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T-18 NEWSLETTER #40

8 January 1974

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BILL OF MATERIALS - Frequently I receive requests for a T-18 bill of materials. Who currently is offering one for sale? If anyone has an up-to-date one compiled, please send it to me or let me know where I can get one.

FOLDING WING SURVEY - The survey in the last Newsletter showed an overwhelmingly high percentage of persons responding favor a folding wing design. Actually, only 75 forms were returned, but that is about par for the course. Only one of these indicated that they didn't favor the idea. John Thorp feels the survey was akin to asking people if they would accept a free \$20.00 bill, but he is convinced a folding wing would be a desirable feature. It is not a simple matter of moving the wing break in and folding the wing. There are complications of breaking the flaps and taking the increased bending moment at the joint.

In any case, John says he is not likely able to take on the job of doing all the necessary redesign work due to health and work load problems combined. So your editor has undertaken the job of making drawings for the folding wing design. John is doing all stress calculations on structural parts. The wing will pivot at the rear spar on a pull-out tube and swing back along the fuselage. Two levers will be actuated to extract the two main spar fitting pins and one ball-lock will release the sliding tube at the rear spar fitting. No other actions are required before folding the wing. The break will be made at Butt Line 45, the dihedral starting at that point. If there is someone with a fair amount of experience who would like to build the prototype and could work just from preliminary sketches, contact me. I won't have time to do any design work though if I have to answer a lot of mail on this subject, so I'll keep you all posted on progress via the Newsletter. Please try to have patience. The fuselage is not affected so if you plan to build a folding wing, just work on everything else but the wing.

LANDING GEAR SOURCE - I understand that George Byard, 5354 Ocean View, LaCanada, Calif 91011 is making landing gear 2 1/5" longer than standard. Don't know price.

RIVET GUNS - I see B & F Aircraft Supply, 6141 West 95th St, Oak Lawn, Ill 60453 phone 312 - 433-3220 has a good selection of rivet guns in their catalog which they will send you for 1 dollar. A 3K size gun is \$45.50 used and a new 3-M-401 is \$47.50. Either would probably work fine for T-18 building. Their No 5 Jr Whitney punch is \$17.00 in metal box. Clecos are \$34. per 100. Ouch!

P-51 OR T-18? - Perhaps you saw the sharp picture of Bob Dawson's T-18 in Sport Aviation and thought it looked more like a P-51 (N 45Z). The color photo he sent me sure looks great and I hope it performs as well as it looks. So far, he has sent no data. He said, "I used to get upset when I read in the Newsletter that someone flew his plane and didn't say how fast it went etc. Now I understand. I will send performance and other particulars as soon as I can." It is narrowed to a single place about 28" wide at the cockpit. The main gear attaches to the spar and retracts into the wing. Tailwheel retracts also. A 150 hp engine is installed and equipped with a constant speed prop, inverted fuel system with pressure carb and inverted oil system. An auxilliary fuel tank is installed behind the seat. He says it is an exciting airplane. Now where is the data Bob? He lives at 211 Sunny, Sugar Land, Texas 77476.

FIRST HAND PROP EXPERIENCE - by Frank Bochulein, 6206 Timberline, Independence, Ohio 44131, T-18 #576. Liked the canopy seal on your T-18 at Oshkosh. Please forward two 18-foot lengths and a copy of the prop report. Your prop experience

coupled with your forum at Oshkosh on the wooden props certainly points me in that direction. A recent experience by one of our chapter members also reinforces my tendency towards the wood prop.

Perhaps you do or donot remember the "Ilse" that was at Oshkosh last year. It's a high wing "Cougar looking" 4-place airplane with distinguishing full plexiglas doors and swept forward fibreglas wings. It was built by Rudy Segrist and is quite a performer. At any rate, he and his wife "Ilse" were on a return flight to Cleveland from San Bernadino, Cal when his prop let go approximately 8" from the hub. It just about tore the engine from the mount before he got shut down. They were at 8,500 feet and fortunately he remembered an abandoned mining strip they had passed over shortly before so he headed for it. He didn't think he was going to make it and his last transmission to the FSS was that he was going into the trees. At this point he remembered he had dumped the flaps and quickly retracted them and got enough lift back to skim over the trees to plop it down on the airstrip smack dab in the middle of a hippy commune. They got out, looked at the airplane and found the cowling was gone, 2 feet of prop and the 180 hp engine was hanging there by the 2 lower engine mount tubes.

Ilse, to say the least, was glad to be spared her life. The ride down in the crippled plane frightened her to death but the ride to town on the back of a hippy "chopper" really scared the --- out of her. They called FSS, told them they were OK and in 4 hours had the airplane on a trailer on their way home. The young people couldn't do enough for them - helped them get a trailer, take the plane apart and load it for the trip home. Happy Ending!

A not so happy ending is the Mike Simkanan story. He crashed in his T-18 a week before Oshkosh at Akron, Ohio. A subsequent autopsy showed that he died of a heart attack. We have lost a fine individual and a fine T-18.

T-18 Parts FOR SALE - A G Bartley, 1337 Paseo Redondo, Burbank, Calif 91501 has some T-18 parts for sale which were made for a builder who has abandoned the project due to employment problems. They include sheet metal fabricated and assembled items, some machined parts - both aluminum and steel - and some welded assemblies.

SOUNDPROOFING OF AIRCRAFT - Howard Henderson, 444 Bryan, Kirkwood, Mo 63122. I measured the sound level in three T-18's while at Oshkosh and have started a little study of how to reduce the noise in my own airplane. I am painting this month and hope to fly in the spring. Here is a preliminary report but more data will be forthcoming:

I am in the final stages of putting together T-18 #600 and am about to select the soundproofing material. Since my wife happens to be the type who likes to talk while flying and (to her) a 150 Lycoming sound is not music, I thought I had better do a little research into noise control.

Having been in the testing end of the aircraft industry for 30 years, I have lived through the paranoidal years when we were scared to death anybody who worked around jet engines very long would go deaf and sue us to death. Fortunately, we all calmed down and developed a sensible program so now things are pretty well under control.

Three things you learn from the start when dealing with noise are:

1. Stop it at the source if possible;
 2. It takes mass (preferably limp) to serve as a barrier; and
 3. If it gets in the room with you, try to absorb it with absorbing wall treatments.
- Obviously, all of these are hard to do in an airplane. Homebuilders don't like mufflers, they don't like to add much weight

for a barrier or wall dampeners, and vinyl is such an easy material to clean, it is difficult to turn down as the primary upholstering material.

But if soundproofing happens to be a prime consideration for your airplane, here are some of the things to consider although some may be near to impossible:

1. Get as far from the source as possible since sound is reduced 6 db for twice the distance in free space. Mufflers on the later Skyhawks are in front of oil pan.
2. Add a muffler.
3. Squeeze the exhaust opening down to about 1/4 " wide and add holes in front of this to diffuse the sound.
4. Use a crossover exhaust sys.
5. Consider 3 or 4 blade propeller. Each blade, since it is smaller, produces less energy and the frequency of the pressure pulses is higher, therefore easier to attenuate. (Ed note: Consider a wooden prop. They are unbelievably smooth running and quieter.)
6. Seal all cracks in doors and canopies. This not only prevents the high frequency whistles from being generated but seals out the engine noise that leaks through the holes. (Ed note: An absolutely tight canopy seal is a must. I reduced the noise level many db by installing the new neoprene bulb seal all around the canopy.)

To serve as a sound barrier:

1. Lead or lead impregnated vinyls are best but of course are heavy. Most commercial lead and foam laminates weigh about 1 pound per sq. ft. They are also expensive (as high as 1.75/lb. ft.).
2. Fiberglass mats are a good old favorite because they are so cheap and so fireproof, but not too good for dampening aluminum panels. (Ed note: If the semi-rigid sheet

fiberglass used for lining air conditioning ducts is applied with the special rubber-base cement available for this purpose, it does real fine job.)

3. Acoustical foams seem to be getting more use but there again need to be laminated with a layer of dampening material.
4. Most T-18 builders are first applying soft aluminum tape 3M No. 426 which, by pilot's reports, seems to help a lot.

For sound absorption:

Carpet-like materials, woven fabric or perforated vinyl all will absorb some of the sound once it gets in the cockpit preventing it from bouncing around so much. The idea here is to use a material with a high absorption coefficient but still practical to clean. Many commercial lightplanes have perforated headliners to achieve this. Don't laugh about the lead mentioned above. One prop driven airliner used 700 lbs of pure sheet lead around the inboard engines and at one time the DC-10 used 2000 lbs of lead vinyl to silence an air conditioner outlet.

As can be seen from Table I, a modern Cherokee at 2500 RPM, by using a combination of all these sound reduction techniques, is able to achieve a total sound difference as compared to my "non-treated" Sky Coupe of about 17 db on the "A" scale. From Table II, this would sound like a 75% reduction to the ear. Most of the commercial data on noise today is referenced to the so called "A" scale which is simply a filtered response de-emphasizing the low frequencies (since the ear will tolerate higher levels of low frequencies).

While at Oskosh for the '73 Fly-In, I was able to get sound levels on 3 T-18's and I have subsequently obtained the additional data which is shown in Table I. Keep in mind it is very difficult to compare data from one airplane to another because they cannot be measured under the same conditions of horsepower, rpm etc., since they have different propellers, engines, and have different drag characteristics so fly at different speeds. But if you will permit me to go overboard on the subject a little, it does appear B. C. Roemer's N18T, a clean T-18 with pretty good acoustical treatment, is getting the most miles/sound exposure index. (I'll bet you never heard of that crazy parameter before.)

Many articles have been written on the psychological aspects of noise, but to be brief, what is music to one ear may be noise to another. (Ed note: Amen! Amen!) To most of us, rock music is a grating noise, but as flyers we tolerate the steady

drene of a smooth running engine. Acoustic experts have agreed on some standards for industry (Table III) and meters to compute the "Exposure Index". It is included here as a reference but not necessarily as a requirement. The FAA is encouraging the use of ear plugs for noisy airplanes and many people report it easier to converse with the plugs, even though you still have to almost yell in a 100 db environment.

A good source for a full line of laminated soundproofing materials is Soundcoat Co 515 Madison Ave, NY, NY 10022. I plan to use mostly lead impregnated vinyls and foams with compressed fiberglass over the lead vinyl on the firewall.

Table I, Sound Level Measurements - All at 2000 ft Alt using GR1555-a Meter

Airplane	2100 rpm	2500 rpm	Max rpm	Canopy seal	Barrier	Upholstery
T-18 N380G Pete Gonzalez 125 hp	?	101 db 110 mph	105 db 130 mph	poor temporary canopy	1/4" 3M foam & foil	none
N18T T-18 Roemer 180 hp	93 db 138 mph	100 db 185 mph	100 db 2750 ? 205 mph	good	alum tape fiberglass FW 1/2 Ethafoam on walls	Carpet
N4784G T-18 Dr Shirn 135 hp	91 db 116 mph	97 db 138 mph	102 db 173 mph 2950	fair, not finished	alum tape & poly foam	solid vinyl
N7544U SkyCoupe 125 HP	96 db 90 mph	105 db 115 mph	?	poor	Fiberglass on FW only	solid vinyl
72 Cherokee 140 hp	86 db 90 mph	88 db 115 mph	92 db 123 mph	good	?	vinyl
68 Plymouth at 60 mph - 75 db						vinyl
73 Cadillac at 60 mph - 68 db						fabric
DC-9	83 db forward, 87 db aft					
Wife talking at 2 ft, 85 - 90 db				none	none	good

Table II

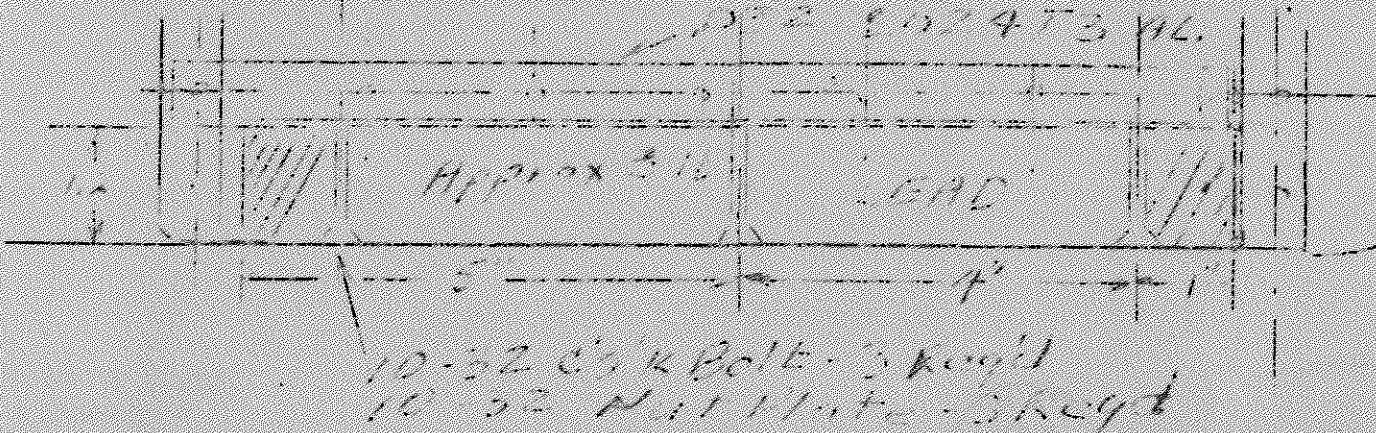
Decibel (db) Reduction	Reduction Heard by ear
2	15%
4	23%
6	38%
8	48%
10	56%
12	63%
14	68%
16	75%
18	77%
20	81%

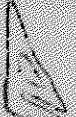
Permissible Noise Exposure Duration per day - Hrs	Table III (Indust Noise Index)	
	Noise in db	"A" Scale
8	90	
6	92	
4	95	
3	97	
2	100	
1.5	102	
1.0	105	
.5	110	
.25	115	
none	over 115	

Ind Noise Level Limit established by the Occupational Safety & Health Act

Ed note: I notice he has a question mark on Roemer's max rpm reading of 100 db. This does seem strange because a 250 rpm and 20 mph speed change can hardly be realized without making a little more noise. I think the reason my wood prop is so much quieter is that the max rpm is only 2550 instead of 2750 and I cruise at only 2350. It sounds like a turbine.

metal propeller I have been using. Although I balanced both the metal prop and the wood one in-flight with a dynamic balancer, the wood prop is unbelievably smooth in comparison except at idle. It weighs only 11.1 lbs - 19 lbs lighter than my 176. Sensenich inspected Dick Lent's T-12 after 70 hours and it was perfect. The W661H props have a standard sine flange so take the standard prop extension but use 5 3/8" bolts. It is for the 125 thru 160 hp engines and costs \$170 the last I heard. Just tell Sensenich the hp engine and they will select a proper pitch.



 Internal Cell Weights - Discussed on page 7. Dimple leading edge skin for 10-32 countersunk screws. The .032 backup is bent up as a channel and joggled to fit inside rib. File off edges of screw head if dimple isn't deep enough. Bend up a trough-shaped form and pour in lead. Don't get lead any hotter than necessary as it will melt.

Moulding from page 7. Full-size. 4 ft long, warp making it difficult to fit.

T-12 OWNERS IN SEATTLE - Had the good fortune to be in Seattle last week and went to an open house held at Bob Hammer's home for the local Chapter of EAA. Bob still flies his T-12, but his time is mostly taken with work on his new two-place jet project. It has a V-tail and a pod mounted 900 lb thrust Pratt and Whitney engine just aft of the tandem cockpit. Later he will install a GP J-35 engine with a thrust equal to the 2400 lbs gross weight. Some will cut-10 Redes yet.

The next evening all the T-12ers got together at Len Johnson's house. Len is sterling many of the trophies from Northwest Fly-Ins with his beautiful T-12, and has a new glider about half finished.

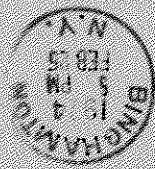
Bill Lawson, 2419 SW 150th, Seattle, Wash 98166 showed me his nice 160hp powered T-12. His workmanship is flawless and, like other owners, is thrilled with his ship.

Bill Johnson finally has his greatly modified T-12 flying and it is performing quite admirably. On the 160 hp engine with constant speed prop he can cruise 203 mph at 7500 feet and 75% power. Bill is writing an article which will appear in Sport Aviation with photos.

The next afternoon, Ford Hendricks took me down to Longview, Wash in his T-12 to see Milt Taylor's new 11P homebuilt which will be flying before long. If you haven't met Milt, you haven't lived. He's a really great guy and I could fill a whole Newsletter with what I learned there, but that will have to wait for another time.

On the way back to Seattle, Ford asked me how I got along at Altitude. I replied that I had been to 17,000 in a P-51 without any trouble so he took me for a bird's-eye view of Mt. Rainier. It was a cloudless day so I got some fabulous shots from all directions - including straight down - of the mountain. His 160 hp T-12 still had lots of climb left at 15,000 feet. Just think, if you would hurry up and get yours finished, you could be taking fabulous flights like that too. Turn off the TV.

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