a trim indicator. Idiot lights were installed on the oil and gen. It's one sure way of not leaving a master switch on.

PLEXIGLASS DRILLING - B.C. Roemer, Manitowish Waters, Wisc., 54545 - After reading all I could find on plexiglass, I didn't see how to drill holes easy and safely. I sharpened drills all different ways, but had little success of keeping them from "grabbing". I tried working through many size drills to get to 1/2" and find that if you stay too close to the last size, you're apt to be in real trouble with the "grabbing" thing. Here is the way to go: (1) Mask both sides of the hole line. (2) Lay out holes. (3) Heat the tip of a prick punch hot and hand push it into plexiglass to form a drill starting mark. (4) Drill 1/8" holes with regular drill using a very slow speed (use variable speed drill). Back the piece with wood -- flat on flat, radius on curved. Always drill from outside inward on a curved part. (5) Enlarge the hole to 1/4" using slow speed and regular drill also backed as before. (6) Use a 3-flute, 1/2" counter bore with 1/4" pilot, slow speed and backed as before and you're done. The 3-flute won't grab and it's a scraping type cut. The backing wood must have a 1/4" pilot hole in it when using the counter bore.

I was very unhappy with the prop from Anderson. They sent it UPS and it was all marked up -- trailing edges nicked and had to be refinished. The rub? Well, you must send cash in advance and Anderson only insured it for \$50 with UPS. I demanded a new prop but they just refinished the beat one. Moral of story -- be sure to have supplies insured for full value especially when you send money in advance.

The building tip concerning heat treating spinners -- you said to leave the rear bulk head in when heat treating to minimize warpage of shell. Surprise! rear bulkhead warped so bad I had to scrap it. EDITOR'S NOTE: Sorry about that-- mine didn't. Pershing Larson does it for you now. So does John Tonzer.

PROPELLER REINFORCEMENT - Figure 1 shows my design for a prop flange reinforcement. John Thorp has designed one made from 1/2" plate and without the two 1/4" clamping bolts. It is .125" thick, Rudy Adler has been flying one like that for a month. John thinks mine is a bit difficult to make and doesn't like the fact that it must be installed after the front seal. But, having had one fail, I think this is a small penalty for the added safety.

Well, the space is about all gone so I'll have to sign off for this time. Our auto trip to California in July was just tremendous - the scenery was great, the many T-18's I flew even greater, but best of all were the many very fine builders I met. I've decided that all T-18 builders are the very finest people in the world. I'll have more on my trip in future newsletters.

Thanks for returning your questionnaire, for the generous contributions and the many nice comments about the Newsletter. Now, quit reading and get em FLYING!!!



