L. D. Sunderland, 5 Griffin Dr, Apalachin, NY 13732

OSHKOSH 71 - This was the biggest year ever for T-18's at the annual EAA Fly-in and according to my figures, there were more T-18's than any other type homebuilt. I believe there were 25. George Leider won the Best T-18 Workmanship award and Earl Ody won the Best T-18 Interior award. They are both from California. I was surprised to win the Best Upholstery award for all aircraft. It is too bad there are so few awards, for there were many deserving of one.

I was so busy working at the T-18 Metalworking Display that I didn't even have time to accept all the offers for rides which were offered. The demonstration was conducted continuously by a group of T-18 builders using a partially completed fuselage and tools belonging to Joe Poklasny who lives no more than a couple hundred feet from the display tent. We didn't make much progress on the project, but we sure did answer alot of questions, and show a number of people how to rivet and how to pound out wing ribs. Tracy Pilurs and her son both formed a rib which they proudly carried around all week and took home to show their chapter members. Lloyd Toll ran a fine welding demonstration which is written up in detail in later paragraphs. The T-18 forum was very well attended. All those with T-18's flying were given a chance to tell of their experiences. Next year I'll try to get the forum scheduled for a time when it can be continued longer because there never seems to be enough time for a good exchange of information.

T-18 Building Instructions - At last a good source has been established for the T-18 Building Instructions. EAA has just published a manual called "Building the Metal Airplane" available from headquarters for $2.50. It contains reprints of the Sport Aviation articles on how to build the T-18 as well as articles about the Pazmany, Mustang and Nomad. Every T-18 builder should get one.

It has a picture of Al Neunteufel's tiger emblemed T-18 on the cover and Don Carter's inside. Al's T-18 got immortalized before he got around to putting on the intended streamlined cowling and Don's before he got on the wheel pants. Al says he plans to put on a streamlined cowling and Don has already made wheel pants.

New Tail Wheel Spring Drawings - After thoroughly re-working N-299V, now owned by Dr. Cottington in Nebraska, John decided that for rough field use the T-18 needs a softer tail spring. He has designed an alternative spring made of two spring steel leaves. He put one on 299V and says it is a big improvement. You can obtain a drawing from John for $1.50. I strongly recommend against using the 3/4" aluminum spring. It is too stiff, even when tapered. I finally solved the problem by making the standard spring from 5/8" aluminum. It has worked just fine and is much softer.

T-18 Decals - If you would like to have an iron-on decal of the T-18 for your shirt, you can obtain one by writing to Bill Terwilliger, Northern Illinois Athletic Supply, University City, Dekalb, Ill. Price is 50 cents each. They are real nice. Get some for the family too for the kids love them.

Rod Balancing - In NL 33, I told how to balance connecting rods. I notice in a letter from John Thorp that he does it the opposite way by first matching the large end weights and then grinding off the small end until all rods weigh the same. So correct the article by changing "large end" for "small end and vice versa.

T-18 in Japan - A. L. Pitts of Tachikawa, Japan has about everything but the fuselage completed and is now working on the fuselage. "Building an airplane in Japan leaves alot to be desired. When it comes to materials or aircraft parts, there is very little available locally. We rely mostly on stateside sources

and the cooperation of many airline friends. It takes a good friend to hand carry two complete landing gear assemblies, along with his own baggage, through customs. If progress continues at the present rate, test flight will be Aug 72 at Seattle. Please find $2.00 for continuation of the Newsletters which I might add, have been a tremendous help in answering our many questions and an aid to construction where there is very limited homebuilt aircraft activity."

Doesn't this letter give some of you who think you have it rough a little encouragement? A number of T-18 builders have had their projects interrupted by tours in Viet Nam. Dick Cavin just told me of meeting Francis Richardson on one of his many trips to Viet Nam. He was very worried the next night to hear of a rocket attack on Francis' barracks. Fortunately, a steel folding chair leaning against his bunk stopped a piece of schrapnel and protected him. Francis is now back in the US and has his T-18 about ready to fly.

Propellers- The horsepower and compression ratio of an engine has an important effec on the stresses induced in the propeller due to vibration. The compression ratios and other data on the Lycoming series of engines are shown below:

Engine	hp	Bore	Stroke	Comp ratio
O-235	115	4 3/8	3 7/8	6.5
O-290-G	125	4 7/8	"	"
O-290-D	125	"	"	"
O-290-D2, A	135	"	"	7.0
O-290-D2B, C	135	"	"	7.5
O-320	150	5 1/8	"	"
O-320	160	"	"	8.5
O-340		"	4 1/8	"
O-360	180	5 1/8	4 3/8	"

During the power cycle of a reciprocating engine, the propeller receives an impulse from the combustion followed by an opposite impulse due compression. One pulls the propeller and the other resists it alternately two times per revolution. At 2500 rpm, this occurs 5000 times per minute or 83 cycles per second. The larger the piston area and compression ratio, the larger are the power and compression impulses. If propellers of the same physical dimensions were to be put on all these engines, it is plain to see that the propeller blade stresses would be much higher in the higher horsepower engines. That is why the M76 props used on the O-360 have much heavier cross section.

Depending upon a propeller's geometry (thickness, width, length, pitch and shape), at certain rpm's the blade stresses will be higher than at others. This is basically because the propeller is like a very stiff spring and, when it is excited, it will vibrate at a certain fundamental frequency like a tuning fork. If the firing and compression impulses occur at the same frequency that the prop wants to normally vibrate, then the size, or amplitude, of the vibration will be much larger. Just like on a playground swing; if you lean forward and backward at the right rate, you will make it swing, but if you move at the wrong frequency or rythm, it won't go.

On certificated aircraft, there must be a placard against operation at rpm's where propeller blade stresses are too high, if indeed there is such an rpm within the operation range of a particular installation. But with homebuilts with unknown propeller, engine and engine mount characteristics it is difficult to determine the rpm's to avoid. Two propeller blade failures have now occurred on T-18's, both with 68 inch long 74-DM propellers. Both were on 160 hp engines. Consequently, John Thorp is getting very concerned about the need for a vibration survey.

According to John, all propeller manufacturers have Dave Bierman, Vice President and Chief Engineer at Hartzel do all their vibration surveys and he is the only one in the US which the FAA recognizes as qualified to do this type of work. He has quoted a price to John of $10,000 for each combination tested. A survey involves instrumenting a propeller with strain gages and recording their outputs during actual flight.

Propeller Test Fund - It is time we do something about getting a proper vibration survey performed. I feel that it would be worth $25 in peace of mind for everyone with a Lycoming engine on his homebuilt to know that his propeller isn't going to come apart without warning. Just ask anyone who has had such a failure (if he is lucky enough to be around) and he will tell you that even $100 would be cheap.

So, the T-18 Mutual Aid Society is starting a special fund which will be used to finance a propeller vibration survey. This will be done first on a cut down M 76 and then on an M 74. We don't expect to raise 10 or 20 thousand for this, but John thinks we can find a less expensive arrangement. I will keep records of all donations and if by some small chance we raise more money than is needed we could put it toward the legal fund. Perhaps you could pass the hat at your Chapter meeting because this is something that will benefit all EAAers. Make all checks payable to L. D. Sunderland and mark at the bottom "for test fund." Please don't put it off for this is a very important project. The main thing is for everybody to participate or we'll never raise enough money.

Since writing the above, I discovered that Bob Dial, who nearly lost 19 inches of his 74 DM cut down to 68 inches on his O-320, is already making arrangements with Hartzel to start the tests on his airplane, a T-18. Bob now has an M 76 and it will be tested with two different prop extensions. Then Parker Miller will have his T-18 tested with a 74 DM. So, the machinery is all set up. Let's do our part.

Legal Fund - We haven't been notably successful in raising money for causes because only $796 was donated by 39 people (out of over 800 plans holders), considering that two persons gave $100 each, to help pay for John Thorp's legal expenses. Perhaps this was because I didn't have much specific information. Since the last Newsletter there have been some new developments.

Both the Southern California Edison Power Co. case and the Finney case are now scheduled on the court calendar for the fall of 1972. If you want to hear something ridiculous, here are the charges in the Edison case:
First cause: (1) Negligently, wantonly, recklessly, tortiously, wrongly, and unlawfully designed, processed, constructed manufactured, assembled, prepared, selected materials and parts, presented to test, and inspected, managed, maintained repaired, serviced, owned, sold, resold, operated the aircraft and its component parts involved in this accident. (2) Instructed others regarding the aforesaid etc. (3) Failed to warn, instruct, advise, educate and inform. (4) Otherwise conducted themselves with reference to aforesaid aircraft and its component parts and plaintiff's property.
Second Cause: Hutchison and Finney were unaware of defects.
Third Cause: Maliciously, wantonly etc. crashed into their power lines.

For the above, they want $6,376.50 plus interest and other relief deemed proper by the court. The Finney case has similar gobeldegook charges and they want 3/4 million. To me, it sounds like they tried to write down a vast array of random words in hope that they could confuse a jury and make them think one of them might apply. This is the thanks John gets for designing the finest homebuilt in the world and just because a pilot who hadn't flown for 25 years disregards John's advice to re-skin a twisted wing and instal stall spoilers, and without ever practicing stalls in his airplane, illegally takes a passenger on a test flight and gets into a low altitude spin.

Materials Wholesale - A. Laurie, 1615 N. North Street, Peoria, Ill 61604. Here's a tip that may help some other T-18 builders. I originally bought a T-18 sheet metal kit from Sport Aero. I had started on, I believe the ailerons, when I discovered a material callout for 49 or 50 inch long stock, and the metal rec'd in the kit was only 48 inches long. I think I spent a year trying to find some .040 2024T3 at a reasonable price. I quickly discovered that there is a 50 cent a pound penalty for aluminum orders under 100 pounds. I hit upon calling local manufacturers, telling them I was building an airplane, and found one using 8,000 to 10,000 pounds of 6061 per month. This good man had the aluminum salesman call me and I ordered 300 lbs assorted aluminum sheets. (Lots for scrap and templates.) My order was sent in under the manufacturer's name with a regular monthly order. It was delivered in a separate crate to my city - no shipping charges. Average cost was about 65 cents a pound for .020, .025, 1032, .040, and .050 alclad. Now, if I get time to use the material.

Exhaust Tubing - Has anyone discovered how to bend .035 x1.75 stainless tubing or where you can buy the bends already made? I tried getting some formed at a local muffler shop which has a nice hydraulic bender but the tubing wrinkled badly on the inner radius. Everyone says to use sand, but I haven't found a convenient way to plug the ends. Has anyone succeeded in this?

We have found a good source for tubing. A. B. Murray Co, Bristol, Pa 19007 has 304 stainless 1.75 x .035 for $1.50 per foot. Minimum order is 20 feet. Tell them they can cut it in two 10 foot lengths or it will come in one piece. They don't have 321 stainless. If you want it you can get it from Tube Sales for $3.00 per foot.

I still have ball joints and slip joints for $13.00 per set postpaid in US. These fit 1.75" tubing. Ralph Bowles, is now making ball joints for 1.5" tubing if you know of anyone needing them for a 65 or 85 hp engine. His address is: 592 Troy Rd, Ithaca, N.Y. 14850.

Split Nose Piece - I finally got around to splitting my fiberglas cowling nose piece so it could be removed for inspection without removing the propeller. To do this, I simply sawed the nosepiece in two right down the middle (in the vertical plane). Then I added a 3/4"lip made of fiberglas all along this parting line to which I attached plate nuts. To lay up the flange, I first fastened the two halves together by screwing on a 2" wide strip of aluminum externally along the parting line. Holes were drilled and tapped in the fiberglas for number 6 screws which were used to secure the strips. The screws were short enough so they did not extend through the inside surface of the fiberglas when inserted from the outside. I covered one side where the fiberglas wasn't supposed to stick with a strip of mylar. Scotch tape would also work. After sanding the other half well to make the new resin adhere, I laid up a flange across the parting line using a strip of fiberglas mat.

This worked out quite well so that I can remove the nose piece without removing the prop, and just as importantly, I don't need to hunt up a small child to reach in and instal the prop bolt nuts when I do need to remove the prop. I strongly recommend this feature. Caution! Be sure you can remove the nose piece half without first removing the top cowling. Mine just barely makes it.

Tie Downs - I keep my T-18 in a hangar and never have occasion to need tie downs except when I go to Oshkosh each year. I haven't installed any because I couldn't find a good low-drag solution. George Leider has a good design. The tiedown is made from a piece of aluminum angle - perhaps 1 x 1 by .090. It bolts on the b ottom two holes on the main spar fitting on the center section and extends out at the edge of the gap cover.

Metal Tips - C. Tibbitts, 24 west Roanoke St, Richmond, Va. 23225. Credit goes to Charles Vogelsong, Chapter 122, Harrisonburg who ran an excellent forum show at the East Coast Fly-in, Frederick, Md. September 25-27. He and others really knocked themselves out to do a good job in demonstrating the simplicity of working with metal. A tip I learned is to put masking tape along the lines where layout is to be drawn on aluminum..draw on the tape and after the holes are drilled, pull the tape off. The tape helps to prevent walking of drill bits, making scratches on the aluminum, and prevents marking the aluminum in breaking it up. If standard tape is left on for several months, it is difficult to remove.

Charlie also demonstrated how important it is to have metal shears sharp and in good condition. He had an old pair that he found by the road more than 20 years ago..duckbill type. He had sharpened them well and honed the edges. It was an enlightening experience to compare his old ones with some new ones of the same type that had been "almost" correctly sharpened and stoned. He showed that correct cutting technique was to not apply pr@ssure to the metal - just let the shears support the metal. I am enclosing a price sheet from Charlie for metal picked up in his shop. He normally doesn't ship but will if someone is too far away.

Aluminum for Sale - Charles T Vogelsong, Rt 3, Dillsburg, Pa. 17019, phone 717 432-4589. (all sheets are 144" long and alclad unless noted) .016 x 36 $13.00; .020 x 36 Bare $15.00; .025 x 48 $23.00; .032 x 48 $27.00; 040 x 48 $31.00; 063 x 48 $46.00; .063 x 48 x 48 $17.00.
The above prices are for pick-up at my place of business. Sufficient aluminum for a homebuilt aircraft can be transported in a standard automobile or station wagon by rolling the .016 and cutting the . 063. Pa. residents add 6% sales tax.

Projects for Sale - From time to time I receive word that T-18 projects are for sale. If it is just a set of plans, I don't advertise them in the Newsletter, but if a partially completed project is involved, I'm glad to mention it. Since the Newsletter gets published rather infrequently, I usually recommend advertising in Sport Aviation and Trade-a-Plane.

Bill Mathauser, Box 5, Sun Valley, Idaho 83353 has written a long letter describing his project which he must sell. I'll try to summarize. Bill is an A&E who has worked for Boeing and Lockheed for years and has built a few sailplanes. The fuselage is complete, engine installed, wings 99% complete and horizontal tail is about the only thing not completed. Has one of John Thorp's O-290 engines with a D shaft, special valves, cam, special barrels and all the goodies. Complete panel with new instruments, metal cowl, wheel pants, hardware and a complete set of templates. He has $6,000 in it and will sell for $5,000.

Mrs Eugene Weeks, 3309 East Cardinal Dr, Okla 73121 informed me that her husband passed away recently and she will sell his T-18 materials and plans. No price was given.

Sport Aviation Info Requested - Jack Cox, EAA General Manager just wrote to me requesting that I urge all of you T-18ers to send information and photos to EAA on your projects. He says it is very difficult to obtain material. You probably feel that you are not qualified to write for such a professional looking magazine and that is exactly why we have the T-18 Newsletter - to give us a less formal means for information exchange. However, don't let Sport Aviation scare you. It is your magazine as much as anyone's. It is more for the average guy builder than for the expert and the only way to keep it that way is to get contributions from you, the average guy. Pretty soon it will be so filled with special sections for the various categories that it won't be of any interest to the little guy who is trying to get educated on how to build an airplane. Racing and antiques and who won what award doesn't help you make a part easier.

I think the T-18 will get its deserved attention as being the very finest homebuilt in its class if we will tell our story to others. Just read through the back Newsletters and see how enthusiastic the T-18 owners are. Now, read through back issues of Sport Aviation and see what you find - few notes about crashes, law suits, how hot a Tiger it is and how the tail flutter was solved. Even the Efficiency Contest article only had one sentence about Ron's T-18 winning it. The last issue had a nice article by Chris Fast, however.

One thing anyone can do is get a picture of his T-18 in Sport Aviation. If you aren't a good photographer, you must know someone who is and he would be flattered to think his picture might be used in Sport Aviation. Just remember how NOT to take pictures. Aerial photos are the most difficult, for with most cameras you need to almost overlap wings with the photo ship or the subject aircraft will be just a "little speck", to quote Paul Poberezny.

So, if you can't write, send a photo with some pertinent info. You guys who have flown, send in an article. Even you beginners should send in tips when you hit onto something good. Since so few people will take the time to write ledgibly, it is preferable to use a typewriter - always double spaced to help the editor. But if you can't get it typed, handwritten script is acceptable. Don't use tiny note paper. Plain old lined notebook paper is better for handwritten material. They prefer 5 x 7 photos, either color or black and white but smaller size and transparencies are acceptable. If it is not in sharp focus, forget it. If you hope to make a cover, you must have professional quality.

You've been complaining about the antiques and Breezies getting all the coverage in Sport Aviation. So, if you want to see the T-18 get equal space with Breezy, get busy!

Australian Project - There are now about 30 owners of T-18 plans in Australia so I suggested that they organize their own mutual aid society since many of their problems are quite different than ours here in the US. Bert Oosterhoff, 15 Urana St, Kilsyth 3137, Victoria, Australia (a displaced Dutchman) writes about homebuilding there. He says that most of those holding plans are inactive but he might change the situation by supplying pre-marked skins and some of the more complicated sub-assemblies. I'll send him a list of all Australian plans holders so people can contact him to see if there is someone nearby who is building.

"I am not exactly a Newsletter producer, or even correct material for one. However, with my trade and flying experience, I am thinking of making up marking-off templates for all the parts of the T-18, mark off and drill and bend all the sheet, weld up engine mounts and undercarts, etc, in my small shop behind my house for first T-18 builders and later other aircraft. Because, the majority of ultra light aircraft association members here are frustrated would be commercial pilots who cannot find a job, and who have no other training or trade, and are a bit apprehensive about the building of anything let alone a T-18. Thus, I will make the parts at cost price for any member of the Ultra Light Aircraft Ass'n.

Another difficulty that arises is, though we pay the same price for materials as you do in the USA, we get only $81.00 per 40 hour week, and that is tradesman wages, non skilled or semi skilled get only $55 to $65, in Australian money, about .15 cents more dollar than the US dollar. So you see that although there may seem to be a lot of aircraft started, in view of the prints sold here, the actual aircraft finished and flying would be no more that three or four. Also, any builder intending to build an aircraft in this country has to get each set of bluiprints/workshop/and builder approved by the D.C.A. and he is then put on a list in the department H.Q. In due course, all members of the ULAA are notified by circular of that association every month." How about some flight reports?

Horizontal Tail Fittings - Care should be exercised when locating the 510-1 fitting on the horizontal tail tube. There must be a trap in the drawing for a number of people have read it wrong and ended up with the fitting at the wrong angle. Bill Warwick made his wrong on the first T-18 and they are still doing it. Better make a note on your drawing now before you forget it.

John says that before the first flight, you should check the horizontal tail :

1. Align the horizontal tail with the row of rivets along wl 42. The stick should be 7 1/2 degrees forward of a line perpendicular to WL 42.
2. The horizontal tail tab should be approximately streamlined at this point.
3. If not, bend the steel tube arm. DON'T change the length of the aluminum links or it will change the kinematics of the linkage.

Flight Testing - Most builders are taking my advice and obtaining experienced pilots for initial flight tests. But then they are anxious to see for themselves and, too soon, jump in the right seat and go along. Regardless of whether or not this is permitted by the FAA, it is not wise to fly dual before the airplane has been thoroughly checked out. Before adding the second person, make progressive loading changes with sand bags in about 25 pound increments. There is no problem if everything is alright, but it is the unexpected that you must look out for.

B D Hamm of Orlando, Florida had trouble with his electric trim when he went along dual with his test pilot for the first time. He had installed an auto seat motor directly connected to the screw jack trim mechanism and it ran too fast. If you try something new like that, be sure to test it out on the ground.

Modifications - As I have said many times, about the only way people get into serious trouble with building the T-18 is when they depart from the plans. I think that 95% of all modifications are bad and some downright dangerous. For instance, John says he has the most trouble with people trying to modify the ultra simple trim system with a complicated electric system. Next comes the flap system. I can assure you that if you don't follow the plans in these two areas, you will be making a big mistake. Here is an example I heard about: Instead of the standard flap handle, an emergency brake handle from a sports car was used. A single cable was run back through the tunnel which rubbed against the rudder cable and forced it against the push tube. The battery cable was run through the center tunnel where it rubbed against the rudder cable. Had this worn through, it could have burnt the cable through very easily. I ran my battery cable up the side along with all other wiring and think this is better because of possible interference.

John is using high pressure flixible hose in place of the flexible cable for the trim system. He thinks it will work out real well and solve the problem of finding a source for the flex cable. More details later. I think he said #601 hose.

Another Bad Deal - Don Warner said he gave $50 to Aviation Instrument Developments Box 575, McHenry, Ill for a remote compass while at Oshkosh but no compass was ever received and the post office box is now closed out.

Flap Bulletin - John says that on T-18's with a forward cg loading, it is possible to get a phenomenon he calls "boom" at a 40° flap setting and at speeds between 100 and 120 mph. He thinks this is caused by a horizontal tail stall due to high tail loading and bad airflow due to the tail getting into the wing wake. He says that while flying solo he can nearly always cause a pitch over in N 299V and occasionally when dual. I've never experienced this, and can't imagine what it is like, but then, my cg is pretty far back. John says that the solution is for all T-18's to have the flap travel limited to 30°. Consider this a mandatory bulletin.

Gas Welding Aluminum - Lloyd Toll, Hazen Ark. (Ed Note: One of the most popular demonstrations at Oshkosh this year was the oxy-hydrogen aluminum welding demonstration conducted by Lloyd Toll. In just a few minutes time he could have a person, with gas welding experience, making fairly respectable welds in aluminum. The secret is the use of hydrogen, which burns clean, instead of acetylene. The tough part is getting the right amount of heat and adjusting for the right mixture since you can't see a nice cone like with acetylene. Lloyd says he has welded up over half a dozen T-18 aluminum tanks and hasn't had a single problem with leaks. His technique makes the most beautiful, smooth bead you have ever seen. Here is how you do it, from the old pro himself:)

The aluminum welding technique which I used in the demonstrations I gave at Oshkosh this year was the method used in the aircraft factories before and during WW II. Since Northrop's initial development of the Heli-Arc process in the 1940's, the Oxy-Hydrogen method seems to be a lost art.

Why Heli-Arc? Because it is easier to learn, no flux removal problem, works better on thick material(2" or more), and more adaptable to automation.

Why Oxy-Hydrogen? Because of simplicity and low cost of equipment involved, and it actually does a better job on thin material (.016 to .125).

Alloys generally used are 1100, 3003, 6061 and 5052. Rod used is 1100 and 4043 in 3/32 and 1/8" diameter. Flux used is Alcoa #22 (pink) and #8 flux made by Anti-Borax Compound Co, Ft Wayne, Indiana. Use 1100 rod on 1100 and 3003 material and 4043 on 6061 and 5052. The latter melt at lower temperatures. When welding a combination of the above materials, use 4043 rod.

The equipment needed is an oxygen regulator with an adapter to fit hydrogen tanks and the left hand hose fitting to accommodate your acetylene hose. Use your oxy-acetylene torch, but tips used for aluminum must be about twice as large. On .020 material, use an orifice diameter of .035; on .032, use .045; on .050, use .065. Unlike oxy-acetylene, you will have a wider range of heat adjustment on a given tip with no back-firing or popping. The flame adjustment either way from neutral can also be greater. Flame adjustment will give you some problems. You cannot visually (as with oxy-acet) adjust the inner cone etc. Remember that an excess of hydrogen results in heating too wide an area too slowly, and too much oxygen concentrates too much heat in a small area and oxydizes metal to a degree which is indicated in finished weld bead showing little pits on the surface. If, in adjusting flame, you will direct it toward fluxed area, it will intensify color and make the adjustment easier. While holding flame about 2 inches above fluxed metal, the yellow flame visible on the surface should be about the diameter of a quarter.

Set both gauge pressures at about 8 lbs. Actual amount of gas used is much less and is determined by torch valve adjustment. When completing weld, shut hydrogen valve off first to blow out hydrogen flame. Otherwise, hydrogen flame has a tend ency to burn up in the torch. Not dangerous, but damaging to equipment. Flus is mixed in non-metallic container to a creamy consistency. Apply flux to rod by rubbing on with small brush. No flux is required on base metal. Flux is removed from finished part by immersing part in cold acid for 10 minutes or 4 to 6 minutes in acid held at 150° F. Technical sulphuric acid (93% H_2SO_4)(66BE) 1 gal acid to 19 gal water. Personally, I just wash it off with water and let it go at that and have had good results.

Material being butt welded does'nt have to be clean (as with Heli-Arc) and does'nt have to be vee'd out at joint to get 100% penetration on material up to 3/16" thick. The more curves, radii, angles and flanges you have in the part being welded, the less distortion you will have. A butt weld is as strong as any and easier to make.

Before any welding is begun, have the part all tacked together. Tacks should be as small as possible and about 1" apart. Closer on thin .016, and wider spaced on heavier .090.

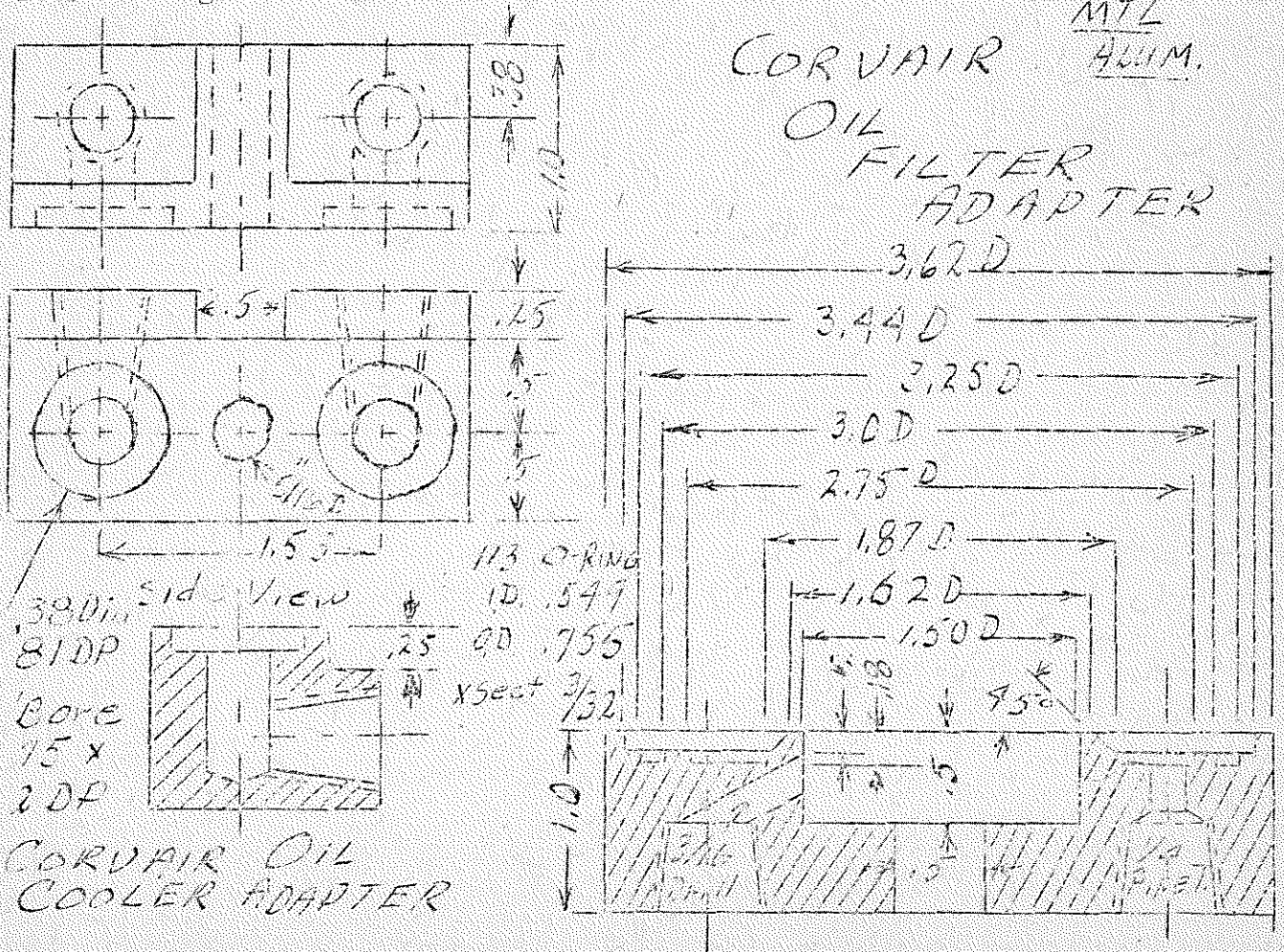
A book, "Welding Alcoa Aluminum" by Alcoa, Pittsburg, Pa. is free for the asking and will be very helpful. (Ed: O'boy, lookout Alcoa!)

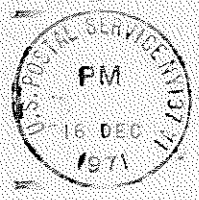
The best welding lense to use is one that American Optical makes for glass blowers. I have forgotten the name of them. Cobalt blue is next best and sun glasses a last resort. Much more could have been said on this subject, but I have been so busy on my T-18, which I intend to fly before Christmas, that I can't get anything else on my mind right now.

Performance on N299V - John has been flying Dr. Cottinghams 180 hp model which he rebuilt and put in all the latest mods. He says "I have decided it is pretty much of a pussy cat instead of a tiger." (I have been saying that for years and thus never gave the name Tiger much publicity since I didn't think it appropriate.) "It seems to cruise about 195 mph at 75% power and 8,000 ft (2400 rpm and 22.5 ").

Surplus in Burbank - L. C. Raymond, 2331 N Orchard Dr, Burbank, Calif says that his favorite salvage dealer on Victory Blvd, Burbank has 1500 feet of flex cable suitable for operating the trim system for 10 cents a foot, marked Lockheed 5222. He also has aluminum.

Oil Coolers and Filters - Here are drawings showing adapters for Corvair oil coolers and filters. The cooler adapter must be made from scratch but a filter adapter can be made from the Corvair part. The cooler can be mounted to the cowling nose piece with #6 screws and nutplates placed in the cooler flange. You should be able to find "O" rings for the cooler seal at a hardware store.





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