T-18 NEWSLETTER

ISSUE NUMBER 84

THREE OF A KIND IN WITICHA FALLS, TEXAS
Eby's, Simpson's, Mihaila's

IN THIS ISSUE:

At Oshkosh we were saddened by the recent news of Lyndell Cavin's death. She was a gracious lady who made us feel at ease. She was caring, wanted to know how things were going in our lives. She was a good listener, and remembered details. We would look forward to visiting with her again. Lynn treated us T-18ers like family, and helped keep us together as a group. We'll remember her sense of humor and the good times we all had with her. She will be missed.

On the lighter side, we recall a story that Dick Cavin told. When he retired he was one of the Senior Captains for Braniff Airlines. He and Lynn met when she was a steward-ess for Braniff. When Dick was still flying and Lynn had retired, she would go along on flights with him. One time as a practical joke Dick told the flight attendant that the Braniff President's girl friend was in seat 2B. Actually it was Lynn. Later the flight attendant said to Dick, "I don't see what he sees in her -she's old and fat!" Thanks to Dick and Lynn the camaraderie goes on...

Dick worked long and hard writing and editing the T-18 newsletter. But we know it was Lynn that got the newsletter out.

Pat and Dave Eby

SERENADE TO A HOMEBUILDER

My husband has a hobby
which really keeps him busy.
The activity in our garage
often makes me dizzy!

I always know where he is...
after work, evenings, and
weekends too!
With this project there's
always something to do.

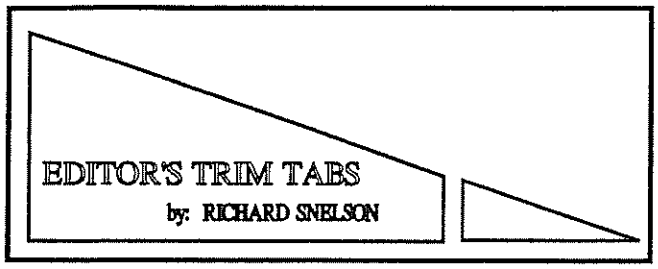
He's working on the gas tank,
the frame and wings are done.
He pounds, shapes, drills and
welds-his idea of fun!

He stands back, admires his work,
and in his mind sees himself soar.
He tilts his head, listens, and
I know he hears his engine roar.

He has become an artist in
his own way....
Carefully planning for that
one great day.

And on that one great day
he will head for the sky and I will be with him
ready to fly!

Poem by Dianne Gilpatrick whose husband is Newsletter Editor of EAA Chapter 288 Daytona Beach, Florida



First Flight for my T-18, N295RS was July 21, 1992. It was great! It was great! It was great! It seems everything in my life has been on hold for the last several months to get N295RS in the air. That included answering the mail and getting this newsletter out. It's one great feeling to finally get your project in the air. I'll report the details later, but for a summary: I did the test flying which included a short lift off on an 8000 ft. runway and later a one-hour flight spent at 3,000 agl over the airport to start seating the rings and to have a landing place in case of trouble. It all went well and I've now flown off my limitation of 25 hours. I've learned a lot about what to do and more importantly, what not to do when making those first flights. I promise to write about my experiences in a later newsletter. If your about to fly a new bird, feel free to call me and discuss "my lessons learned".

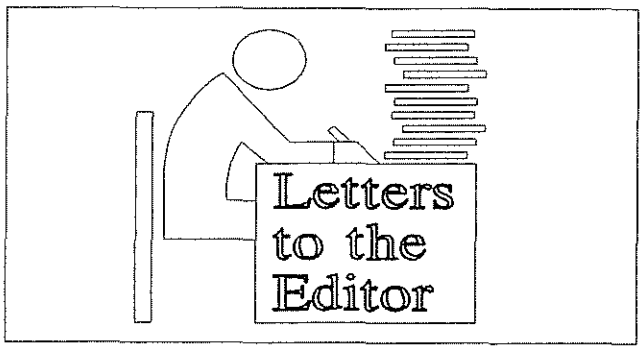
Some events that you should know about are: a California T-18 Fly-In on September 19th and 20th at Placerville, CA. (40 miles east of Sacramento). The planning for this event was done by Hal Stephens whose home phone number is 408-723-0244. Thanks Hal for setting up what should prove to be a great event for the west coast T-18ers. It's back to Kentucky Dam for the fall get together here in the mid-west. The dates are Oct 9, 10 and 11. Jim Paine is again helping to put that event together. Thanks Jim. RoxAnne and I have always had a great time with you and the T-18 gaggle at Kentucky Dam.

Oshkosh Fall Out: There was a lot of discussion at both the banquet and forum about having a "cookout" in place of the banquet. I would like to have your ideas on this so drop me a line ASAP. It was suggested that the cookout could be on the same night as the forum, to shorten the time one would have to stay for T-18 events. Several things we should think about: if we give up our banquet slot at Butch's Anchor Inn we probably won't be able to get it back! Do we care? The cookout would be more work and require folks with transportation to bring grills and pick up food. As for a place to have it Dave Eby has his eye on a place that's right on the bus route so transportation for the masses would be no problem. We didn't get very good treatment on our forum slot this year, in spite of the fact that we had our request in very early. So we aren't sure what we might get next year. I understand the forums are being evaluated to cancel some that aren't worth while in terms of attendance and material. Maybe we will do better next year. Right! I'll take a positive approach to this one.

I want to get out several newsletters before the end of the year, so material is needed. I will write articles on painting with the turbine system and give you all the tips that I picked up on paint preparations from the old master himself Dave Eby. I will also pass along details of my first 25 hours of flying. I need your help with other material that can include building or operational articles etc. We still have a lot of folks that are building and need your lessons learned and or that special little way your T-18 is put together. So do it now! Write me a note for the next newsletter. California T-18ers attending the Sacramento Fly-In send pictures and details for the newsletter. Hope to see a lot of you at Kentucky Dam in October.

Rich Snelson
Route 3 Box 295
Clinton, Illinois 61727

On a sad note, a long time T-18 builder and friend Paul Shifflet of Earlham, Iowa passed away. Paul never missed a fly-in at Kentucky Dam or Oshkosh as far back as I can remember. He was an Electrical Engineer by profession and a fine craftsman who always took a lot of pride in building his T-18. We will all miss him.



Dear Richard,

I enjoyed my first new T-18 Newsletter. I did note a couple of things to comment on. Both are related to Bob Highley's helpful article. I found one idea I expect to use, that is the stiffener for the deck cutout for luggage access. The other is his method for annealing sheet aluminum. I can't argue with results, of course, but other descriptions I have seen, including John's in the EAA publication, "Building the Metal Airplane", call for setting the torch rich, and coating the aluminum with soot. Then the torch is adjusted normally, as though you were going to weld, and passing the flame (outer cone) over the metal, until the soot is burned away. Then allow to cool. This technique is used to keep from overheating the aluminum, but allows it to get hot enough to anneal. If a part requires extensive forming, the process must be repeated else the part work hardens. Depending on the Job at hand, it may be used over the entire sheet, or just locally.

Maurice Brooks
1608 Casa Ct.
Alvin, TX 77511
Day phone 713 483-0313

DEAR RICH,

Have enjoyed reading your newsletters, and thought it's time to write you a letter. Enclosed is a check for $25.00; please start my subscription with newsletter #84. I purchased a standard model T-18 from James Hunter of Big Bear City, Ca. who was also the builder. It is one of the finest examples of metal craftsmanship I have seen. I have had my eyes on this aircraft for a number of years and told Jim that if he ever wanted to sell it I would be first in line. Well one day while working on my Maule M-5 Lunar Rocket, Jim said he would sell it to me. Well I guess by now you know what a thrill it is to own your own T-18. I bought N52JP on July 18, 1991 (my birthday). After six hours of a very thorough checkout I soloed, and have had a smile on my face ever since. I have almost 100 hours in T-18's now and I'm still learning the finer arts of high performance sport plane flying. Jim Hunter and I share his hangar at Bullhead City/ Laughlin Airport in Bullhead City, Arizona. If any other T-18 aviators come to this area please call me as I would enjoy seeing and visiting with them. Here are some of the Specs. on my aircraft:

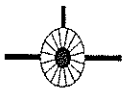
Lyc. 0-360A4A 180 HP,
SENSENICH 76EDM-68/83
MAX. SPEED 200 MPH TAS,
2700RPM SEA LEVEL
CRUISE SPEED 190 MPH . 2600RPM @ 8500 MSL
CLIMB 1400 FPM,
GROSS WT.1550 LBS. @ 120 MPH CLIMB 2200 FPM, 1350 LBS. @ 100 MPH
EMPTY WEIGHT 960 LBS.
STALL SPEED CLEAN 70 MPH INDICATED
STALL SPEED 40 DEGREES FLAPS 60 MPH INDICATED
INSTRUMENTS/AVIONICS, FULL PANEL IFR, NARCO MK12D/GS, KING 8001 LORAN. Enclosed is a picture of my aircraft, and thanks again for providing a very informative newsletter. Yours Truly,

John K. Chang
911 Ramar Rd.
Bullhead City, Az. 86442
602-758-6250
Editor's Note: John's picture is on page 7

February 12, 1992

Dear Rich, Last fall a friend pointed out to me that I probably would never complete my project. He then proceeded to make me an offer in an attempt to separate me from my unfinished T-18S. That caught me by surprise. I had to think it over for about thirty seconds. I then responded with:''you may be right but selling my T-18 would be like selling one of the family. I just can't do it.'' Last I heard he was working on his first RV-6 kit. According to the last newsletter, your T-18 should now be at the airport. That being the case, my Skylane and I would love to hop down and visit, My fear is that I may keep you from your work. Hopefully, one day soon, I'll feel bold enough to call and see if a meeting at the airport can be arranged. Like all the others, thank you for what you do. Besides the building and flying information, what you do is also helping to keep a dream alive. Sincerely,

Bernard D. Scola



Rich
I am still working on the rebuild of N56VB - It can still fly in 92 if I can just get enough time to assembly it.

Question: Has anyone had a problem with aileron counterweights striking top of wing tips? My counterweights conform exactly to the DWGS but strike upper interior of wingtips about 1/4" before full aileron travel is achieved. I am tempted to straighten out the counter weight arm by about 1/4" - Any thoughts? *Editors Note: That's exactly what I did to fix mine.*
I need a good cowling complete (mine is pretty junky) and also need everything from crankshaft flange forward----- prop, extension, all material inc. spinner bulkheads etc. for 0320 B3B. I have a prop governor and drive for the 0320 in good operating condition that is surplus to my needs. Evan Roberts 101 Timberline N. Colleyville, TX 76034 (817) 498-0388 or (817) 485-0253

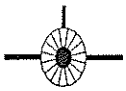
Dear Richard, I sure did hate to miss the T-18 Fly-In last May. My wife & I were on a trip to Israel we had planned for some time. If we have a fly in this fall I'll make every effort to make it.
I have purchased a new hangar at Ryan Airport southwest of Tuscon. It is 43'x36' with a 41'x12' high hi-fold electric door. Has bathroom with shower, telephone, insulated, sky lights (4), and epoxy coated floor. It's BEAUTIFUL!!!

I moved in June 1 and have been busy getting organized. The T-18 looks small by itself, but I keep the Cub there also. By the way, I have a beautifully restored 1946 J3C, 65hp, metal spars, Stits covered, 60 hp SMOH, etc. I'd like to sell. Spread the word if you would.

Good to hear your T-18 is ready to go. I'll look forward to seeing it. Remember, Be careful!!!

The T-18 is a great airplane, but is no safer than the guy who has a hold of the stick.

Steve Hawley
7300 N. San Anna Dr.
Tucson, AZ 85704
(602) 742-7411



Hi, ... I had high hope's of going to Oklahoma and then out to the West Coast, but I temporarily lost my medical. Took a stress test in November as I have passed every year since 1986, but this year it was done at the hospital and the doctor misread the x-rays. Thought he saw a defect. My doctor found the error. Now we are trying to get it straightened out with the FAA. Maybe I'll have my medical in time for a Fall Fly-In.
See Ya.
Dick Amsden
20704 Birch Meadow Dr.
Mt. Clemens, MI 48043.

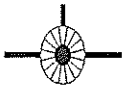
Dear Rich:

Great newsletters! Find enclosed my check for 92 renewal.

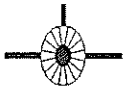
I might pass along a tip for a cheap rivet squeezer. I ground off a bolt to insert in the bottom of my Whitney Punch. Then I ground off flat one of the male tools. You can set the depth of squeeze with the bolt. With the small soft rivets used on trailing edges the job is done easily. I have even used it on 1/8 rivets on the trailing edges of my gear fairings when I had to remove one and didn't have a rivet gun handy. You might try it.

Thanks again for terrific job on the newsletter.

Sincerely,
Nate Eastman
416 West 2nd Street
Kimball, Nebraska 69145



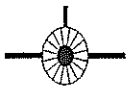
Rich, Standard T-18 Parts Wanted
Cowl, Engine Mount 0-320 Dyn, Stab or parts, rudder or parts, any wing parts, axles wheels & brakes, seat frames, any misc parts. Call or send list to Corky downer P.O. Box 561 Mt. Vernon, TX 75457 Phone 903-588-2773



Rich,
I have decided to sell my T-18 project. Age and health have caught up with me and I don't think I will be able to complete it. Although not much has been done in completing major components, all of the machined parts are finished and I have all the materials necessary to build the airplane except engine, canopy, wheels and brakes. I have more than enough aluminum to complete the airplane and allow for many mistakes.

Perhaps someone in this neck of the woods (Calif) would like to take over and continue the project. I would be willing to sell everything for $2300.00, about half of what I have invested. Anyone interested can call me at (916) 342 5319 for details or write to me at home.

Your help through the newsletter would be appreciated. Sincerely,
Cy Williams,
3440 Hackamore Ln.
Chico, CA 92065



Dear Richard:

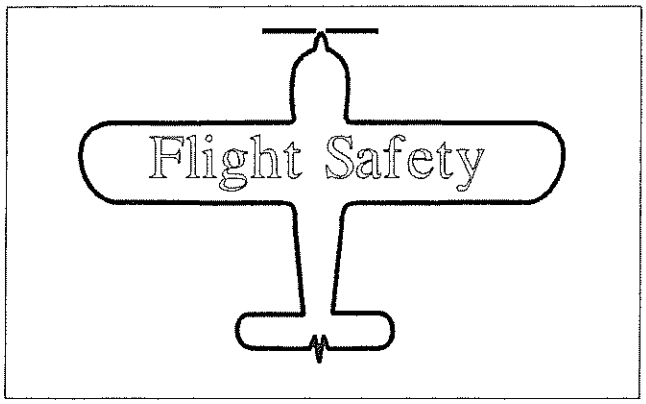
I enjoyed the T-18 Fly-in very much. The new people I got to meet and the renewed friendships from last year make it all worth-while.

The first leg home was the usual headwinds and a little weather to contend with but overall was no problem. After the fuel stop at Tradewinds in Amarillo, more headwinds and thermals to Gallup NM. From there to home base was pretty much the same. Anyway, home safe and sound. I managed to communicate with Walt Griffin, Dean Cochran and John Evens most of the way to Amarillo as they were on their way to Garden City. I was about 60 miles from Tradewinds when I couldn't hear them anymore.

We will be moving to our new home within the next week or so, here is the new address for the newsletter subscription.

Harold F. Thompson HCR 31, Box 497 Jean NV, 89019

The new house is finished and is located on the Sky Ranch Estates airport in Sandy Valley Nv. It is 28 Nautical SW of the Las Vegas VOR and the designator is 3L2. The runway is 3460ft long, paved, and is 2599 in elevation. We also have a xwind runway that is 5000ft and packed dirt. We have an FBO with maintenance and fuel available. Anyone who likes T-18's or just wants to stop by, is welcome. We currently have 14 hangars and about 17 aircraft on the field with more coming. Keep up the good work.
Harold F. Thompson (Tommy)

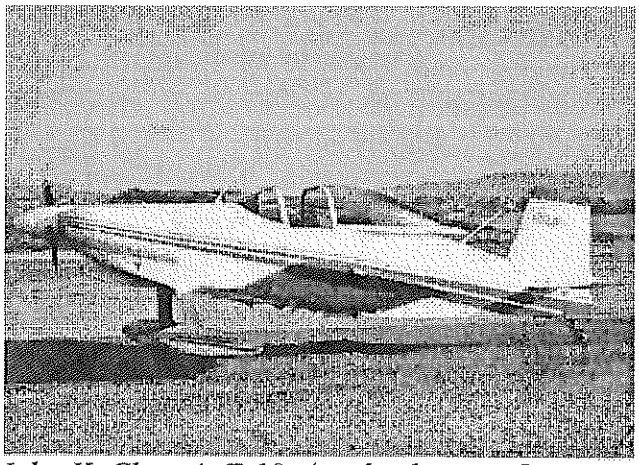


Important Safety Item for all Flying T-18s

A T-18 control stick has broken on take-off and could have resulted in a bad accident. The stick broke about one inch above the point where it was bolted in the control yoke socket. At that point there was a hole drilled for the push-to-talk cable to come out. The crack apparently started on the back side of the stick at that hole and gradually progressed around the stick.

Check all T-18 control sticks for cracks before your next flight.. Jim Paine submitted this information and feels that he was lucky his airplane wasn't damaged when it happened.

The stress is much higher at the lower end of the stick so avoid drilling your wiring outlet hole just above the socket, stay up toward the top 1/3 of the stick.
Thanks Jim for the safety tip.

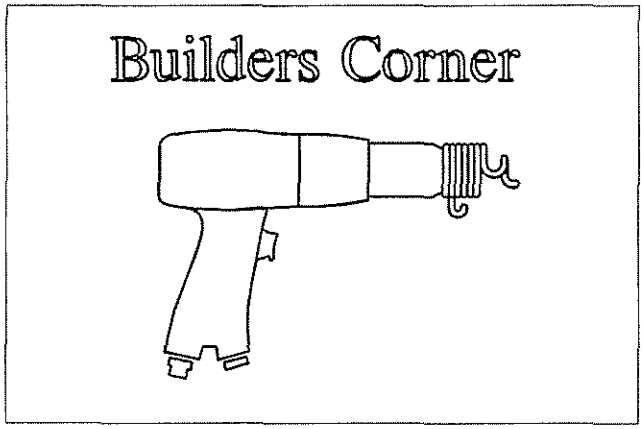


John K. Chang's T-18 (see his letter in Letters to the Editor section)

Dear Richard,. I saw an extremely dangerous scheme in a newsletter on converting car engines to aircraft, applied to a Glassair, no engine type stated. This applies to all types of engines. This scheme for getting "free" vacuum from the engine manifold is dangerous !!! (vol 3 nr 1 illustration #1) The gyros must be in parallel, not in series as described. This type of connection is OK on gyros with separate inlet filters. The MP gage on the panel reads ABSOLUTE pressure available in the manifold. At sealevel the gage reads 30" with the engine OFF, the gyros don't move. What you are trying to do is get free pressure difference from the ABSOLUTE atmospheric pressure at altitude and the lower pressure in the manifold. The author understands this by stating that he cruises at 2350 rpm and closes the throttle to get the 4 in. reading on the gyro vacuum gage. The author understands that he is praying that the gyros don't slow down too much during takeoff and climb. When you are at 8000 ft most engines are running with the carburator WIDE OPEN to get cruise MP. This is practically equal to the atmospheric ABSOLUTE pressure. The pressure difference drops to zilch and so do your gyros. Gyro stability is proportional to the square of the gyro rpm. You had damn well better supply rated 4" of vacuum to each gyro IN PARALLEL NOT SERIES as described, which is an additional mistake. KEEP THE FILTER CLEAN! Some or all regulators limit the vacuum by feeding ambient air to the pump which will allow a condition of very inadequate air flow while showing a normal 4 in. value. In a B-29 my bombardier covered the filter inlet. My gyros tumbled with 4" showing on the gage. Electric gyros were developed to solve the problem of gyros slowing down because the mass (weight) of air at 30,000 ft (unpressurized cockpit) and 4" gage was too low to keep the gyro rpm up. Another trap in the B-29 was loss of both inboard engines stopped both vacuum pumps but the cabin pressure would keep the gyros happy

down to about 13,000 ft. The cabin pressure system went off automatically at 8000' and your gyros would go to hell and you with them if you were in the soup. REAL INSTRUMENT PILOTS CAN FLY NEEDLE SPEEDLE AND AIR BALL !!!. Seriously, practice partial panel and have an electric T and B.
Very sincerely yours,

Leo Corbalis
2998 Via Del Sol
San Jose CA 95132



LANDING GEAR EXTENSIONS

by Bob Hartmaier

I just had a set of landing gear extensions made for my original short gear T-18. First I purchased a piece of flat rectangular steel from Aircraft Spruce. The material is E4340, 1/2" x 3" x one foot long, found on page 41 of my 1990 catalog for $13.89. 1/2" stock is the thinnest that comes in wide enough stock for our purposes. if anyone can find a source of 3/8" stock, I believe that is more than adequate for the extensions. I called every supplier of 4130 in New York, Newark, and Philadelphia, and could only find 3/8" stock if I was willing to buy much more than I needed, with minimum orders on the order of $125 and up! So I settled for a little bit thicker material for a lot less money. I then got my old college drawing kit out of mothballs and made a full size drawing of the extension in Newsletter #51. I knew my B.S. in Aerospace Engineering would come in handy sooner or later! I sent both the steel and the drawing to Rich at Specialty Parts Corp. 7648 S. Pine Ave., Oak Creek, WI. His ad can be found in a recent issue of Sport Aviation. Even though the E4340 material is already heat treated to about 110,000 psi, which is probably good enough, the spec in the newsletter called out 180,000 psi, so I had Rich do that also. His total charge for the work was $85.00, and he was very prompt.

I puzzled over this job for many months, but when I finally found the steel in the Aircraft Spruce catalog, and Rich's ad in Sport Aviation, the job was accomplished quite quickly and easily. I'm sure some builders have access to steel suppliers, machine shops, and heat treatment facilities. and could get this done cheaper, but for those who don't, this way works for a reasonable amount of money and a minimum of time and effort. I'm sure Rich still has my drawing, but if anyone wants to send me a SSAE. I will be glad to supply the full size drawing to them.

Hope this helps someone.
Bob Hartmaier
EAA 78889
T-18 #573

First Flight Report

by Jimmy Cash

Dear Rich,

I'm one of your delinquents who has not yet paid up, so here it is. Also, I figure that it is about time that I give you an update on my Thorp. Serial #411 was purchased from Gerald Czarnack, from Milwaukee, in September of 1990. He had been working on the project since 1968, and he did a fabulous job. Most of the metal work was completed, and all I had to do was construct the firewall forward, build the panel, and install the electrical system. Easier said than done. It's the standard wing and body with all of the modifications

required by John Thorp. I have the Ratray cowling, spinner, and wheel pants. The panel includes the standard 6-pack of flight instruments, Flybuddy LORAN, Narco Comm 810, and the Narco transponder. All of my engine instruments are 2" and are mounted in square angle mounts. This engine instrumentation is complemented by an Electronics International Smart Scanner (4-EGT's, 4-CHT's).

POWERPLANT: The Lycoming 0-320-E2D was in the process of reassembly, but it had no logbooks or history. So, I disassembled the whole thing, gave Monty Barrett a call, and hauled it all to Barrett Performance Aircraft in Tulsa, OK. After the initial inspection, it appeared that the engine was on its first run, and almost everything was within limits. Good news! I had Monty NDI everything, and bring it all to within "new" limits. BPA installed the valves into the cylinders, and with the help of some experienced engine builders (Charlie Calivas: RV-6, and Gary Turner: Jodel), I assembled the rest of the engine. Great learning experience! After about $6,000 for parts, labor, mags, test run, etc., I have a new flow balanced 160-170 hp 0-320 with a doweled case.

PROP: After reading the prop evaluations that Van's performed in Sport Aviation, I ordered the prop made by Harold Rehm. This was the same model prop used on Van's RV-6, and I'm very happy with the results. Harold is a great guy to work with, and he'll do anything to make you happy. The cost was $400, and he delivered it in about three weeks.

ALTERNATOR AND STARTER: The Ratray cowling is very tight in this area, and it took me a while to find the right alternator. I wound up with a rebuild from Precision Parts and Reman Co., that turned out to be smaller than the "Honda" alternator sold in Aircraft Spruce. It can be bought in 50 or 35 amp models, and I was able to use my Lycoming boss mounted bracket and arm with only slight modifications. Its Hitachi part number is #050391, and the perfection part number for the 50 amp is #DAA 100-50. Make sure that you specify a reverse rotating fan. A good deal for $70. The starter is also one featured in Sport Aviation by Mr. Denight. I used #a Nippon Denso rebuilt by Precision Parts #TOS 112, or #052191. It turns over my 8.5:1 pistons with no problem, and the bracket is easy to have machined if you can find the aluminum angle. If you have the 149 tooth ring (U-shaped), you might as well send $20 to Mr. Denight for the proper gear, because he was the only source that I could find.

I flew the airplane for the first time in September of 1991 after getting a lot of practice and advice from Gary Green. It was one of the most satisfying experiences of my life, and I would recommend that you not miss that first flight, as long as you feel prepared.

I'll be sending more information on my performance, and lessons learned the hard way. I hope to be at Oshkosh this year with my bird. Take care and fly safe.

FOR SALE ITEMS

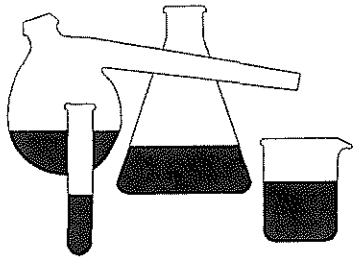
0-290G Engine Parts, for details call
Roy Farris (618) 723-2594

T-18 Airframe complete, All these parts installed: Gear, rudder, Cleveland Wheels, & Brakes, Master Cylinder, Engine Mount, Rudder Pedals, Rudder Cables, Tailwheel, Vert Tail, Horz Tail, Trim System, Push & Pull Tube, Fuel Tank, Windshield, Wing Tips, Sound Proofing, Canopy Frame: Not installed. Rattray Canopy, All Controls, Flap Control with cables. Lots of small Parts, flush Riveted, Zinc Chromated inside. Price is 10,000 firm.
Frank Seats 13113 Chapel Hill Dr.
Ferdericksburg, VA 22407
(703) 786-7843

OCTANE RATINGS Part 2

by Craig Marshal

with reprints from EAAC by
W.J. Keough



In the Fall 1987 issue we discussed some concerns about motor gasoline and compared the qualities of octane and volatility of regular unleaded mogas with aviation 80/87 grade. At the end of that discussion it was mentioned that there were other ingredients in mogas that should be understood when this fuel is used in aircraft engines. Things like aromatic hydrocarbons, alcohols, engine cleaner and antiicing additives are different in mogas and we should be alert to the impact these components have on the materials and operating characteristics of an aircraft engine. It has been said that history is a good teacher and even though you may not have enjoyed the history you learned in school, you may appreciate a little of the history of aviation and motor fuels. Modern aviation fuels were born, or perhaps a better term would be created, in 1935 when a famous aviator named Jimmy Doolittle and two other Air Corps officers, Edwin Aldrin and Frank Klein persuaded the oil refiners and the U.S. Army Air Corps to manufacture an aviation fuel with an octane rating of 100. The development of this new grade of fuel required a very complex refining process to produce the high octane component that was blended into regular 68/70 octane aviation fuel. Tests with the 100 octane fuel on military aircraft of the day showed a 30% increase in power, a 40% increase in rate of climb, and a much shorter takeoff run. With this kind of improvement in performance, the military and the commercial airlines were quick to demand more 100 octane fuel. But' the oil industry was not equipped to produce the high octane component at an economical cost, and a new process had to be developed to meet the demand. The new process was known as ''alkylation'', a low temperature catalytic process that welds together two butylene molecules to form an isooctane molecule. This product is the low volatility, high octane, clean burning fuel component that is simply ideal for aviation fuel. It is such a good and economical fuel that it is still used today for both grades of aviation fuel and it accounts for the difference in quality that we see in aviation fuel and mogas. Mogas evolved in a different way and uses different components to produce the needed octane. Throughout the forties and the early fifties, there was no problem meeting the octane required for automobiles which had relatively low compression ratios and tetraethyl lead could be used to boost the octane rating of the fuel. It was later in the fifties, when the compression ratios began to climb and the ''muscle'' cars appeared, that the oil refiners were once again faced with the need of a new process to increase the octane of mogas. This time the process that was most economical was ''naptha reforming''. Reforming is a high pressure, relatively high temperature catalytic process that breaks up and reforms long molecules of naptha to form odd shaped molecules that have higher octane rating. The product from this process accounts for the material referred to as ''aromatics'' in the fuel, and these com-

TABLE 1
COMPARISON OF MOGAS AND AVGAS COMPONENT MIX

COMPONENT	TYPICAL UNLEADED MOGAS	TYPICAL 80/87 AVGAS
BUTANE & PENTANES	% 25	% 30
MIXED AROMATICS	% 35 - 40	% 5 - 25 MAX.
ALKYLATE	% 5	% 65
MIXED OLEFINS	% 25 - 30	% - 5 MAX.
ALCOHOL AS FUEL 3	% 10 ALLOWED	NOT ALLOWED
ALCOHOL AS DE-ICER	NO SPEC.	SPECIFIED
OTHER ADDITIVES	NO SPEC.	SPECIFIED
VAPOUR PRESSURE	k Pa 107 MAX.	k PA 48 MAX.
TETRAETHYL LEAD	g/L NONE	g/L 0. 14

pounds can cause gaskets and sealants used in fuel systems designed for avgas, to swell or deteriorate as we shall discuss later. During the seventies and eighties, as tetraethyl lead was phased out of mogas, the refiners were forced to increase the aromatic content in unleaded gasoline to produce the necessary octane. This increase in aromatic content also necessitated some changes in the materials selected for the fuel system of the new vehicles to resist the effects of the chemicals encountered. So much for history now let's look at the components in mogas and avgas and see what differences there are and how they might effect an aircraft engine.

Aromatic fuel

Table 1 shows that the typical aviation gasoline has a relatively low concentration of aromatic hydrocarbons, somewhere in the league of 5%, although it is allowed to go as high as 25%. And since it is still permissible to use lead in avgas, there is little incentive for the refiner to add costly aromatics which are more valuable for unleaded mogas. So 80/ 87 avgas is likely to remain low in aromatics. Aromatics are good solvents and you may recognize some of them by their individual names of Benzene, Toluene, and Xylene. As more of these compounds are added to mogas you can expect to have problems with sealant systems, if the sealant materials are not designed to resist the degrading effect of these strong solvents. Mr. B. Silverman of the Products Research and Chemical Corporation, reported on investigations into the "effects of high aromatics aviation fuel on sealant systems" in a 1980 paper to the Society of Automobile Engineers. His work was in response to the concern expressed by airplane manufacturers, who were experiencing fuel leaks on various airplanes in Canada and the U.S. "far in excess of previous years". His investigations found low lead aviation fuels and automobile fuels with aromatic contents as high as 60%. A test program was initiated to determine the best type of sealant to resist the effects of the aromatics, and the following recommendations were made: 1. Dichromate cured sealants exhibited the least loss. 2. Manganese sealants appear to resist deterioration. 3. Lead cured sealants conforming to MILS7502, MILS8784 or MILS8516 should not be used for sealing structure in general aviation fuel tanks. 4. Use MILS4383 for coating metal fuel tanks. Although Mr. Silverman does not speculate on how many of the aircraft operators were using mogas in their aircraft,

it is entirely probable that some of the problems were caused by highly aromatic unleaded motor gasoline which would be more damaging than avgas. Aromatic fuel also is an excellent solvent for certain kinds of composite foams used in amateurbuilt aircraft. Aviation Safety of Oct. 1985, has a report of a failure of the wing of a Quickie homebuilt, with the cause identified as the leakage of highly aromatic mogas saturating and dissolving the foam wing structure.

Alcohols In the fuel

Alcohols are excellent high octane fuels and have been used for many years in race car fuels and as special booster fuels for high performance aircraft engines during takeoff. However in these applications the engines and the fuel systems are designed for the effects of the alcohols and they avoid the problems that are inherent in some alcohol fuels. With the phaseout of tetraethyl lead from mogas, some gasoline marketers are using blends of alcohols in their mogas to provide the needed octane rating. Alcohols have octanes in excess of 100. The common forms of alcohols in fuels are methanol and ethanol. Methanol is made from natural gas and is pretty wild stuff to handle. It is deadly if consumed. Ethanol is made from fermentation of grains and is OK if mixed with the fuel but should not be mixed with the pilot less than eight hours before flight time. The United Cooperatives of Ontario announced in October, 1987 that they plan to market an unleaded motor gasoline containing 3% ethanol and 5% methanol. Similar gasolines have been marketed by others in Saskatchewan and British Columbia. Service station operators and gasoline bulk plant operators should know if their products contain substantial amounts of alcohol but, there is no legal requirement to notify the motorist. Acohol spiked fuels seem to give acceptable performance in automobiles but are considered to be unacceptable for aircraft engines, because of a number of reported incidents where elastomers in the fuel have swollen and interfered with the flow of fuel. Reports in Aviation Safety cite incidents such as a swollen carburetor needle valve made of neoprene, a jammed fuel selector caused by swollen "O" rings, deterioration of the rubber tip of the fuel strainer plunger in a Cessna 150, and many reports of swollen tank cap gaskets. Tests performed on aircraft fuel system elastomers immersed in alcohol spiked fuels, have shown that the nitrile compounds used in general aviation systems swell excessively in the fuel, while the flurocarbon elastomers such as Viton and the fluorosilicones and poly sulfides are much more compatible with the fuel. Motor gasoline may also have small amounts of other alcohols added in the winter months to prevent gas line freezing, but these quantities are extremely small. This is not considered to be detrimental to the fuel system components.

Other additives

You may have noticed this year that the major oil companies are all claiming to have new gasolines that clean your engine, stop injector fouling and do everything except wash your car. All of these miracles are created by tiny amounts of special chemicals added to the fuel and you have to take it on faith that they really will improve performance without some horrible side effect. These additives are a potential source of problems for the aircraft engine, but we have not heard of any incidents that are attributed to this source, so it is best to leave it at that. Tetraethyl lead (TEL) TEL was the wonder additive of the last 60 years, that allowed compression ratios and engine power to grow dramatically. Now it is disgraced by the health effects on people in urban congestion and it is disappearing from mogas. But, it will continue in aviation fuel and this is due, in part, to the fact that many airplane engines need lead to protect the valve seats.

Twenty years ago both auto and aircraft engines were designed to operate with leaded fuel and the valve seats were not hardened because the lead formed a protective layer on the seat and retarded valve seat wear. With the advent of unleaded mogas, however, it was found that these older engines suffered rapid recession of the valve seat if they were operated for long periods at full throttle. This problem was most noticeable in marine engines. As the years have gone by, most of the old auto engines have been scrapped. This is not the case for airplanes, which tend to have much longer life because of the maintenance discipline. So it is that many airplane engines still need a shot of lead once in a while to keep them healthy. Unfortunately there is no way of knowing what kind of valve seats you may have in your engine unless your AME can give you this detail. You should try to find out and fuel your plane accordingly. Conclusion From these discussions of the differences between avgas and mogas, we can conclude that qualities such as octane, engine additives, and TEL, are sufficiently alike that unleaded mogas is very much like 80/ 97 avgas and performance differences vall be small. We have also looked at volatility, aromatics and alcohols, and have cautioned that these qualities of unleaded mogas are very different from aviation fuel and they deserve careful consideration by anyone who uses mogas as a substitute for 80/87 avgas. With the proper knowledge of your fuel and with good handling and storage procedures, the risks of using mogas can be reduced to very acceptable, limits in those engines that have been STC'd for automobile fuel. But, do remember those guidelines that we have discussed such as:

Octane: unleaded regular mogas is equivalent to 80/87 avgas but, don't use it if 100/ 130 is required for your engine. Volatility: get a copy of CGSB3.5M87 spec. so you will have an idea of the vapour pressure of the mogas in your area each month of the year. Sealants: if you are using sealants in the fuel system, be sure they are compatible with the aromatics in mogas. Alcohols: do not use fuels with significant amounts of alcohol. Tetraethyl Lead: if your engine needs lead to lubricate the valve seats, then use leaded avgas every third tank. Don't think of this discussion as either supporting or condemning the use of mogas in aircraft, but rather as a guide to making an intelligent choice of the fuel that suits your particular situation. We hope this discussion will help you fly more safely.

REFERENCES:

Alexander R.Ogston: ''A Short History of Aviation Gasoline Development'' SAE Paper No. 810848. Bemard Silverman: ''Effects of High Aromatic Aviation Fuel on Sealant Systems'' SAE Paper No. 800881 Aviation Safety: October 1,1985 Vol. V, No.19. CGSB3.5M87: National Standard of Canada for Gasoline, unleaded. CAN23.25M82: National Standard of Canada for Gasoline, aviation.

In Future Issues:

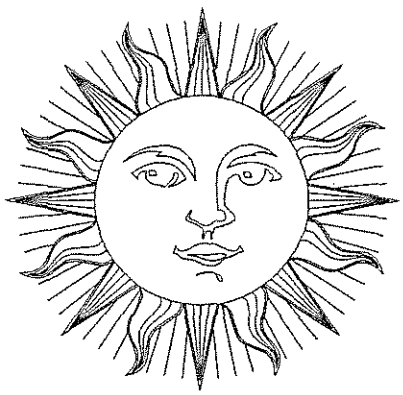
Visit to Witicha Falls Texas for T-18 Checkout
Some fine points on aircraft painting
Plans for a portable spray booth
That first 25 hours and lessons learned
More on Oshkosh 92.
NASA Reports on fuel management problems
Engine Failures from the RV Newsletter
A report on the Sacramento T-18 Gathering (Help! me out on this one west coast folks)

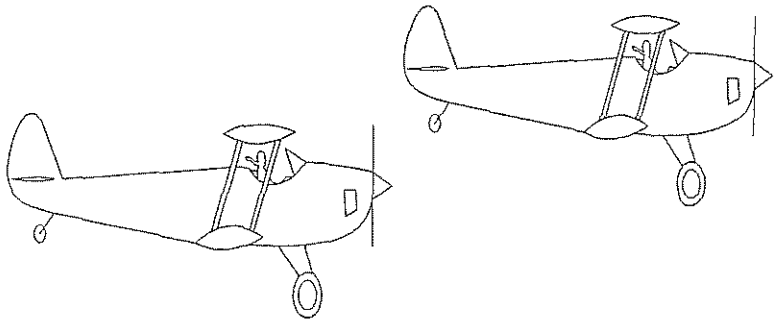
Your articles and letters, are really what make the newsletter, so turn on that computer, or pick up the pen, which ever, just do it now.

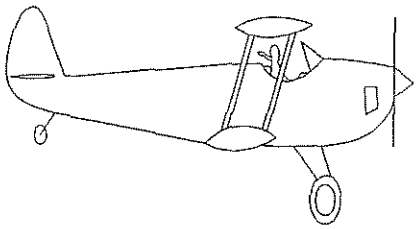
Rich Snelson

SUN 'N FUN 92

by Pat Eby

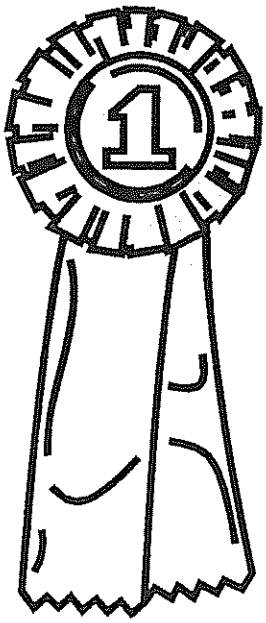




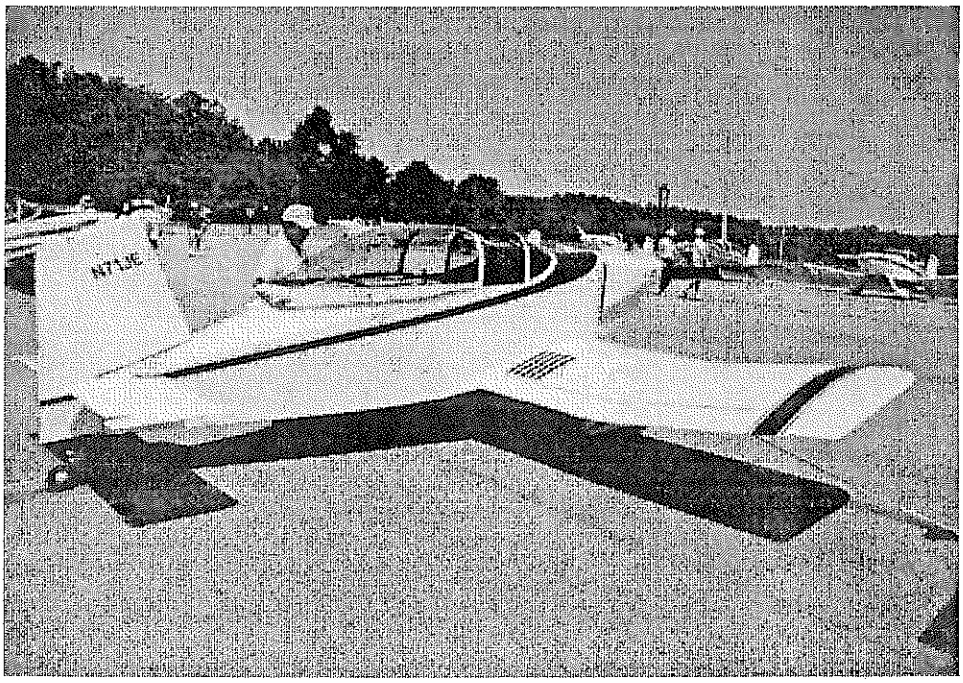


No piano this year, but ''Oompahl'style music greeted us on arrival at Sun 'n Fun. It was Jerry Sleger and his one man band, fun to hear and watch. That and the continual sight of a beautiful green biplane wafting by on final set the stage for nostalgia. It was a New Standard built in 1930 by 'Patter-son NJ, by Standard Aircraft Co., giving rides to the public. Bob Highley supervised the arrival of the''Spirit of St. Louis'' replica from the EAA Flying Museum at Oshkosh. He said that Lloyd Toll did all the welding when that was built. The ''Spirit'' flew every day at 2:00 p.m. There is always a personal welcome'from John Starr. We miss visiting with Jean. Eight T-18s were registered at the Homebuilt tent. More than that flew in. Next year stop by Homebuilt Corner and chat with Maynard and Nanci, Engel,,volunteers there ev-ery year. They post the names and airplanes to help answer the many questions of people looking for someone in particular. We missed seeing Jim and Judy Paine and N747JP, also Dan Culhane with N76KC. Maybe an informal evening for T-18 people to meet and eat together would be a good idea. John McClure drove from Marietta GA, Jim,, Perrine from Cabot AR9 Alvin James from Simpsonville SC, and Ted McLam from New York. Nick Seraphinoff finished building a T-18 for a Doctor who is flying off the time needed. Wendell Green got there via airlines as his time was limited. Charlie England from Jackson MS bought a T18 in March that had been Sylvan Keebler's. Bill Hall was there with his video camera. He replaced his T-18 with a Varieze. It was the first time at Sun 'n Fun for N85FT with proud owners Stash and Gladys Simpson. The opening airshow on Sunday was breathtaking. The clear blue sky showed off the Sky Dive Tampa Bay Team, nine jumpers with four of the ''green group'' in formation. And the designs from wing tip smoke on Manfred Radius' glider were spectaculars enhanced by appropriate background music. The Harvard AT-6 North American Team was a new act, well done. You missed Linda Myers' ''rolling turn'' if you weren't there. She is second in world aerobatic competition, women's division, flew an Extra 300. Try viewing your next airshow lying on your back. With nothing in sight but airplane and sky, you and the aerial ballet are one, Susan Highley worked at the Communications and Head-quarters Building. Special recognition was given to volunteers this year for the management of a bigger and better Sun In Fun airshow. It is still my favorite airshow with the size, weather and fresh squeezed orange juice just right.

WINNERS OF THE 1992 OSHKOSH BEST T-18

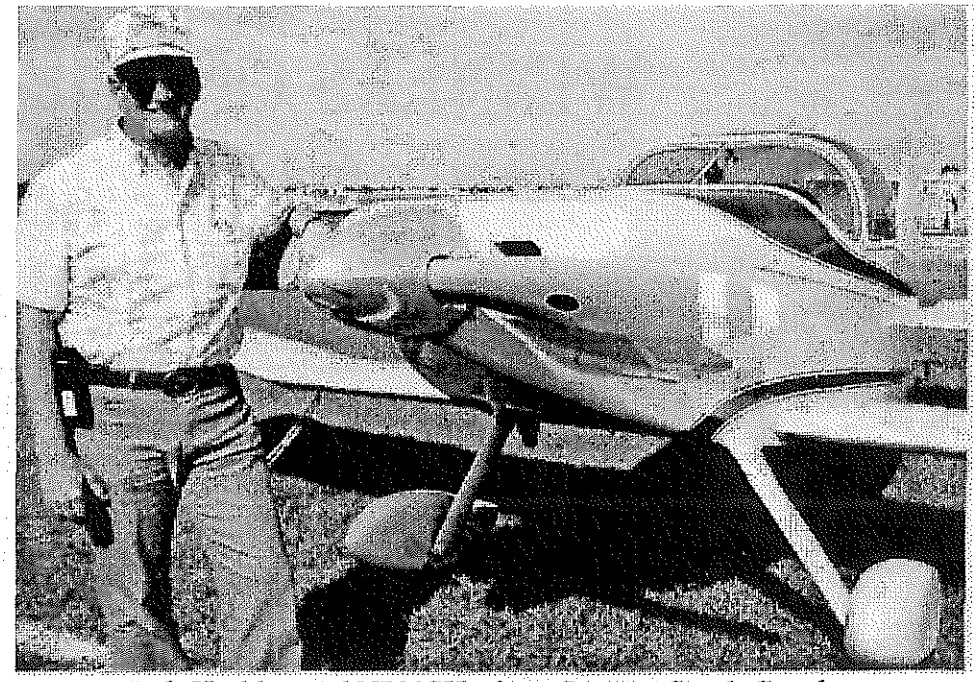


JOHN AND VICKI EVENS OF ARVADA, CO



JOHN & VICKI EVENS BEAUTIFUL THORP N71JE

Plan on spending some time looking at this airplane when you get an opportuntity as there are lessons in John simplistic craftsmanship for all of us.



Bob Highley and N711SH from Sumter, South Carolina

T-18 FALL MEETING
KENTUCKY DAM VILLAGE STATE RESORT PARK

We have been asked to arrange the Fall 1992 T-18 weekend at Kentucky Dam Village State Resort Park. Reservations are made for October 9 & 10. The private dining room has been reserved for Sat. October 10, at 7:00 P.M. We will again use the buffet.

MAKE YOUR RESERVATIONS WITH THE PARK DIRECTLY. YOU MUST **SPECIFY YOU WANT THE PAINE PARTY** ORDER TO GET THE QUOTED RATES AND A ROOM, AS THE LODGE MAY BE FULL OTHER THAN THE ROOMS THEY ARE HOLDING FOR OUR PARTY. RESERVATIONS WITH THE PARK MUST BE MADE BEFORE SEPTEMBER 9, 1992 AND THERE WILL BE A $10 SERVICE CHARGE FOR CANCELLATIONS MADE AFTER THAT DATE. RATES ARE: $45.47 (single), $54.75 (double)

KENTUCKY DAM STATE PARK
P. 0. BOX 69
GILBERTSVILLE, KY 42044
1-800-325-0146

Camping is also available on a first come, first serve basis as well as cottages. Contact the resort for information.

Kentucky Dam State Park Airport is 30 miles east of the Cunningham VOR (Paducah) on the 90 degree radial, 8 miles south of V178. The runway is paved, 4,000 feet long. The Airport is approximately a mile from the resort, however transportation is available for those who do not wish to walk.

BRING YOUR OWN TIE-DOWNS.

LET'S FLY !!

SQUADRON T-18

(Thank you John Thorp!)

September 19th & 20th, 1992

Placerville, CA at the Hangtown VOR
(40 miles east of Sacramento)
in the EAA 512 Hangar

RSVP:

Hal Stephens (H) 408/723-0244 (W) 408/371-4320 (organizer)
Please keep calling if I am out or write 5286 Rafton Drive, San Jose, CA 95124

Meals:

Saturday noon	Lunch at airport Saturday evening
BBQ Dinner	
Sunday morning	Breakfast
Sunday afternoon	Box Lunch or Lunch in Columbia

Accommodations:

Camp out at airport or Placerville Inn (with a pool, Jacuzzi, deck, non-smoking rooms, restaurant)