Like Mark Twain once said, "The reports of my demise are greatly exaggerated" so if you thought I might be in that category because it had been so long since the last newsletter was mailed, surprise! Not that I haven't had the very best of intentions. 'Course with good intentions and a buck you can probably get a cup of coffee anywhere. If you are a reader of EAA's magazines you probably can guess why I am running behind. Most of the time since last December it has been a full time job, 8 hours a day and at least 6 days a week and has involved a considerable amount of out of town traveling. I have have cranked out some 50 stories in the past 11 months, not all of them published as yet. We have to stay well ahead of the game for those issues that need "fill" articles that aren't especially time sensitive.

If you are not already a subscriber to EAA's companion magazines, The Lightplane World and The Vintage Airplane, I would highly recommend you add one or both to your regular EAA membership. The Lightplane World was formerly EAA's Ultralight magazine, but with the flying lawn chairs rapidly fading out of the picture the coverage in turn is oriented toward proper little airplanes and soon will be featuring airplanes the size of the T-18. As a matter of fact, I'm preparing articles for a regular series that will be very similar to the "Tinbenders Corner" that was a monthly feature back in the '50s and early '60s. I'm also working on the story of the T-18, from its beginning in '62 up to the present time. It probably will be in Sport Aviation and will be several months down the line. This coming weekend I'll be going up to Snyder, OK, on an assignment on a radically new type of 2 cycle engine that MIGHT be the biggest aviation story in the past year. IT might be the best news we've had in aviation for decades. The prototype weighs only 44 lbs and puts out 85 hp and has a SFC of .35 lbs/hr, has far less moving parts than ordinary engines and is FAR cheaper to build. They are in the process of building a 300 hp one that will weight about 1/2 lb per hp. Stay tuned for this story!

The following story is from Peter Beck and is one that will get your full attention, I believe:

Dear Dick:

I promised I would provide a writeup on my inflight canopy incedent.

First, T-18 102PB has been flying with its present canopy since 1980 - about 300 hours. Installation was standard, except that there were two pins screwed into the steel roll bar just above the canopy rails, that protruded backward, parallel to the rails, and inserted into holes in the canopy frame. These took all the vertical loads of the canopy and left no upward pull on the canopy rails. The latches were two, not very sophisticated over-center type locks mounted on the canopy frame, low on each side, and had a curved finger that extended around the roll bar to keep the canopy closed. The rear mounting was standard - rails mounted on the turtle deck per Thorp drawings.

CANOPY TROUBLE

I do not know how the canopy broke loose - whether one of the latches slipped, or what - but during letdown at about 6000 feet and 165 indicated, 15 miles out from the field, the canopy simply tore loose from the plane and disappeared. The separation was instantaneous - the canopy did not twist or hang on anything as it departed - accompanied by a muffled explosion from the sudden rush of air entering the cockpit. As soon as I realized what had happened, I was concerned for what the canopy may have hit on the tail as it ripped off. Apparently nothing, since the plane was totally under control. I slowed to 100 mph immediately - not hard to do with the new source of drag. At that speed, controllability felt good, although the plane was considerably less responsive to normal power inputs. The turbulence over the fin and the rudder were very noticeable through vibration in the rudder pedals, although

the vibration did not have the regularity or buzz of incipient flutter. There was no noticeable turbulence over the stabilizer. What was remarkable was that not a single map , piece of paper or anything else in the cockpit blew out or was lost. And as long as I stayed behind the windshield, still locked in the shoulder harness, I never had the feeling that either my headset or glasses were going to get snatched by the wind. Approach and landing were normal except for higher rate of sink.

Once parked on the ground, I was able to look over the entire ship. I found that the rear crossbar of the canopy frame, the bar that carries the rear set of rollers and rides on the canopy rails, was still attached. The ends of this piece had ripped from the rest of the canopy frame at a point about 1.5 inches outside the rails. Both ends showed evidence of a single violent twist and tear upwards. The canopy rails were not distorted in any way, and there was no buckling of the turtle deck. There were no marks anywhere on the airframe, indicating that the canopy went straight up and blew free of the tail. Good thing my ejection seat wasn't armed! The front canopy rails were distorted at the front end, where the canopy had pulled straight up on them - the roller bearings had escaped off the inside lip of the rails.The vertical load pins I mentioned were still in place. These are about half an inch long. Virtually no other damage was visible.

I never even tried to locate the canopy fluttering down. We were over the Shenandoah National Forest, and they do mean forest. Locating it from the ground even if I had seen where it landed would have been impossible.

At this point I am at a loss to explain the cause - no prior canopy problems have been encountered during the 500+ hours of operation on the plane. I am trying to get a new canopy finished by Oshkosh time. For sure this one will have a John Thorp standard latch. Having seen the distortion on the canopy side rails, I believe the pins that insert into the canopy frame are a sound idea. I am going to put longer ones in to assure positive engagement. These are basically 10-32 screws through a bushing, tapped into the base of the steel roll bar, with the heads filed off.

Having landed at the destination 100 miles from home, I opted to fly back to home base sans canopy rather than disassemble and trailer the plane. The prop noise, even wearing headset and EAR plugs is unimagineable. And 90 mph in a T-18 is no thrill. Otherwise, the trip was uneventful - afterall the canopy had already gone.

All the best,

Peter

Thanks, Pete, for that report. As far as I know, ther has only been one other T-18 that lost his canopy in flite and that was John Foy's, which was one of the first 10 T-18s to fly. He also had no problem flying the airplane without canopy. A couple of summers back Ken Hamilton flew Vern Peppard's T-18 several times locally with the canopy off, with no control or vibration problems. Have any of you ever had this problem,or known of another T-18 having this problem? I sure would appreciate hearing from you if so.

How many of you have flown with the canopy partially open? A couple of year:

CANOPY ACTION

ago I flew all the way back from OSH with my canopy open about an inch or two and it didn't want to move either way. I had experimented with leaving it open that much several times before, with a C clamp mounted just aft of the roller as a stop...just in case. I quit using the clamp after a couple of hops with it. It did help to keep us cool, but it was a little noisier. Since my static vent was in the fuselage it gave me a plus 7 to 10 mph increase in indicated airspeed.

I would like to remind you that your T-18 could respond entirely differently, so proceed with caution. Also I know of several other T-18s that flew with their canopy off and had no particular problem, but anytime you do such things remember you are strictly on your own. It would be interesting to get your comments if you've had experience with the foregoing.

FOR SALE

Pete also has his "old" wing for sale. It's a standard T-18 wing with 300 hours total time on it. It was removed for replacement with the T-18C folding wing. It is complete, in excellent shape, and is painted. He is asking $2500 for it. At today's prices that's a real bargain. If your project has been dragging along, maybe you might want to consider this to get airborne faster. Pete's address is 8712 Queen Elizabeth Blvd, Annandale, VA, 22003.

FITTING WINGS

Some have posed the question, "Is there a major problem fitting another person's wing to my fuselage?" Answer: No. If the 601 bulkhead is not riveted in it's a cinch. Replace the 601 and match the fittings and holes. One builder I know had his 601 riveted in, so he carefully drilled out the rivets and replaced the bulkhead. Here locally, Ron Bostic bought John Walton's original standard wing and had no trouble mating it to his wide body fuselage. It worked like a charm. All he really had to do was do some trimming of the center wing skin at the inboard side to fit the wider fuselage.

BONDING ALUMINUM TO ALUMINUM

BONDING OF ALUMINUM TO ALUMINUM: Several of the newer builders have expressed interest in building much or all of their airplane using pop rivets, but due to comments made in earlier newsletters that pointed out the shortcomings of pops vs AN rivets, that they would like to have the convenience of pops, but were nervous about long term effects on structural integrity. They posed the question, "Can adhesive bonding be used to AUGMENT pop rivets, thus eliminating practically all shear loads that allow pop rivets to loosen?" They make the point that not having to invest in a compressor, air tools, bucking bars, etc., and the elimination of riveting noise were potent points of consideration. In addition, one of their chief concerns was having a qualified rivet bucker on hand when they had work periods available.

While all these are valid points, let's take a closer look at the entire picture: First of all, to properly pull a pop rivet it is desirable to use one of the air powered tools, so that requires a compressor. Secondly, the additional cost of pop-type rivets over ANs would probably pay for air tools and a compressor. Next, it is true that AUGMENTING the pop-type rivets with an adhesive in all probability WOULD eliminate shear effects IF the surface is properly prepared.....and that's a big IF, as most homebuilders don't have the technical knowledge to do this properly. The EA 9410 epoxy (sold by Monnet) is expensive and messy to use.

In the Jan. '84 issue of Homebuilt Aircraft magazine there is a superb article on the process of bonding and it's an education on the subject, as slanted toward the homebuilder. Its title is "No more rivets" and is written by Otis Holt, who is building a Moni. He makes an important point

MORE ON BONDING

that you are bonding aluminum oxide to aluminum oxide, not parent metal to parent metal. The pre-preparation of those oxides is all important and the "scuff and wipe" method that many homebuilders use doesn't go far enough. He quotes tests by Boeing that showed that ALL EPOXIES ABSORB ATMOSPHERIC MOISTURE, thus greatly deteriorating bond strength...or even causing complete delamination with some epoxies. The Hysol EA 9410 that Dick Schred uses in the HP series of sailplanes has proven very satisfactory. The article is too long to summarize, so I suggest you get a copy from Homebuil A/C mag if you are interested. If that doesn't work out send me a buck and I'll send you a photocopy. If you are considering a wing fuel set-up, be sure and only use the recommended tank sealant and also be certain its allo able shelf life is still valid.

VACUUM FORMED SKINS

For the past year I've had opportunity to watch a Cricket being built, whic uses EA9410 to bond the skin to Klegecel foam ribs. The whole assembly (i.e a fin or rudder) is wrapped in a sheet of polyethylene, taped, and a vacuum is pulled on it for about 6 hrs. The vacuum utilizes atmospheric pressure t hold the skin tightly to the foam ribs while curing. This builder also made metal ribs to add to the klegecel ones in a 1 to 4 ratio "just in case".

This same vacuum method has been used to bend the leading edge of wing skin The builder of the LF-1, that I wrote about in the Oct. '85 issue of Sport Aviation, used such a method to bend his skins. It takes a strong vacuum cleaner, like a shop vac, to handle anything that big and it also takes a simple bleeder valve to modulate pressure, so that overbending doesn't take place. You must also allow extra length, (which is trimmed later) since the traailing edges are taped together. The bend then is at the ½ way point, bu since it is longer over the top of an airfoil than on the bottom, you have to adjust after bending. The matched hole tooling method puts the bend where it belongs and(possibly) is more accurate.

COMPOSITE FLAPS

I talked to a new builder the other day that is giving serious thought to using composite construction on his flaps, since so many have trouble in getting the skin bent properly. He asked my opinion and I said I didn't foresee any problem using that method if he had all the details worked out on the actuation system. I also suggested he give some thought to using the vacuum bag method to bend those skins. I've never tried it, but that just might be an answer.

GUS GORDON STORY

GUS GORDON FLIES: I recently got the kind of letter I don't like to get. Gus told me of his T-18's first flight by Bill Warwick and his subsequent checkout in the airplane. They put in their forty hours on the airplane and he and his wife headed for OSH. When he got to Alamosa, CO, they had some hard luck landing. He says his unfamiliarity with high density altitud flying was a factor in their accident. He didn't say what led to the rather considerable damage to their T-18, whether it was a low stall, high bounce, or what, but outside of his wife's bruises from the shoulder harness (that did its job) they weren't hurt. They hauled it on a trailer back to their Calif. home in Granada Hills. He's already hard at work repairing the damag and hopes to be back flying in a few short months. It was truly a beauty, too, with red, white, and blue striping ending in three large stars on the cowl cheeks, with the rest of the ship sprayed a silver gray metallic (at least that was the wy it looked in the picture he sent). We feel for you, Gus. That has to be a king size trauma to cream a bird you've poured so much of yourself into for so long. He was getting good performance out of it, too. At 9500 and 11,000 ft. he was trueing 160. The engine is an O-320 E2A and he was cruising it at 2400 rpm and burning just over 7 gal/hr. Prop a 68 x 78 McCauley.

TAILDRAGGER TALK

SHORT FLIGHT REVIEW: This might be a good time to review a few simple little hints for making the landing in any taildragger easier and safer. When you first sit down in the airplane carefully note where the horizon cuts across the cowl. Take a mental picture. That's the absolute angle that the nose should EVER be raised on a landing, since that is very close to the stalling angle of the wing. Actually, if you stop just a tad short of that point you'll touch with the tail wheel almost on the ground and if the angle is not quite perfect the most you'll get out of it is a little skip.

It's extremely important to not START to flare until you are 2' or less. A too high flare habit will get you in trouble on a landing about as quick as anything you can do. Even tho' you're in ground effect a full stall from just one ft. high can cause you to hit hard enough to possibly damage your gear. If you keep your speed on final to an EXACT number each time you will get a good handle on how long to expect the airplane to float. Altho' an airplane will stall at the same INDICATED speed at high altitude, as it does lower, you will find the RATE of flare will be different and will require adjustment on the part of the pilot. Remember at high altitude cruise you must carry a higher angle of attack than you would at S.L., to compensate for the difference in density. (When you reach the absolute ceiling you have just about run out of angle of attack).

It's essential to get the airplane on the first 20-25% of the runway at altitude, as you'll often find wind blowing from three different directions at different places on the field. If you are floating past the aim point and pick up a tailwind at that point you might wind up going off the other end. Also remember that at altitude if you have to go around don't wait until you are almost out of airspeed and altitude. You can't depend on your engine to accelerate you out of trouble, because it is only developing a percentage of the power it would at S.L. In spite of what some fuzzy head people in a certain gov't agency try to tell new ones, angle of attack is airspeed and power is sink/climb control and momentary acceleration.

You should also find the horizon/windshield mark that will give you the proper airspeed on final approach. Put a piece of tape there until you have it cold. You'll find only slight difference in the angle of attack with one or two pilots. If your airspeed quits working you don't have any sweat. While you are at it take note of various rpms and angle of attack vs the airspeed for down wind base, entering steep turns, etc. That's a pretty healthy thing to do when you are flying off your time. Do the same thing in your climbs.

One more little thing: when you aim the airplane, use a spot directly ahead of you. Do NOT sight over the tip of the spinner, as you automatically are several degrees out of alignment with the centerline of the runway. if you do-and touching down at an angle to the true line of motion in a tail dragger is a real no-no. If you are drifting L or R from the centerline imagine you have a hook on your wing tip and drop that hook to whatever bank angle it takes to keep that hook hooked on the edge of the runway. Then squeeze in enough opposite rudder to keep the nose straight down the center. Now you have a new "neutral" position for the stick and rudder and only small adjustments are necessary. Since your airspeed is deteriorating after landing the controls are less effective, so continue to add control, not relax them, as you might have the habit to do in a tri-gear.

All of that is elementary and you've probably heard it all dozens of times, but I've flown with pilots with several hundred hours that have gotten into one or more of the above and it's become a habit with them. Check yourself on these things and be your worst critic. Be honest!

CORROSION AND ITS PROTECTION:

A number of you have written asking what they should do to protect their T-18 from corrosion. I've also had several letters and phone calls from new owners of already flying T-18s on the same subject. In these instances the new owners had just stripped off the old paint in preparation for an all new paint design and had seen some evidence of pitting under the old paint. Naturally they were concerned. One or two had crawled clear back ib the fuselage for further close inspection and weren't too happy with what they found there.

Before we launch into a discussion of what corrosion really is and what causes it, let's take a look at factory built airplanes that you'll find on any airport and see what has happened to them over the years. Look for partially painted Cessnas that are around ten years old or older. If you can get the owner's permission, take a look inside, as Cessnas are not given corrosion protection at the factory and you can readily see what the combination of the elements and neglect will do, especially if the airplane has spent most of its time within about 100 miles from a sea coast. You've heard the old saw about wooden airplanes where the termites were holding hands to hold it together....well, you'll likely find some of these oldies, where the metal grains are in somewhat loose formation. Perhaps your little "field trip" will help you make up your mind as to whether you should take the time and trouble to corrosion protect the interior of your T-18 or not.

CORROSION - CORROSION -

First of all, in these days of liability vulnerability, consider your position if an accident occurred as a result of structural failure that resulted from neglect of corrosion protection. Granted, such things are rare, but they DO occur and you could be wide open. Don't assume that just because you live far inland that your airplane is in no danger from corrosion. In these days of industrial air pollution, acid rain, etc. that your susceptability could be even greater than one near the coast. Since corrosion is usually a slow process, it's probably human nature to downplay it, put it off, etc.

The cause of corrosion is simple...ELECTRICITY, in one of its most subtle forms! If you remember your physics or chem classes, do you remember how you suspended two different types of coins in a beaker of electrolytic solution , hooking the coins to a galvanometer? Remember, too, the lecture about how each specific metal type has a certain number of EXCESS electrons, which thus determined its electric POTENTIAL, and when dissimilar metals are brought close together IN THE PRESENCE OF AN ELECTROLYTE that there would be a current flow? And when this current flowed that you would have an actual migration of excess electrons (ions) from one to the other and that the result would be an eating away of the active (+) metal and an oxide deposit on the passive (-) metal? Remember, too, the chart list of metals in their descending order of active (anodic) or passive (cathodic) value? And the further apart were metals on the list, the greater their electric POTENTIAL? (Look at our chart at the end of this article and you can see why we use zinc battery plates or nickel-cadmium for batteries. The list dosesn't cover the entire atomic spectrum, only common metals).

The more the amount of electric potential between metals, the more the rate and amount of corrosion that will take place. Perhaps you are already saying, "My airplane is all one metal, so I don't have to worry. WRONG! Metal is not a homogenous material. Aircraft aluminum is an alloy of several different metals and is made up of microscopic grains. These grains have been heated, squeezed, rolled, stretched, chilled, etc. until these tiny crystals are so tightly interlocked that it looks like a homogenous material unless it is examined under a microscope. So the POTENTIAL is there for a galvanic current

(Corrosion cont'd)
to flow between the grains. This is particularly true on the surface in the presence of an ELECTROLYTE. In fact there MUST be an electrolyte present for current to flow!

What constitutes an ELECTROLYTE? Typically it's a fluid with enough ions (atoms that have been stripped of electrons) that current flow is promoted. Surprisingly, water (non-distilled) is an excellent electrolyte. Rain water in salt air or certain industrial areas enhances its electrolytic quality, as it picks up sodium and other ions as it falls. Thus the geographical location, the metal alloys, time of exposure, PROXIMITY of dissimilar metals, the heat treatment of the alloy, and mass (thickness) of the metal are all potent factors that determine the type and amount of corrosion that could attack your airframe.

Basically, there are three types of corrosion that are considered the most prevalent and most worthy of our efforts to combat it; pitting, stress corrosion, and intergranular corrosion, with pitting the most common. Pitting is a highly localized metal attack, resulting in small HOLES in the metal's surface. Gravity affects them, so look for them on the top outside surface or the inside bottom surface first. Once it starts it becomes self-generating, thus accelerating the amount of surface affected. (Now would you EVER consider using a piece of "cheap" watermarked metal (corroded) in your ship?)

What is scary about pitting is that it forms a cavern under the tiny surface hole that is many diameters larger than the hole itself and are not detectable by ordinary surface observation. The white deposits on top of the hole are salts, fairly easily removed by abrasives, perhaps only slightly roughing the surface. CLEANING THE SURFACE DOES NOT STOP THE PITTING! It only removes the tell-tale evidence. A coat of zinc chromate here is an exercise in futility and will scarcely even delay the corrosion spread. Once it starts the only remedy is to replace the affected part, so bite the bullet and do it. More importantly, don't let it start! (More on that downline). It should be obvious that unchecked pitting can siphon off so much strength from a metal part that it can fail catastrophically. It has happened on factory built airplanes that supposedly wre well maintained, so let's treat the subject with the respect it commands.

Stress corrosion is the result of a fine (sometimes almost invisible) type of cracking in the surface of the metal that permits the electrolyte to more readily penetrate to the grain boundaries, sometimes called "crazing". It can be caused by bending stresses generated when inadequate bend radius is used and it can also be caused by vibration, fatiguing the parent metal and weakening the bonding in grain boundaries. Like pitting, once stress corrosion begins the initial or continued stress or vibration will further tend to accelerate the corrosion. As the part weakens and more unexposed metal is now in close proximity to ongoing corrosion the entire part will soon fail, probably suddenly. Moral, watch for those tiny, spidery cracks.

The third type, intergranular corrosion, will occur along grain boundaries and is extremely difficult to detect. It occurs between the base metal (that makes up most of the alloy) and the "minority" metals it's alloyed with. The surface will blister in the advanced stages. Metal discoloration often is the only early stage clue and the only positive way to detect it is with the use of eddy current or ultrasound inspection methods. Fortunately, this type isn't often found, but remember that it, too, requires the presence of an electrolyte, even tho' the amount may be almost microscopic.

All of the above should highlight that the most important thing we can do about corrosion is to prevent it starting. This means keeping a potential

(Corrosion cont'd)
electrolyte (i. e. salt air, industrial fumes, dirt, etc) in combination with either visible or invisible water, away from the vulnerable metal surface. Go back now to the definition of an electrolyte on page 7 and see the importance of the electrolyte to galvanic flow of ions.

ANODIZING

Probably the most effective way to isolate aluminum from the bad guy electrolyte is to ANODIZE it. The anodizing process deposits aluminum oxide on the surface, making things tough on the corrosion process by reducing surface ions available for attack. Some experts say that to be safe in a salt air environment that you should spray zinc chromate on top of the anodized surface. There are several types of anodizing and it is a specialized subject unto itself. Many books on the subject are available in good technical libraries. Suffice to say that there is no compelling need for the homebuilder to arm himself with full knowledge on the subject.

ALODINING

From the homebuilder's standpoint, unless you live in one of the big metro areas where there are plating shops, you more likely will want to use an ALODINING process instead, following it with zinc chromate. Whereas the anodizing process is a reverse electrolytic process involving electric current flow, alodining is an acidic coating process, whereby a chromic acid compound (water diluted) is brushed or poured on the pre-cleaned alum' Alodine compounds are readily available from large paint stores and aviatio parts houses. One of the average 1 liter size bottles will cover about 250 sq. ft., or about 5 sheets of aluminum on one side. You might also wan t to know that an alodined surface is an infinitely better base for paint adhesion than a bare aluminum surface (no matter how well it is cleaned and degreased), as paint adheres much better to an acetic rather than an alkaline surface. (Yes, bare alum is considered an alkaline surface).

That one fact alone might be worth all the other information about using alodine. Hopefully, it should be plain from the above info that everyone really should at least apply zinc chromate as a corrosion protection while building their airplane. It also is a protection against scratches and a mark on it is much more readily visible on it. (Of course you know that you should never use a lead pencil to mark on aluminum or use a graphite lube on aluminum, as it is highly corrosive, now that you know a little more about aluminum and its ions, etc.)

If you do alodine your parts, it's a good idea to wait until all parts are formed before doing so, including all holes drilled. You then cab easily make a dip tank that will even hold a full sheet of metal, using polyethylene sheet and scrap lumber for some sort of a frame. Don't forget to make some provision for a drain, so that you don't get acid on you or your clothes. Also, rubber gloves are must. In accordance with directions, apply the zinc chromate as soon as practical after alodining, too. Remember that zinc chromate is full of chromic acid and is very dangerous if inhaled, so ALWAYS wear a respirator and do your spraying out of doors. Use ONLY MIL SPEC zinc chromate. The other types that are called zinc chromate are nearly useless for corrosion protection. Mil spec zinc chromate is only available from an aircraft supply house, due to its toxicity. Remember, too, you don't need put zinc chromate on so thick that it hides everything below it. It just a weight to do so and makes it more vulnerable to chipping. If you are about to paint a steel part, DON'T use zinc chromate for a primer. z/c is for al not steel. Use one of the good epoxy primers.

(Corrosion cont'd)

The subject of corrosion in metals is too complex a subject to thoroughly cover in detail, with all the ifs, ands, and buts, in the few paragraphs above, but perhaps some of the basics presented will be of help to some of you. If nothing else, perhaps you now understand why the Air Force stores their surplus airplanes in Tucson ....and maybe you've wondered why they used lead and zinc in batteries and why you should use distilled water in batteries, etc., so maybe the discussion has been worthwhile. I'm sure that most of you already knew all of the above, but if we assumed that each one of you knew all about all aircraft subjects there would be very little need for a newsletter, so please bear with me if we get too basic sometimes.

As a final word on the subject, in your occasional inspections of the T-18 interior if you see that the aft fuselage is showing signs of dirt, oil, etc. collecting, it's a pretty good sign you need to check what kind of drainage holes you have in low places. A good detergent and water bath is needed occasionally, followed by a fresh water flush. You should check and see that water does not stand in low places. Condensation of atmospheric moisture inside any sort of metal structure can be significant. To sum it all up, it's like they say in the NFL, "In case of doubt...punt!"

ELECTRIC SERIES POTENTIAL CHART

	METAL
	Magnesium, Magnesium alloys
Galvanic Flow from	Zinc
top to bottom	Aluminum (1100) "Pure" Aluminum
	Aluminum 6061 T-6
ACTIVE (Anodic)	Aluminum 6063-T832
	Cadmium
FLOWS	Aluminum 7075 T6
FROM	Aluminum 2024 T3
	Steel; Iron, cast iron
	Stainless Steel (Chromium type, active)
+	Ni-Resist iron
to	304 Stainless steel (active)
-	316 Stainless steel (active)
	Lead, Tin
	Nickel, Iconel (active)
	Monel, Brass, Copper, Bronze, Copper-Nickel Alloys
	Silver solder
Passive (Cathodic)	Nickel, Iconel (passive)
	Chromium steel (passive)
	304 Stainless steel (passive)
	316 Stainless steel (passive)
	Silver
	Titanium
	Graphite (lead pencil type)
	Gold
	Platinum

(Note: Some metals above can be either active or passive)

The following is NOT the kind of T-18 subject I like to write about, but it seems this sort of thing is going to happen when people have a show off urge that they can't control. The sad thing is now that the T-18 will get another undeserved black eye. (More on this subject down stream).

From: Glenn Dail
3134 Clarendon Dr.
Annapolis, MD 21403

December 3, 1985

(Glenn is a T-18 builder and an investigator for the NTSB)

Dick Cavin
10529 Somerton Dr.
Dallas, TX 75229

(ANYONE KNOW ABOUT THIS AIRPLANE OR BUILDER)??

1947Z

Re: Airplane Accident: Thorp T-18, S/N = (?), N471S, 11/17/85 at 1347L, Lubbock, TX, Pilot = Fatal, No Passengers.

Owner/Pilot = Leland Miller

T-18 ACCIDENT - PROBABLE CAUSE, LOW LEVEL AEROBATICS

Dick:

The above accident was delegated to the FAA. The GADO in Lubbock is investigating it. The Inspector is Richard (Dick) Martz at 806-762-0335 or FTS 738-7675. Their address is:

DOT/FAA GADO-7
Lubbock Intn'l Airport
Rt. #3 Box 51
Lubbock, TX 79401

Seems, Miller purchased the airplane from Thomas W. Boughn, of Holstein, IN who flew with Miller for 1:25 min. in Dodge City, KS. Miller flew the airplane back to TX. Miller flew the airplane twice out of Level Land, TX, apparently where it was kept/hangared or tied down.

On the day of the accident three hunters identified an airplane of similar physical size/color, etc. doing acrobatics in pulling out low in a valley. They noise stoped and the hunters thought the airplane had crashed. They looked for the airplane for a short time and traveled about 2 miles with no results. I don't remember what time that was. The airplane crashed that afternoon in a residental area - about 2 blocks from Miller's girl friend's house, and not far from his home. The airplane attitude was about 75 to 80 plus degrees. Witnesses saw the airplane pass overhead about 800 feet AGL.

An autopsy was performed. Tissue samples were sent to CAMI in OKC. Tox samples/results are not back. Miller was not an M.D. or Phd. There were police reports concerning that subject.- his title. He had left or been discharged from some college over that same subject.

That is all I know.

Sincerely,

Glenn Dail

THANKS, GLENN, FOR THE PRELIM REPORT.

KEN KNOWLES SPORT AIRCRAFT, INC.:
The following is a note from PHIL TUCKER re the above:
"Enjoyed talking with you at OSH this year. It was quite an event for me and my grandson, but no more campground for me.
Enclosedis a brief note on the sale of Sport Aircraft, Inc. Jack Cox indicated he would run a copy in Hot Line. Perhaps you, too, may want to run it in the T-18 NL.....Phil

Ken Knowles, well known and respected supplier of parts for the Thorp T-18 has sold his Company, Ken Knowles Sport Aircraft Inc, to Phil Tucker of Lancaster, Ca. All parts and supplies for the T-18 and S-18 will continue to be produced and sold.
Phil Tucker has been associated with aircraft fabrication for 35 years, most recently as Manager of Tube Fabrication and Development on the B1-B program for Rockwell in Palmdale. He built his own T-18 starting in Nov. 1975 and completing it in Mar.1982.
After cancellation of the B1 in 1978 Phil spent close to a year building T-18 parts for Ken while on layoff from Rockwell, which provided additional knowledge and experience of the T-18's detail fabrication and assembly procedures.
The new mailing address is; Ken Knowles Sport Aircraft Inc. 1237 E.Ave.J12, Lancaster,Ca. 93535,Phone (805) 945-2366.

In case you are wondering if Ken was forced to sell on account of a health problem, the answer is no. Ken is in good health. He went at building the T-18 parts and kits hammer and tongs for a good many years and I think he just got battle fatigue and wore his tread a little slick. Anyway, now he's spending as much time as he can playing golf and doing some of the other things you do when you are "retired". Geri has also kept him busy doing gardening chores, too.

There are a bunch of you guys out there that owe Ken a debt of gratitude. A good many of you wouldn't have a T-18 in the air today if it hadn't been for Ken. One thing I always appreciated about him was his promptness in filling an order. He always kept a stock on hand and most of the time the order was shipped the very next day and that's a most commendable trait. (Too bad the #1 aircraft parts house on the West Coast doesn't practice the same thing). In the beginning Ken made most T-18 parts himself, but down the line when he started getting swamped he farmed some of the items out. I don't know how many complete kits he put together, but it was a bunch. There are about 60-70 T-18s flying or being built in Australia and New Zealand and I'm sure that all but one or two came out of his shop.

I'm sure all of you join with me in wishing Ken and Geri the best of every thing in their golden years. If you should want to call them and say hello their new number is 714/734-3998. I think, too, you'll find Phil will break his back to please and uphold the high standards Ken did.

About 90% of the new builders these days are building the convertible wing, which admittedly is somewhat more difficult to build than the standard wing. Primarily, this is because of the aileron control system. In previous newsletters John Kleber, John Walton, and others have made excellent step by step writeups and John Walton has even made drawings and complete writeups available for those that want to add wing fuel for only $10 to cover mail & printing costs. Incidentally, John W. still has a couple of pin extractors left (a necessity if you fold the wing) for his cost of $49. He was able to get that cost by having several made at once, so won't have more made.

Here now is Chis Fast's step-by-step writeup for assembling the center wing for the folding wing. so now you have directions from three experienced, highly qualified builders, all of which have built at least one other st'd wing before. Compare all the articles as you build and it should be a piece of cake for the newcomer.

T-18 CENTER WING ASSEMBLY.....by CHRIS FAST (FOLDING WING)

ASSEMBLING CENTER (CONVERTIBLE WING) WING - CHRIS FAST

1. Make sure all ribs fair with spars, both top and bottom. Punch out all rib flange holes with a #40 nibbed Whitney punch.
2. Check that rib joggles fit the spar flanges. Adjust as necessary.
3. Attach the ribs to the spar webs with #40 clecos, but do not rivet at this time.
   NOTE: Make certain that the 213 -1 & -2 bellcrank brackets on the 210L and 210R ribs are NOT drilled for the bellcranks, as this must NOT be done until the outer wing is attached with the mating brackets. BELLCRANKS MUST HAVE A COMMON AXIS. VERY IMPORTANT !
4. Drill/ punch all holes in skin with a #40 before forming the leading edge bend, DO NOT DRILL THE CENTER WING SPAR HOLES IN THE SKIN AT THIS TIME.
5. Cleco top and bottom skins together for forming. CAREFUL. Be SURE and use the proper index line or the LE bend will be wrong!
6. Using a 3/4" X 16" X 48" FLAT masonite board (or equivalent) CAREFULLY crush the skin down until it pretty closely fits the nose rib. Go slow! Check and re-check (It probably will take several attempts to get it right). Rememeber....if you get too sharp a bend in the LE skin it will adversely affect the stall characteristics. Also be sure the bend radius of the left wing skin is the same as the right one. Also remember that outer ends of the skin crush easier than in the middle, so keep your knee pressure in the middle. When checking fit, use a strong light behind the ribs to compare the gap size.
7. Remove clecos at TE and trim skins to the final dimension.
8. Attach skin to ribs and REAR spar (only) with #40 clecos, using an ice pick to draw holes into alignment.
9. Using a straight edge on the center spar location and another one on the rear spar...EYEBALL the two, They should be parallel. If not, remove the clecos from the top flange of the rear spar and using small clamps, shift the skin to spar position slightly until the straight edges are parallel. Thisprocedure insures no wing twist.
10. Once you are satisfied with the alignment, drill out all the holes to 1/8" and install 1/8" clecos as you go. (Do not remove too many clecos (#40) at a time and run the risk of losing alignment. One at a time is much safer.
11. Check alignment one more time and then lay out main center spar holes top and bottom. Be sure and add a STAGGERED additional row of rivets between BL21.375 and BL41.375. top and bottom. This avoids having rivets get loose and working, as some have experienced. Also it is helpful to move FWD rivet line about 1/8" aft in the AREA OF THE STEEL ATTACH PLATES, TO AVOID INTERFERENCE WITH THE 1/4" ATTACH BOLTS. Makes riveting MUCH easier

(CONT'D)

(cont'd)

12. Drill spar holes and install clecos.
13. Fit step plates and support angles.
14. Now disassemble skin and ribs.
15. Beburr all holes in skin and ribs. Dimple all holes EXCEPT the main spar holes. These will dimple as the rivets are driven, making a very tight wing. COUNTERSINK the main spar caps.
16. Zinc chromate spray ribs and inside surface of the skin. This is also the best time to rivet the step plates and -7 angles to the skin.
17. Re-install ribs to spars and rivet fore and aft flanges to the spars, EXCEPT do NOT rivet end ribs 210 and 201-3 at this time. They must be removed for access to some skin riveting, so install them temporarily with clecos for alignment purposes.
18. Re-install skin, using clecos in alternate holes at least.
19. Re-check alignment, as in Step 9 above before riveting.
20. Remove #201-3 nose ribs at inboard end and completely rivet the next outboard rib.
21. Re-install the 201-3 rib and complete riveting the nose section.
22. Remove clecos at the Top rear spar and a minimum number of clecos near the trailing edge to allow the top skin to be lifted enough for riveting of the main spar caps, top and bottom, between main ribs 533-1 and 534. Also rivet the BOTTOM flange of the REAR spar.
23. Re-install all trailing edge clecos.
24. Remove butt rib #210 and rivet #534 rib completely, also upper and lower spar caps.
25. Re-install #210 butt rib and complete all riveting.

And there you have it ,gents. About the only additions I would make is that before drilling all the index and trailing edge rivet holes at the trailing edge that you leave every other one undrilled on the top skin. The idea is that if you do have to slightly shift the skin after the first alignment check only a few holes will be mismatched and you can then match drill the blank ones in with the spars. This may be hair splitting anyway, since the #40 holes will later be drilled out to 1/8" and most likely you won't have to move them that much anyway if you have been carefull to lay out the lines of rivet holes for the ribs in the flat skin. Those lines should be absolutely parallel!

You might also want to lay a couple of levels (long ones) up there like long straight edges to cross check your eyeball look. The whole assembly must be carefully leveled up beforehand for this to be valid. The eyeball method is very accurate if you do it carefully. You might want to switch straight edges if there is any doubt that they have all edges parallel.

You might also want to make a spar hole template out of a scrap piece of metal that's about 2" wide and as long as the wing skin is wide. You can position the template over the skin and prick punch the hole pattern thru the holes. This allows you to eyeball in at the ends to see that your line of rivet holes is in the proper fore and aft position over the spars. It also saves layout time and lets you have a nice straight line of holes.

Anyway, Chris, we are all very grateful for your taking the time and trouble for the writeup of this and other components on the T-18. You probably don't realize what a BIG help this is to a new builder. Again, Chris, thanks a million! You're a super-nice guy in my book.

Just talked to Chris and he says his health is reasonably good, even tho' they had to do a balloon angioplasty after his 2nd by-pass operation. He also said he is getting into some big R/C models and having fun with them.

(THE ABOVE DESCRIBES PRE-PUNCHED RIBS & SKINS FROM KEN KNOWLES)

The following addresses a problem of considerable interest.

FROM Russell Ross
RR#1 Box 411
Sioux City, Iowa
51108

March 27, 1985

Mr. Dick Cavin
T-18 Mutual Aid Society
10529 Somerton
Dallas, Texas

Dear Dick,

Inclosed is a drawing for a locking gas cap on the T-18. I have a Ken Knowles aluminum tank with the cam operated expanding rubber seal. John Walton reported in one of the news letters that the cap would pop out when the tank was dropped on the grass from about three feet. I know he used a differant method to secure the cap. I used a piece of 2024-T3 -.187 by 1.5" by 3" which is the cap diameter. By sloting this plate and the original cap for an AN3 bolt this plate can be slid to one side allowing the cap to fit on the tank flange and then sliding the plate back to lock under the flange; when compressed by the cam it is securely locked in place and cannot come out. The original gasket is cut flush with the cap and the expansion plate is also retained as a seal. See drawing.

I have purchased a Sensenich M-76 metal propeller cut to 68" with 74" pitch for an O320. According to what information I have this prop meets vibration standards. Would like to know if anyone using this prop has had any problems. Would really appreciate any info on this in the newsletter. Hope to have my T-18 flying in about three months.

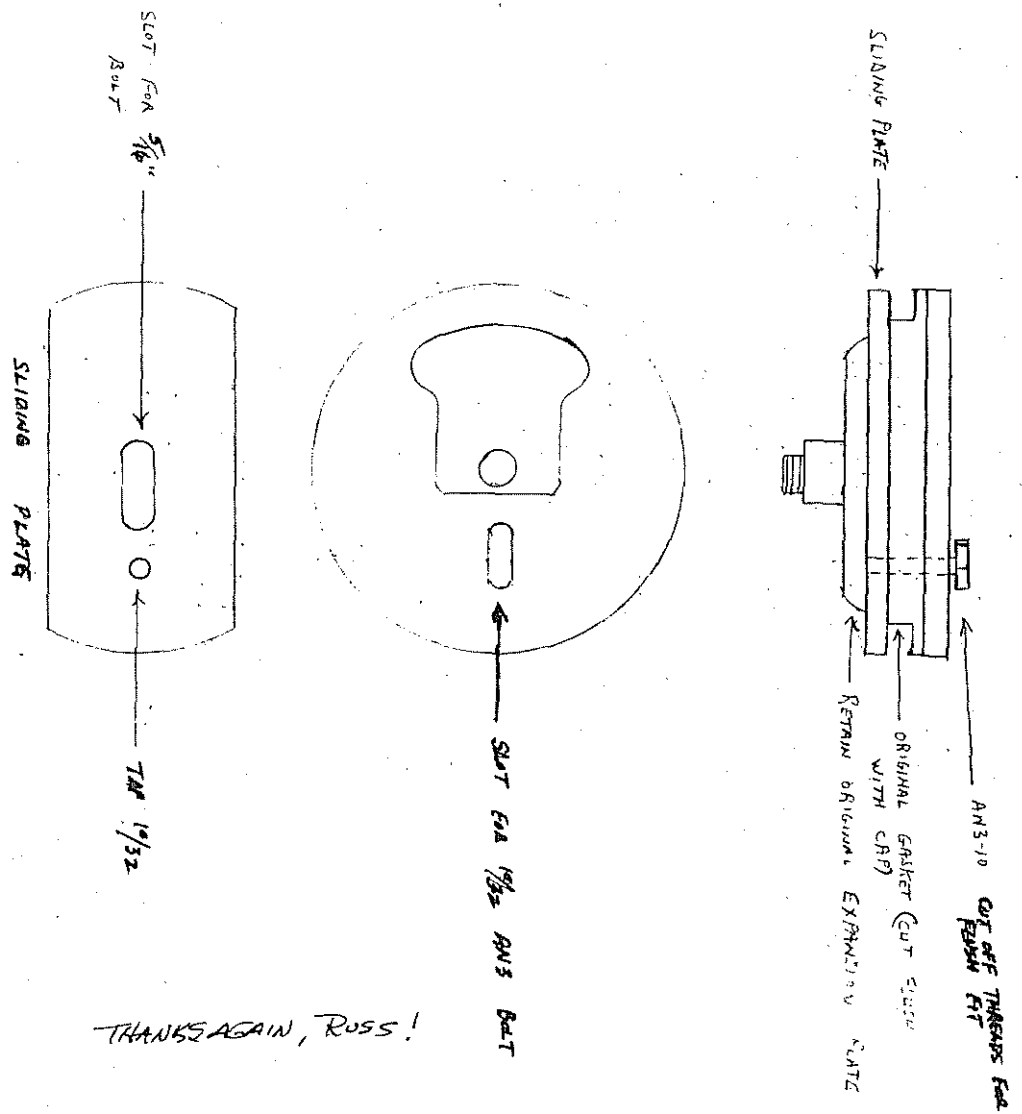
Best Regards,

Russ Ross

Thanks, Russ, for the drawing and writeup. Looks like a good method. Good luck on your new bird.

ANY COMMENTS ON THE M-76 PROP?

RUSS ROSS' DRAWING
of GAS CAP LOCK



THANKS AGAIN, RUSS!

Dear Dick, 7-27-85

Copy of this letter is being sent to John Walton for his prior advice. I purchased a set of his plans for "Thorp T-18 Wet Wing" from Ken Knowles. The plans are excellent and I am indebted to John for them. The rework of my wing is progressing very well and I feel very good about the direction and completeness of the plans.

A further MOD is necesary as my (folding) wing has a chordwise lap joint for the skin at the third (from left) .025 rib. This lap joint without additional strength would eventually leak with flexing.

These nose ribs have been replaced with .032 ribs per drawing. The MOD being made is to add a doubler using .032 mat'l 1½" X 15½" fitted into the top and bottom of ribs #3 and #10. (See Fig.1)

(Note) These ribs came from Ken Knowles with the wide spaced center punched hole locations. Drill and debur...all ribs and cleco in place. (This is remodel-not new construct). draw a line through center of holes in wing. place additional holes midway. draw a second line parralel and centered over the doubler. Drill holes in the skin matching those just completed. This becomes a template for the holes for the doubler. Remove the ribs. Using AN 460-3 rivets and adhesive indicated in (Fig.1) attach the doubler to the rib spaced as needed to draw the parts together for curing.

A second MOD seemed desireable and has been made to four of the ribs...namely #1, #5, #8, and #10...tank end ribs. This gives me Fuel Quantity Indication, left and right and Low Fuel Quantity Warning by way of a light or busser next to the respective guage...see Fig.2).

RIB DOUBLER FIG. 1

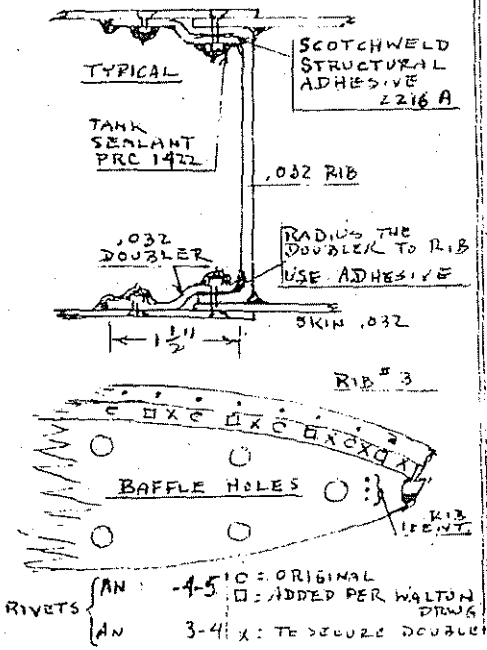
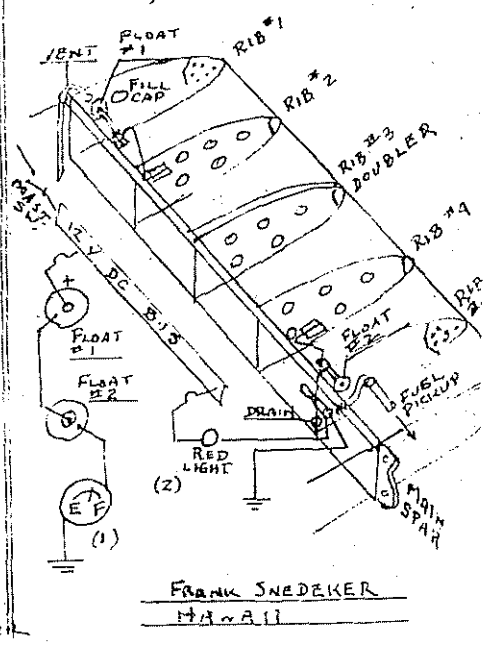


FIG. 2 (1) FUEL QUANTITY (2) LOW FUEL WARNING



FRANK SNEDEKER
HAWAII

VERY GOOD, FRANK. THANKS FOR THE TIPS

FROM: John Foy
3801 127th N.E.
Bellevue, WA 98005
22 June 1985

Dear Dick and Lynn:

Just received your T-18 ~~HYATT REGENCY HONG KONG~~ could add a little even though my T-18 is long since a memory.

All the years I flew for the airlines, I never gave much thought to the effect of propellor performance on engine hp. Really dumb but you just shoved everything forward for takeoff, reduced some for climb and reduced more for cruise. Kind of simple (for simple guys) and designed that way.

Well today I am going to change all that for those of us who never gave it much thought.

When I purchased an aircraft engine, it came with a hp rating of 85 or 100 or 150 or whatever. I just bolted on the engine mount, jammed on a fixed pitch prop (they are much less expensive! But only if you buy just one) and figured that I got full hp with full throttle. How dumb can a guy be? My brother, Marty, finally forced me to start thinking about propellors when he insisted on using a constant speed prop on his airplane. So I dug out the operator's manual for the Lycoming O-320-D (160 hp) and started reading. That engine only developes 160 hp at 2700 rpm. Please note that the important phrase is rpm. The operators manual has some very interesting charts, one of which shows hp per rpm and that is the chart we want for this discussion. It's called "Sea Level Power Curve."

A fixed pitch prop is a compromise. So what does that mean? If your prop turns the O-320-D at 2400 rpm for takeoff you are only getting 112 hp for takeoff. If your prop turns 2450 for climb you develop 120 hp and 2500 rpm is only 126 hp. What happened to the 160 hp that I paid through the nose for? Well, it is still waiting for you to get the rpm up and it will be happy to oblige with full hp. What does that have to do with a fixed pitch prop? A fixed pitch prop will only let the rpm turn so much for a particular airspeed and will top out at a particular airspeed for your aircraft. It really boils down to maximum rpm in straight and level with wide open throttle. If you stay at 2700 rpm max, then your takeoff and climb rpm will be less than 2700 and you will never get full hp for takeoff and climb. WHICH IS WHERE WE NEED IT MOST. So what is the answer?

A constant speed or variable pitch prop. In both cases you select the engine rpm for the max hp desired. At that point you finally get the hp you paid so dearly for.

Every fixed pitch prop owner I have met has more than one prop and is always talking about his next miracle fixed pitch prop.

John

67 Nathan Road Kowloon Hong Kong B.C.C. Telephone 3-662321 Telex HX 73127 Cable Hyatt HongKong

(Page 2 of letter from JOHN FOY)

HOTEL Miramar HONG KONG
NATHAN ROAD KOWLOON HONG KONG 3 [illegible] TELEX [illegible] CABLE MIRAMAH
AN ASSOCIATE OF HOTEL MIRAMAR HAWAII

Throw away the fixed pitch props!!!! Buy ONE constant speed or variable pitch prop and enjoy full advertised performance of the aircraft you have. Almost all of the performance figures on homebuilt aircraft with fixed pitch props were taken off two props-one for climb and another for cruise-but it's awfully hard to change props in flight.

Another hint for those of you who are debating the choice of engines between the Lycoming O-320 and the O-360. The same operator's manual show the O-360 to be a much more efficient engine at 65% rated power. i.e.; the O-360 will turn 2350 rpm giving 117 hp using 8.5 gallons per hour vs the O320 turning the same 2350 rpm but putting out only 97 hp and using 8.8 gallons per hour. Just a hint.

Dick, I'm retired from NWA now. The long hours on the Trans Pac flights finally got to my back and I decided to retire three years early instead of major back surgery. I still hold a 1st class physical but can't take the long hours anymore.

After 20 years of reading and building parts from blueprints, I finally decided to go to school and learn the right way. The instructor says he will make a techinical illustrator of me yet! So far it is a fascinating course and I highly recommend a course in basic drafting for anyone who is not experienced in reading blueprints. I wish I had done it before I started all this!

I'm thinking of another homebuilt project (it's a fatal disease one never gets over, it just gets worse) but the 210 redline on the T-18 is giving me pause. The glassair is already over 260 and the Mustang 2 is 245.

I sure would like Lyle Trusty's wing on the wide body version with the 180hp and 5" longer fuselage, leading edge tanks and a constant speed prop. I'm not a fan of the folding wing aircraft and after "feeling" the difference in airleron friction between the standard and the folding wings, I vote for the standard. As I say, the 210 red line on the T-18 is preventing me from grabbing one of those unfinished projects!

We've enjoyed the articles you have been writing for EAA and others! Best of all I enjoy the T-18 newsletters. You have all of your irons in the fire* at the same time and I don't know how you do it, but I sure am thankful! Just getting a letter out is an all day job for me.

By the way, I am enclosing a sketch of a gas cap that I stole from Jerry Van Gruenevan. Hope you can read it. Best from us all

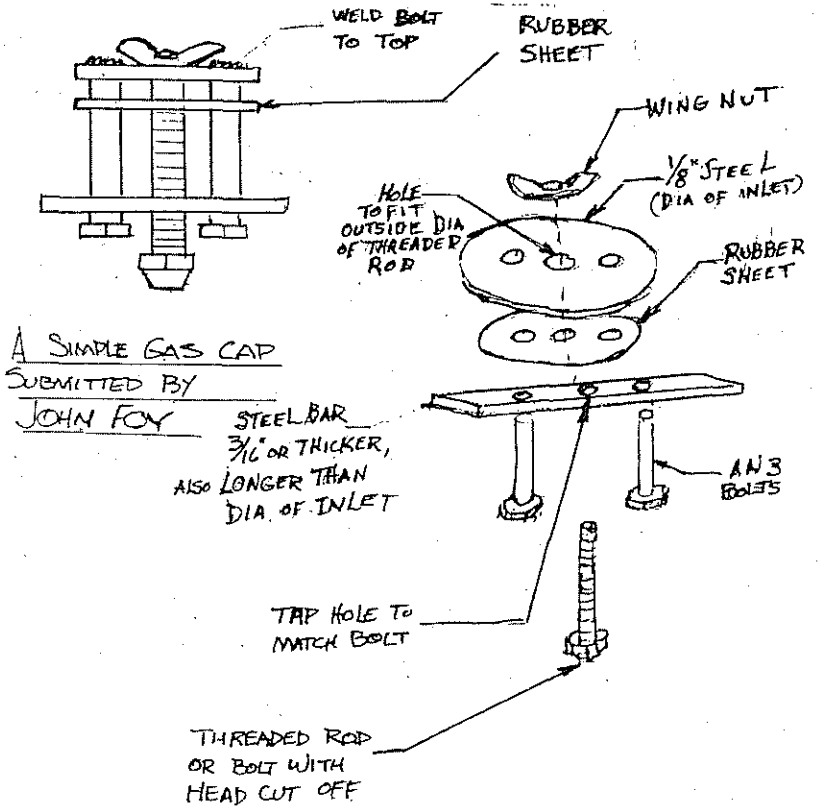
John

*(YES, AND MY WIFE SAYS I LET A FEW OF THOSE IRONS GET COLD ALA 4 THEM TOO)

(JOHN FOY cont'd)

Thanks a million, John, for the previous two pages. The true power output of an engine is a subject that seems to be widely misunderstood by so many people.

I'd like to take this time to pay tribute to John Foy as one of the most prolific homebuilders in EAA. I first met John in the pinfeather days of the T-18, when he lived in St. Paul. I was flying a MSP layover trip at the time and had a crew car available, so I went out to John's house to see his T-18 project. I later visited him in SEA, when he was based there. He had just finished building a Scamp, was starting on a P-51. He also had built a Varieze. He's now building tha all metal Durand.



"Note:Holes in steel bar a loose fir on AN-3 bolts;Weld AN3 bolts to steel top on assembly;Weld threaded rod to wing nut on ass'y;Tilt ass'y to insert in filler neck opening.

THANKS AGAIN, JOHN.

BRIAN P. HARNEY, M.D.
A MEDICAL CORPORATION
POST OFFICE BOX 964
FALLBROOK, CALIFORNIA 92028
TELEPHONE (619) 723-1633

DIPLOMATE AMERICAN BOARD OF ANESTHESIOLOGY

November 21, 1985

Dick Cavin
President, T-18 Builders and Owners Assoc.
10529 Somerton
Dallas, Texas

Dear Dick:

Persuant to our telephone conversation yesterday, I am enclosing some technical information and photos of my T-18, N2751, which is for sale at $18,000. The airplane was put into service in 1976 and has 290 hours on the airframe and the overhaul of the engine. It is powered by a 180 h.p. Lycoming O-360.

The panel was redone about 5 years ago and is finished in black crinkle paint. Instruments and guages on the top row are: airspeed, turn & bank, VSI, tach, EGT, oil pressure, amps and "g" meter. Those on the bottom row are: clock, space for D.G. and artificial horizon, altimeter, manifold pressure, cylinder temp, oil temp, fuel and suction. I have the artificial horizon and D.G., and they can easily be installed in the aircraft.

As you can see from the photos, the airplane is bright red and the paint is in good condition. It has been hangared all its life. A heater has been installed and the trim wheel has been repositioned for more ease of operation.

I trust that this information will be helpful to you in conveying specifications of the plane to potential buyers. Thank you for any help you can offer in this regard. I have also enclosed my check in the amount of $10.00 for renewal on my membership.

Sincerely,

Brian P. Harney, MD

P.S.: The radio is an Edo RT553.

FOR SALE: (MAY NOW BE SOLD)

MUFFLER TIP FROM DEAN COCHRAN:
" Bill Flarity, of the MUSTANG UNITS CO. of Davenport, IA, sent a set of mufflers to me in '84 to test for him. They are about 3½" in diameter and about 8" long. They weigh 1½ lbs. each. We've had them on the bird for over a year now and really do like 'em. They get rid of that high crack sound and give the exhaust a deeper, more mellow sound. They don't seem to hurt performance. I should have prices soon for the fellows".

Dean also wrote about winter interfering with flying in the Denver area, but that he had big plans for taking the bird over the Rockies to the Western slope and to Montana to do some fly fishing.

ENGINE FOR SALE: The following is from WALT GIFFIN, 4277 Kenmont Place, Columbus, OH, 43220:

Dear Dick:

I enjoyed our brief conversations at Oshkosh 85 and was pleased to see that you are again moving around in the middle of the sport aviation scene. As I mentioned to you then I am planning to switch engines in my T-18 just as soon as my new prop arrives. My current engine is still flying in the airplane but I hope to have the switch complete by early September. If you have space in the next newsletter I would appreciate it if you would insert the following for sale notice.

FOR SALE: LYCOMING O-290-D2 (135 HP). ENGINE REMOVED FROM T-18 FOR HIGHER HORSEPOWER INSTALLATION. 650 SMOH, 1800 TT, ACCESSORIES NEW AT TIME OF CHROME MAJOR. INCLUDES DUAL IMPULSE MAGS, CARB AND STARTER. $3300
WALT GIFFIN 4277 KENMONT PL. COLUMBUS, OHIO 43220 PH. 614-451 2126

Thanks for the help.

(MAY ALREADY BE SOLD. BETTER CALL 1ST).

Best regards,

Walt

Walt Giffin
N78WG ser. 865

A REMINDER: If you need addresses of T-18 members, the last page of NL#62 has an up to date list of paid up members.

You asked for some c.g. calculations. My calculations, plus some loading charts I prepared are enclosed. Weighing was done on 3 platform scales at a certified aircraft repair station. I have an O-290-D2 engine with a Cassidy wood prop and battery behind the baggage compartment per plans. The c.g. is further aft than I would like it to be, although the only handling problem I have noted occurs with low fuel, a full passenger load and bags coupled with high cruise power setting. Then I run out of nose-down trim and must hold some forward stick pressure. The plane now has over 300 hours on it with no major squawks.... a real delight to fly and display.

The next three pages are from Walt on his airplane, N78WG. With all the other examples of CG calculation in the various NLs, you should have no trouble with yours, if you use these as a guide.

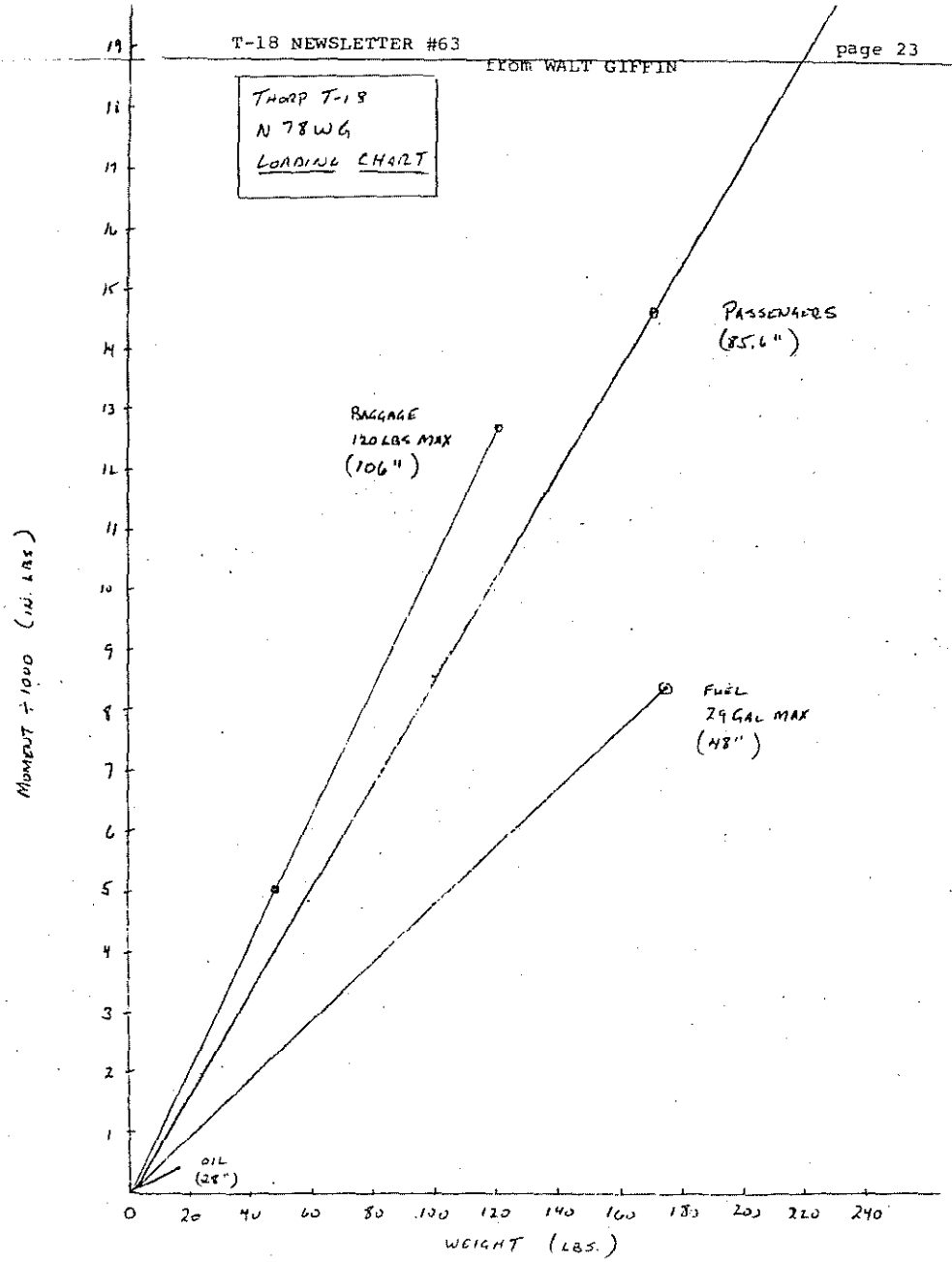
from WALT GIFFIN

C.G. CALCULATIONS FOR N78WG - THORP T-18 WING STA 53"
WING CHORD 50"

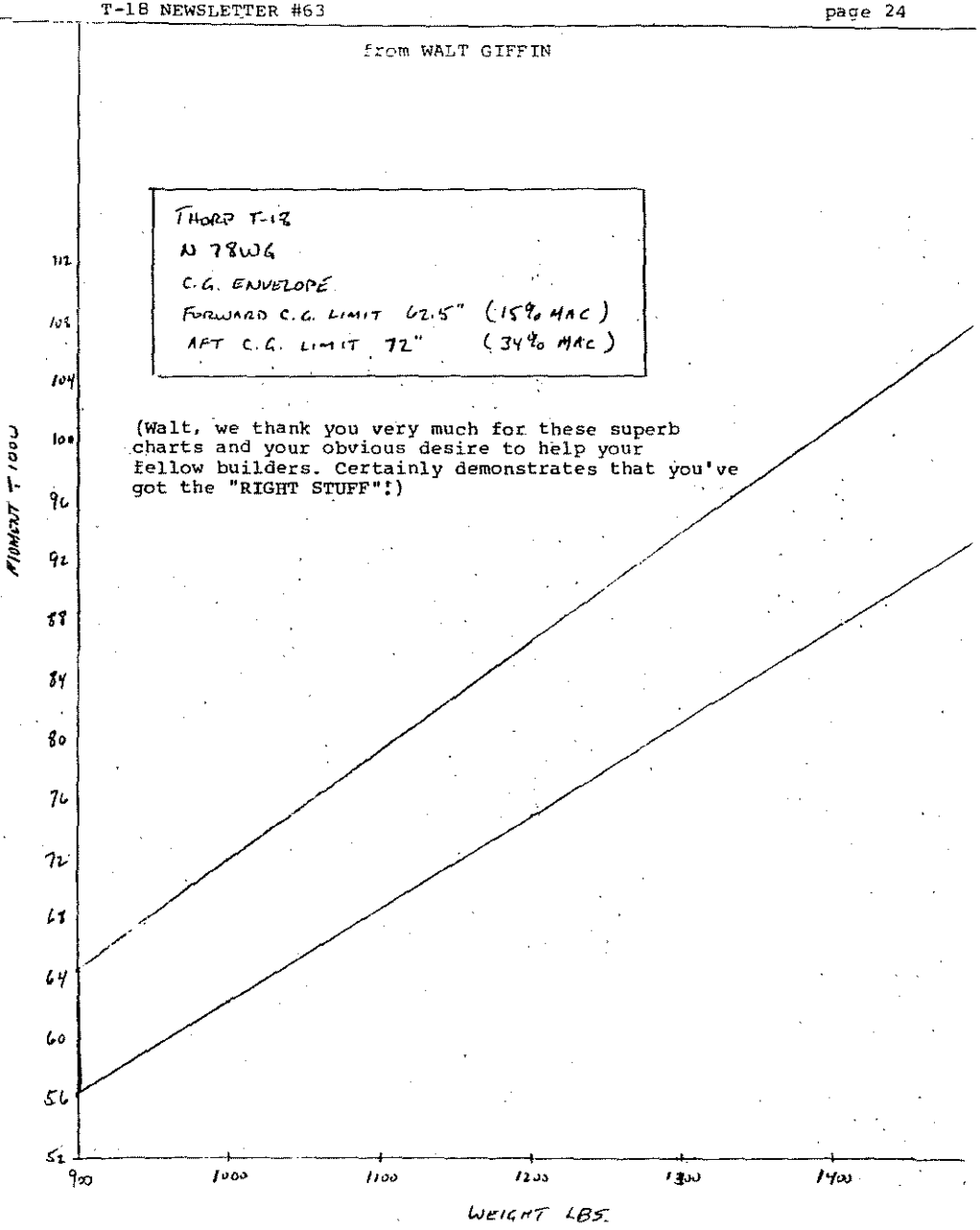
	WEIGHT	x	STA	=	MOMENT	% CHORD
MAIN WHEELS	863	x	53	=	45739	
TAIL WHEEL (BOLT)	75.5	x	192	=	14496	
WITH OIL C.G.	938.5	x	64.182	=	60235	18.36%
OIL (8 QT.)	-15	x	28	=	-420	
EMPTY C.G.	923.5	x	64.770	=	59815	19.54%
1 PASSENGER	170	x	85.6	=	14552	
OIL (8 QT.)	15	x	28	=	420	
FUEL (29 GAL)	174	x	48	=	8352	
MOST FORWARD C.G.	1282.5	x	64.826	=	83139	19.65%
2ND PASSENGER	170	x	85.6	=	14552	
BAGGAGE	47.5	x	106	=	5035	
GROSS WGHT C.G.	1500	x	68.484	=	102726	26.97%
FUEL (EMPTY)	-174	x	48	=	-8352	
MOST AFT C.G.	1326	x	71.17		94374	32.34%

NOTE: THEORETICAL NEUTRAL STABILITY POINT IS AT 34% MAC. FORWARD C.G. LIMIT IS 15% MAC. REPORTED BY JOHN THORP (DESIGNER) IN THE NEWSLETTER No. 18 p1, AUG 22, 1966.

from WALT GIFFIN



from WALT GIFFIN



(Walt, we thank you very much for these superb charts and your obvious desire to help your fellow builders. Certainly demonstrates that you've got the "RIGHT STUFF"!)

STANDARD DISCLAIMER: Please be advised that since its beginnings in 1963 that the T-18 Newsletter is an information exchange between members of the T-18 Mutual Aid Society (now known as the T-18 Builders and Owners Association), a non-profit group. We would make you aware that the T-18 was, is, and will be in the future..a clearing house only for ideas, opinions, and personal experiences of both members and non-members on both building and flying the T-18. Anyone using the ideas, opinions, and experiences presented do so at their own discretion and risk, as no claim for their accuracy is made. Therefore, no responsibility or liability is either exoressed or implied and is without recourse against anyone. All of the above refers to what is called the T-18 NEWSLETTER.
Sorry we have to take up space for that, gents, but in these days, etc.....

SOS...SOS...SOS...One of our Australian builders, (Martin W. Beck, of 44 Sheppard Rd., Emu plains, N.S.W. 2750, Australia), is gearing up to assemble a WIDE BODY T-18, the first to be constructed in Aus. and he's run into a snag with their Dept. of Aviation. Seems they can't approve the project until they have the names and addresses of at least 6 owner/builders of the wide body T-18 that have completed at least 100 hrs. of flying in it.

Martin has all parts on hand to assemble, but he's stuck until we can get some names and addresses to him. I know of Ken Knowle's bird and Karl and Lazie Lipscomb's WBs, but I'm at a loss to know who else of you is now flying a Wide Body. If YOU are one of those, please let me know pronto, even tho' you may not have 100 hrs. on it! If any of the rest of you know of someone besides Ken and Karl, it would be appreciated if you's let me know. My records don't indicate whether or not it's a st'd or WB and it's the same with Lu Sunderland. I know I turned out several WB fuselages for people, but Karl's is the only one I know for sure that is flying.

FUTURE OF THE T-18 NEWSLETTER: As I have written so often in the past, the ONLY THING THAT KEEPS THE NEWSLETTERS GOING ARE THE ARTICLES, TIPS, and LETTERS FROM YOU, THE BUILDERS AND OWNERS.....The problem is that the well is close to running dry for material. I only have enough material on hand for maybe one more newsletter..... certainly no more than two. We have covered the construction of most every item on the airplane and some of them more than once. We have published quite a lot of performance information, comments on flying the T-18, and a variety of other subjects, including reports and articles on the social function side of things.

If I have your interest by now, please consider this point: Best estimates say that probably 500+ T-18s have been built. ALL of them have spinners, props, cowlings, baffles, oil coolers, fuel systems, wheels and brakes, wheel pants, gear fairings, throttles and mixture controls, engine inst'ts, rudder and brake pedals, brake cyl's, instrument panels full of a variety of instruments in a variety of arrangements. All of them have windshields, all have upholstery and seats, all have baggage compartments, radios, antennae, nav lites, flaps, trim systems, tail wheels, etc....you get the idea.

Now go back thru your NLs and make a mote of how many articles you have seen on installing spinners (1), the proper way to install wood and metal props, or how to go about installing cowling (3 or 4 types available), & what about baffles? (Only two have offeres to share their baffle patterns). Have you ever seen an article on the a step by step method to install wheel pants?, or gear fairing? Or routing of brake lines and the AN hdw needed? Ditto a complete fuel system and a list of AN parts needed? How do you mount a throttle and mixture control and how do you route the flex cable and hook them up at the carb? Ditto the plumbing of engine instruments?

(cont'd from pg. 25)
Anyway, the point is that there are STILL quite a number of subjects that we need for the NL. I have had calls asking my opinion on all the above subjects and a good many others besides. I've been able to answer some of the stock questionsand some I haven't. Tony Bingelis' two excellent books should be MUST reading for builders, even tho' a portion of his material isn't directly applicable to T-18 building. His monthly articles in Sport Aviation go clear back to Jan. '72,...15 years worth, and there have only been a couple of months that his column wasn't carried! A fantastic record! I have been photo copying his articles a year at a time and now have an almost complete file of them. I realize some of you have only joined EAA in the past few years and probably don't have a collection of magazines like I do. Sorry I can't help you with copies, due to copyright laws.

I would like for ALL necessary info be in our NLs, but one person can only do so much and when that person is within a few weeks of being 70 and his time is already spread mighty thin, the prognosis for getting it all done is mighty poor. Our T-18 Owners Manual is still in limbo for the same reason....because YOU and YOU won't take the time to sit down and write a p page or two for the NL. Almost all of you have said, "I really do appreciate the NLs and keep up the good work, etc.", but fully 90% of you haven't repaid the debt in benefits you received by contributing an article or tip! If you don't know WHAT to write about, look at the preceding list of subjects or look at every detail on your airplane. We don't have any problem with having enough subjects available...just a dearth of articles.

If you can send in an article, it would help me if you could type it on a st'd size sheet of paper, with st'd margins, but if you can't type it send it anyway and I'll type it. I often have to scissor and Scotch tape articles together to make space come out even. Illustrations come out better if you use a fine point black ink pen and regular block style lettering, but here again I can go over pencil drawings with a pen and make a paste-over lettering patch with the typewriter if necessary.

As to funds, I have enough left over in the kitty for a couple more issues the size of this one. I originally said in a previous NL that we would make our yearly renewal date coincide with OSH, but since my NL production has been so poor the past year, I'm sure some of you thought the NL had gone down the drain and so didn't renew. Some of you have renewed and I do appreciate your support.

That's all for this issue, amigos. It has just turned '86 and for all of you that sent season greetings, I'd like to wish all the best for you in the coming year, along with good health.

I hope to hear from all of you soon. In the meantime, GOOD FLYING. Dick

Dick

P.S. (Room for one more item):

FOR SALE: An IO 360 A1A engine. Overhaul to zero time specs, with or without a yellow tag on accessories. Will accept an O360 core trade in. Ken Morgan, 817/ 268-1834 (Ft. Worth). (Ken is an A & P and building a T-18.

Our deepest condolences to the family of Ford Hendricks, who recently passed away. An old friend, Ford was an ardent T-18er, an example of how we might approach and enjoy life when we get to the mid and high '70s. A fine and respected gentleman. We'll miss him.

Decided to add the following pages to #63, since I hadn't put out the usual number of NL the past year, so this'll be a BIG 'un. The following is from Fred Gindl, 101 Broomfield Dr., Agincourt, Ont, M1S 2W3 (416/293-9810):

Dear Mr. Cavin:

EVERYBODY IN THE "HOME-BUILT" MOVEMENT HAS A DREAM' TO BRING HIS CREATION (IN MY CASE, MY THORP T-18) TO OSHKOSH. MY TURN WAS THE YEAR 1984.

I STARTED BUILDING MY T-18 ON AUGUST 11, 1972--MY FIRST FLIGHT WAS JUNE 11, 1983. "LONG TIME FOR A DREAM!"

ABOUT MYSELF: MY AGE IS 55, I WAS BORN IN VIENNA, AUSTRIA (GLIDDER COUNTRY-WHERE I STARTED SOARING AT THE AGE OF 14). I IMMIGRATED TO CANADA IN THE YEAR OF 1953. I MADE MY POWER FLYING LICENCE IN 1955 AND MY HELICOPTER LICENCE IN 1968. FOR THE PAST 22 YEARS I'VE OPERATED MY OWN SMALL BUSINESS (POLYURETHANE FOAM INSULATION AND SPECIAL COATINGS.)

I ALSO OWN AND OPERATE MY 1949 "NAVION E-225" WHICH IS UNDERGOING COMPLETE OVERHAUL AND PAINTING AT THIS TIME. I OWNED AND OPERATED A "ENSTROM 280" HELICOPTER FOR MY BUSINESS. I WAS FORCED TO SELL MY MACHINE DUE TO UNAFFORDABLE INSURANCE.

MY TOTAL FLYING EXPERIENCE IS 3,477 HOURS IN FIXED WING AND ROTO CRAFT.

ABOUT MY THORP T-18 SERIAL #558
CANADA REGISTRATION: C-G FPB

MY T-18 IS ALL HOME-MADE EXCEPT FOR THE ENGING, LANDING GEAR, WHEELS, BRAKES, PROP, INSTRUMENTS AND RADIOS.

PERFORMANCE ON FIRST INSTALLED ENGINE

150 HP PERFORMANCE

ENGINE: 150 HP. LYC.

PROP: BY SANTA MONICA PROP. 76EM 8-6-71 - PITCH: 71 - DIAM. 70"

A/C EMPTY WEIGHT: 1,074 LBS (I NEVER COULD FIGURE OUT HOW I GOT SO HEAVY!)

STATIC RPM 1,925 (LOWER THAN AVERAGE. TOO MUCH PITCH MAYBE?)

FULL POWER LEVEL FLIGHT 1,000 AGL ST.DAY 2,650 RPM--193 MPH INDIC.

CLIMB SOLO: 120 MPH 1,800' (150 HP O-320 RATED @ 150 HP @ 2700 RPM)

CLIMB PASS.: 120 MPH 1,450'

CRUISE: 2,450 RPM AT 7,500' - 142 MPH INDIC.

STALL CLEAN: 64 MPH

STALL FULL FLAPS: 60 MPH

AT FULL TANK SOLO: 90 MPH, A/C WILL PERFORM INSIDE LOOP

THEREFORE, SELECTED LANDING SPEED IS: 80 MPH

(FRED GINDL, cont'd)

AFTER FLYING MY T-18 (45 HOURS) I DECIDED TO REMOVE THIS "DOG" OF AN ENGINE, AND REPLACE IT WITH A BRAND NEW "160 LYCOMING", THE PROP ALSO NEEDED TO BE RE-PITCHED. I REMOVED THE 150 HP ENGINE AND INSTALLED THE NEW 160 HP ENGINE ON OCTOBER 23, 1984.

PERFORMANCE ON 2ND INSTALLED ENGINE

160 HP PERFORMANCE

ENGINE: 160 HP LYC.

PROP: SAME, EXCEPT RE-PITCHED TO 68" AND BALANCED
ALSO THE PROP WAS HARMONIC CHECKED (AVOID CONT. OPERATION BETWEEN 2,470-2,769) "JUST A PEACE OF MIND"
I ALSO REMOVED SOME WEIGHT FROM THE AIRFRAME.

A/C EMPTY WEIGHT: 1,054 LBS (-20 LBS)

STATIC RPM 2,250 (+325 RPM OF 150 HP ENG)

FULL POWER LEVEL FLIGHT 1,000' AGL ST.DAY 3,100 RPM 212 MPH INDIC.

CLIMB SOLO: 120 MPH 2,200' (O-320 160 HP DEVELOPS 160 HP @ 2700 RPM)

CLIMB PASS: 120 MPH 1,550'

CRUISE 7,500' AGL AT 2,375 AND 18.5 MAN. 162 MPH

STALL CLEAN: 64 MPH

STALL FULL FLAPS: 60 MPH

AT HIGH SPEED BY MYSELF AND FULL FUEL, SHE WILL STILL DO ACROBATICS WITH FULL FLAPS(?) I'M NOT CONCERNED WITH THAT, SINCE I KNOW WHAT SHE'S DOING. I JUST APPROACH SLOWER!

TOTAL TIME ON THE AIRCRAFT IS NOW 84:45 HOURS AND I LOVE EVERY BIT OF THE T-18.

SPECIAL THANKS TO MR. JOHN THORP, MR. LOU SUNDERLAND AND MR. BOB DIAL FOR HELPING - "MY DREAM COME TRUE"

SINCERELY, THANKS, FRED, FOR THE EXCELLENT PERFORMANCE COMPARISON

FRED GINDL

P.S. MY MEMBERSHIP CHEQUE FOR 1986 IS ENCLOSED

IT WOULD HAVE BEEN INTERESTING TO SEE WHAT FRED'S AIRPLANE WOULD HAVE DONE ON THE 150 HP ENG. IF HE HAD FIRST REPITCHED THE PROP.

WE NEED MORE PERFORMANCE REPORTS — PLEASE!

67