EAA® Technical Counselor News

JUNE/JULY, 1987

MUSTANG II PROJECT

Technical Counselor Red Beiteishees of Boulder, Colorado reports on a visit to Mark Brown's Mustang II.

This shot shows the Mustang wings and the vertical jigs in Mark Brown's basement. The leading edge skins are visible between the two wing panels.

Mark is an engineer and is doing a very fine job. He hopes to fly his bird before fall. Mark resides in Littleton, Colorado.

Editorial

Paul H. Poberezny, President

EDITORIAL

By Paul H. Poberezny

Dear Technical Counselor,

I would rather use the name "EAA Designee". However, our legal advisors have stated that "counselor" is more appropriate in today's society of legal ramblings. I would like to take this opportunity to thank all of you who are participating in the program to add to the overall general knowledge of builders, improving construction techniques and promoting commonly known standard aeronautical practices as a basis for a successful amateur-built airplane. It is extremely important that we maintain the highest possible safety record in design, construction and, of course, flying. I think we all realize that it only takes one or two incidents in today's society to make great changes. Consider the possibility of a mid air collision and an experimental amateur-built airplane falling into a school yard or into a group of people attending an airshow. Under these circumstances, the press, a congressman, the Department of Transportation and the FAA could and would make quick and sweeping changes, resulting in the loss of our pleasure and freedom.

Having the Technical Counselor program, over the years, has put EAA in the position of leadership, particularly in this area. Many levels, starting at the top of FAA on down, know that there is an organization which is self policing, which cares and which thus far has helped tremendously in maintaining high standards in the building, maintenance and operation of amateur-built airplanes. If we do not continue to do this, we will find ourselves losing our privileges and rights.

From time to time, the commercial interests within the homebuilt movement would like to see a program designed for them to bypass type certification, to sell nearly complete or even complete kits, under the amateur-built program. They have often used the same statements I've heard over the past 30 years. "Is it not better that 'we' build the fuselages, the wings and assemble the airplane than some amateur?" More times than not, those saying this are amateurs themselves and their effort is profit making. Of course, this is not all bad, for anyone putting out a good product certainly needs to be rewarded.

I work closely with FAA at all levels and, in particular, at the Washington level. I have done this for the past 35 years and am privy to a lot of personal opinions and problems that are often times resolved and solved with little fanfare. To bring some of these situations up in the open or even to receive credit for solving them, as we attempt to move forward, would not be in the best interest of the organization or the movement. It would only open the doors for greater interpretations and changes in the law.

I'm sure many of you are unaware that we have changed the LIGHT PLANE WORLD Magazine to the EAA EXPERIMENTER. The "first" EAA EXPERIMENTER gave EAA its start and was basically a homebuilt magazine. However, with the vast support that EAA needs and the many interests it serves, with some 130,000 members, one would almost have to put out a Sears & Roebuck catalog sized magazine monthly to appeal to the wide variety of aviation interest within our membership. It should also be noted that if EAA was only a homebuilder's organization, I doubt if we would have any more than 6,000 members. Far too few to serve all of aviation and one must remember that when one finishes his or her homebuilt, they have the same problems faced by one who buys a factory-built airplane . . . taxes, airspace use, restrictions, transponder requirements, physical impairments that need to be resolved, etc. I think you will all agree that through numbers there is greater strength and, of course, with increased numbers we, here at Headquarters, have to meet greater challenges. We want to make the EAA EXPERIMENTER even more educational. Our first issue has bought a great deal of support from those homebuilders who have subscribed and receive it. It will, however, need the support of our Technical Counselors in providing us with good input on what you have learned so that we may serve those newcomers to the movement who will need advice, education and leadership. In reviewing the Technical Counselor reports that have been received over the past several years, they are very minimum reports. I believe we need to expand them to make them more useful rather than a check-off sheet. I would like to hear some of your recommendations so that we might improve our educational efforts and reporting system.

I also want to develop a better program, here at Headquarters, to keep our Counselors better informed with up-to-date information on matters pertaining to the overall amateur-built movement. I plan to be in contact with you more often and to reorganize our Technical Counselor program and its office to be more responsive to the needs of the amateur-built program.

Safety

BODY TUBE FAILURE ON A BIRDMAN CHINOOK WT-11

An accident involving a Birdman CHINOOK WT-11 occurred on 8 July 1986 as a result of a fatigue failure of the body tube. The subsequent inspections of two other Birdman CHINOOK WT-11s also indicated signs of serious fatigue cracks in the same location and at approximately the same number of flying hours. A review of the information available leads the Canadian Aviation Safety Board staff to conclude that a safety deficiency exists.

The Birdman Chinook accident was the result of a fatigue failure in the body tube supporting the tail assembly just aft of the doubler. The failure occurred in flight and could have been fatal. Subsequent to this accident further inspection has revealed that fatigue cracks have occurred in a similar location on two other Birdman Chinook WT-11s. The accident aircraft had logged 495 hours while the other two aircraft had logged 500 and 355 hours respectively.

Preliminary laboratory examination indicates the fatigue was high cycle in nature likely resulting from extensive flying operations from rough terrain. The particular design of the Chinook doubler and tube assembly tends to focus the stress at the rivet line under the doubler resulting in circumferential cracks at the engine mount and eventual failure.

The manufacturer, Birdman Enterprises Limited of Edmonton Alberta is aware of the deficiency and has taken advisory action both overseas and within North America. There are approximately 196 of these CHINOOK WT-11 type ultralights in Canada and a further 300 abroad. Also, Birdman Enterprises has indicated that there will be a retrofit kit available shortly that will reinforce the body tube in the area susceptible to fatigue.

SAFETY ITEM ON THE MIDGET MUSTANG

The report follows from Jim Burris, EAAer from Mississippi.

Jim reports that following a mishap to a Midget Mustang which entered into a progressive stall pushing the nose up and down and into a spin, he looked the aircraft over pretty carefully. On this particular Midget Mustang, the elevator stops allowed the elevator to go to a 48 degrees up position rather than the more normal 25 degrees up position. There is a gap seal that the airstream ballooned out and wedged between the elevator and the horizontal stabilizer. Once it was caught in that position, the elevator would not go down again. On the ground afterwards they tried to force the gap seal back into the gap even though it was in poor condition, there was no way to get the elevator to come back down again.

SAFETY NOTE FROM WICKS AIRCRAFT

Wicks Aircraft is the distributer for the KFM engines and currently has engines in stock. They did note that due to the extension shaft installed on Moni aircraft, that the KFM engine has been breaking some shafts in this aircraft only. In other aircraft this has not been a problem. We suggest that KFM owners with Monis take a good look at their shaft to see if the extension is placing too much of a strain on it and causing cracking.

Design

Notes from the Nautical World.

The U.S. National Aeronautics and Space Administration researchers have determined that barely visible grooves on the surface of an aircraft fuselage may reduce drag producing air turbulence and increase fuel efficiency. The grooves, shaped in the form of "v" with the angle pointing forward on the fuselage, could be as small as two-thousands of an inch in depth and still favorably alter the turbulent flow of air that forms over the surface of a moving aircraft. There are projections on the skin of fast moving sharks, called dermal denticles, that resembled the riblets or "v" grooves developed by NASA. They don't know if the ridges on the sharks are used for drag reduction but it is the basis for the development of the drag racing tape. 3M products has produced their drag reduction tape that was used on the America's Cup victory by "Stars and Stripes". The product is available through marine distributors and for further information and a small sample of the material (while supplies last) write to EAA Information Services.

CALIBRATE YOUR AIRSPEED INDICATOR

An air pump or source of air pressure is not necessary to calibrate an airspeed indicator. Simply connect a piece of plastic tubing to the pitot port (labeled "P") on the airspeed indicator and remove the tape or plug from the static port (labeled "S"). Fasten a dime store plastic ruler to the other end of the plastic tubing as shown in Figure 1. Insure that the connections do not leak!

Place the ruler and end of the plastic tubing vertically in a jar of water, family fish aquarium, swimming pool, or what ever container you have that you can see through so that the air column trapped in the tube can be measured.

NOTE

It is important to be able to sight perpendicular to the ruler at the top of the water column to obtain as accurate a reading as possible.

For a 0 - 140MPH indicator, the container must be able to hold at least a 10 inch, vertical column of water. For a 0 - 250MPH indicator, the container must be able to hold at least a 33 inch, vertical column of water.

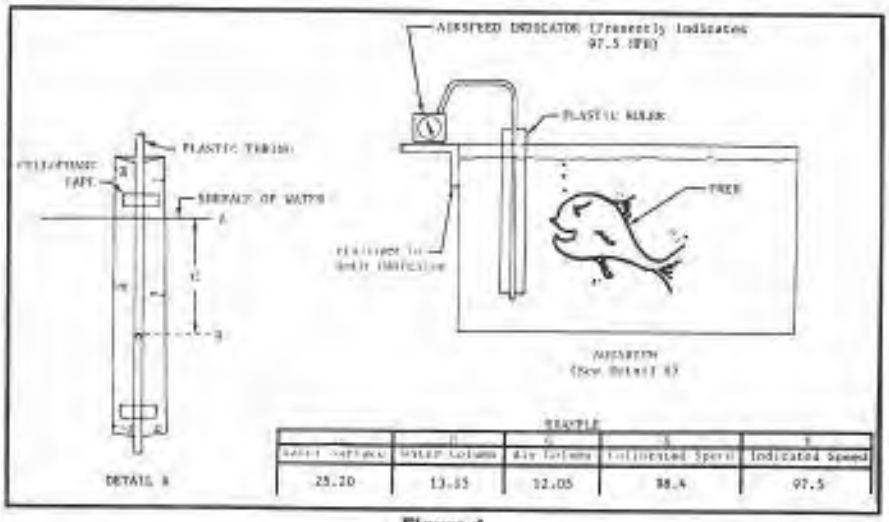


Figure 1

Notice as the tubing and ruler are pushed further under the water, the airspeed indicator reading increases. Very simply, the distance from the surface of the water to the tip of the column of water in the tube (shown as "C" in Figure 1) is proportional to the calibrated (actual) airspeed.

The centimeter scale (marked MM on my ruler) is used because it can be read a little more accurately than a fractions of an inch scale. If you get confused as to whether you are reading millimeters or centimeters, just remember that 2.54 centimeters equal one inch.

One more point worthy of mention before starting the actual calibration; all airspeed indicators have internal friction which must be overcome before the needle will move smoothly. In powered aircraft, the airframe vibration caused by the engine does the job. In sailplanes, the "sticking needle" is sometimes overcome by attaching a small electric motor to the instrument panel with an eccentric weight attached so the motor vibrates the panel when the motor runs. After a discussion with Fred the Fish, about the feasibility of bolting an A-65 to his aquarium to provide a vibration for this test, it was mutually agreed that a few taps on the indicator, just before taking a reading, was a more practical solution.

Now, we are ready to calibrate! Push the ruler and the tube vertically into the water until the airspeed indicator comes up to the length of the air column in the tube. You will notice the top of the water column in the tube is convex. The correct point to record is at the high point or center of the water column in the tube.

NOTE

The accuracy of the calibration is equal to the accuracy of your readings. A good way to record the data is to: 1) record the dimension on the ruler at the surface of the water (column "A" in the example, Figure 1); 2) record the dimension on the ruler at the top of the column of water (column "B" in the example); and 3) record the indicated speed (column "Y" in the example).

Repeat this procedure in **about** 5 MPH increments up to the top of the airspeed scale and then back down again in similar increments to the starting point. It is not necessary to stop at exactly the same point coming down that was recorded on the way up. When taking the reading, the indicator should be placed in the same attitude as it will be installed in the aircraft.

You now have three columns of numbers, a wet ruler and Fred Fish is mad! Well, Fred and the ruler will get over it - but you aren't done with the numbers yet. Subtract the "water column" dimension (column "B" in the example) from the "water surface" dimension (column "A" in the example) and record in column "C". Almost as bad as an IRS Form 1040, isn't it? Now, refer to Figure 2. Take your column "C" of numbers and convert them to calibrated airspeed

numbers. Enter these calibrated airspeed numbers in column "X" of the example.

Grab a piece of graph paper (recommend using 10 sqares to the inch paper; not 8 squares). Plot the X and Y coordinates on the paper using the X and Y columns of data.

Connect the plot points together in a smooth curved line - and Presto! - you now have your own Airspeed Calibration Chart showing indicated airspeed vs. calibrated speed.

NOTE

When plotting the X and Y coordinates, it is possible to end up with an "increasing speed" calibration curve and a "decreasing speed" curve. If this happens, it is a result of not tapping the indicator before each reading or trying to calibrate an indicator which has too much hysteresis. If you have ever heard tales of "flying on the step" you can bet it was done using an airspeed indicator with too much hysteresis. Recommend not using the just calibrated airspeed indicator if the hysteresis exceeds 2 MPH in the range you expect to operate in.

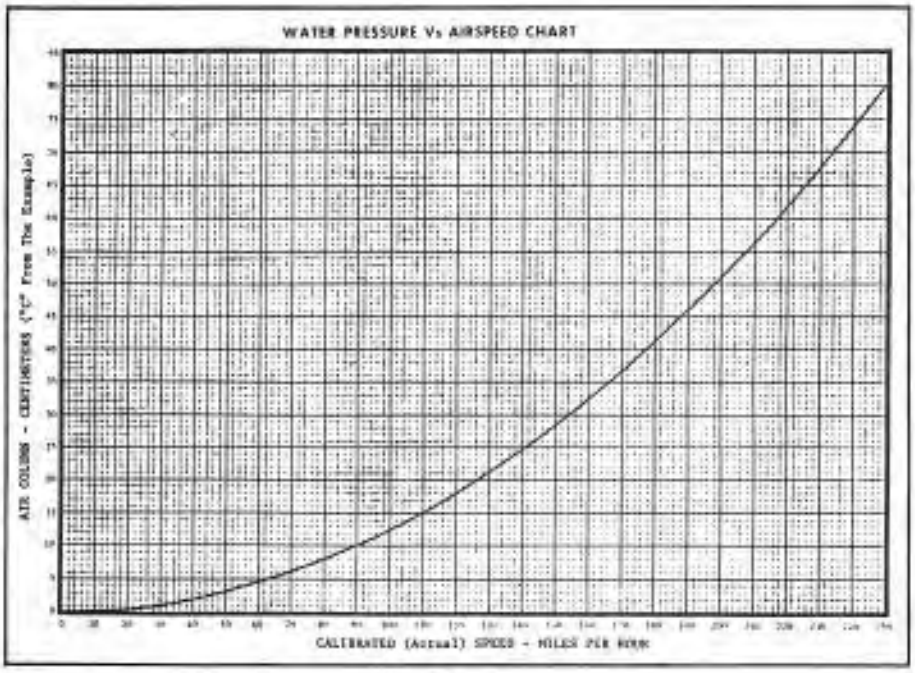


Figure 2

DESIGN INFORMATION ON CRASH SURVIVAL

The FAA has done some crash survival studies which state that a crashworthy design will have five basic traits: (1) A seat and restraint system that will keep the occupant firmly in place and prevent him from smashing into the instrument panel or other parts of the cabin interior. (2) A strong, rigid cockpit area that will provide the occupants with "living room" in a crash impact. (3) A cabin environment free of sharp, hard objects that can do lethal damage in a crash impact. (4) A reasonable amount of protection from postcrash fire, and (5) a way out of the wreckage.

Just a gentle reminder, foam filled fuel cells such as used in Indianapolis cars are available for aircraft and were reported on in the Craftsman Corner, April '87 from an article by Dick Finch of Finch Books. See R. Stanley Mohler's excellent article on crashworthiness in the same issue.

Composite Corner

Technical Counselor Bob Stagner has visited Dave and Tilda Adams' Long-EZ project. The aircraft is being built in a 12' X 4' bedroom. This photo is taken from outside in the hall!

I decided to install a spherical bearing instead of the plans suggested phenolic bearing for two reasons. All of the Long EZ's I have seen have had more friction in the roll control systems than I thought was necessary. I also thought that the chrome moly tube/phenolic bearing would probably develop some play with time.

A ball bearing was suggested in the Canard Pusher newsletter, but it weighs 1.3 pounds and is designed for a conveyor belt roller application. A good friend found an aircraft spherical bearing (Part. Number COM-10) carried by B&F Aircraft Supply. It only weighs .11 pounds and allows as much as 8.5 degrees misalignment. The latter criteria is necessary due to the arc that the other end of the torque tube goes through as the aileron rotates.

To install the bearing, I cut a hole in the wing root glass, large enough for a press fit of the outer race of the bearing. The groove in the outside of the outer race was widened and deepened enough for 1/8 inch 2024T3 aluminum to fit into. Two pieces of the aluminum were cut as shown in sketch A. The wing root glass was sanded in the area that the aluminum pieces go, plus one inch all around. The aluminum was cleaned with alcohol and sanded all over with 100 grit sandpaper. I put duct tape in the area shown in section AA to keep epoxy from between the ball and the outer race. The aluminum pieces and bearing were installed with wet flox on the aluminum pieces next to the glass and in the outer race groove. To hold the aluminum pieces in place I put some "super glue" on the outside corners to hold them against the glass. Wet

flox fillets were used where shown. One ply of BID was layed up over the assembly plus one inch all around. When cured I trimmed the glass away in the area where I put the duct tape. The 4130 tube that goes through the bearing was a snug fit. The fit had to be opened up, because there is some axial movement of the torque tube as it rotates. I used a sanding drum in my moto-tool to open up the bore of the bearing just enough for it to slide freely over the 4130 tube. LPS-3 lubricant has been recommended to me to keep the bearing from rusting.

This is a shot of the Dave Adams' Canard acuating tubes. It is essential for the Canards to be lined up properly to operate smoothly.

This is the bearing that was modified with the ridge down the center for the aircraft. David Adams is from Sikeston, Missouri and reports as follows:

This shot shows a modified Long-EZ bearing and how it is installed.

The following tips are from the Glasair Newsletter #23.

1. **Cutting Plexiglass** from Charley Scott - FT builder in Bentonville, Arkansas.

Use 1/4 inch wide masking tape for cutting the plexiglass 1/4" wider than the window opening. Place the tape on the line, then use the opposite side of the tape as a reference to cut to.

2. **Removing Sign Strip** (Sign Strip is a plexiglass protective coating)

If you are experiencing difficulties removing the sign strip protective coating from your windshield and canopies, try using wide masking tape and/or isopropyl alcohol. Never use acetone on plexiglass - it melts it!

Note: We have recently received comments concerning the sign strip coating which is currently available in the options catalog. Builders have reported the sign strip as being very difficult to remove. We have found that this can be caused by a couple of different variables:

1) Too thin. The thicker that the sign strip is applied, the easier it will be to remove. Applying a couple of thick coats will help.

2) Keeping the windows and windshield out of direct sunlight and/or moisture.

3) Type of sign strip. We have found that the sign strip offered in our options catalog is intended for short term use and after one month it begins to deteriorate. There is another type of sign strip available which is better suited for long term use. We are changing our inventory to the W-8906-8 compound which will be much better suited for the longer term application suited for homebuilders.

3. **Lightweight Starter**

We installed a lightweight starter from B&C Specialty Products on our Glasair III prototype and have been pleased with the results. This starter is eight pounds lighter and develops more torque than the standard gear reduction type starters. For more information, send a self-addressed, stamped envelope to: B&C Specialty Products, 518 Sunnyside Court, Newton, Kansas 67114.

4. Frequently remove your cabin heat muff on the exhaust and inspect it for signs of exhaust leakage, such as a smoky gray deposit coming out of a crack. Exhaust leakage into the cabin can cause carbon monoxide poisoning, a very serious condition. An additional precaution would be to use carbon monoxide detectors purchased at any aviation supply store, for inflight monitoring.

5. **RG Builders Hydraulic Lines**

A Glasair RG builder had someone else help him put together his hydraulic lines and the proper mandrels were not used during the installation of the Aeroquip fittings. The fittings cut into the tubing slicing off large pieces of rubber. The rubber pieces floated around in the hydraulic system for 70 hours until one finally lodged in the hydraulic manifold in flight. Despite cycling the pump up and down many times to get the gear to move, the gear would not come down and he was forced to land gear up (on grass.) Bent prop - costly mistake but it could have been much worse.

Canopy Note

The firm of Micro-Mesh supplies kits for cleaning scratches from canopies. They also do a demonstration in the Oshkosh workshops. Information is available from Micro-Surface Finishing Products, Inc., 1217 West Third Street, Box 818, Wilton, Iowa 52778, telephone (319) 732-3240. Information on how to apply this to remove scratches is also available at no charge from them.

NOTICES - LIABILITY CONCERNS FROM THE GLASAIR NEWS, FIRST QUARTER 1987

LIABILITY INSURANCE

Last year at Oshkosh '86, I was admiring Paul Cloyd's Grand Champion Glasair RG and began thumbing through the large photo album he had put together which covered the details of the entire construction process. I thought that this had to be a great way to help defend oneself if ever involved in a lawsuit regarding a plane you have built. You need all the documentation you can get to show that the aircraft was assembled with care, quality, and in accordance with the instruction manuals. If you don't have this, it will simply be your word against theirs, and they will be showing pictures of a crunched up airplane. How can your word alone possibly put an image of quality in the mind of a judge and jury after that?

Almost everyone owns a camera, and the film can be thought of as cheap liability insurance. Take a picture of each step and show plenty of close up detail. This may be one way of involving your spouse or teenager in your project, by appointing them as chief photographer.

Another important consideration is to jot down personal notes in the instruction manuals. It documents the fact that you followed them and built the airplane as it should have been built. The more notes you make, the better it will be. Make them neat and readable — they may work against you if they are messy and scribbled.

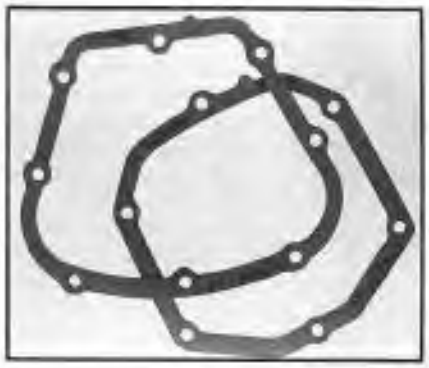
One last thought — if you have a friend who is an A&P mechanic, it would be very beneficial to have him look over your shoulder from time-to-time, or have the local DAR (designated airworthiness representative) come by as often as he/she will stand it. Having the credibility of a licensed mechanic or FAA designated representative testifying that you did first-rate work on your homebuilt could quite possibly be worth more than you could ever pay for the insurance.

There are two important side benefits to this type of documentation:

1. You will build a better airplane.

2. Someday you will be able to curl up on the couch, pull out the photo album, and reminisce about all the "fun" you had building your own airplane.

This is a lamp rack for tabletop drawing of glued items. Note two switches, one for every two lamps, so heat intensity can be varied. It hangs from adjustable chain, which can also be used to vary heat intensity. This item is used in the EAA shop.



These gaskets were entered in the Lycoming Safety Award contest in 1966 by John D. "Doug" Price, 1534 SE 56th, Portland, Oregon 97215, work phone (503) 231-0341. There is a supplemental type certificate for these, the gaskets are reuseable and are available for most engines.

Technical Tips

PROPELLER BUILDING

Note from Allen Clark of Somers Point, New Jersey who is working on building propellers. We passed on some advice to him from Fred Weick, the Ercoupe designer and propeller book author, that he check an old propeller to see what kind of tipping was used in it. He reports: "A couple of things I've learned by examining a broken Cub prop are 1) 3/8 inch long steel magnetic screws are holding 2) .025 inch thick metal sheathing in place. These were Sensenich propellers that I examined. The sheet metal seems to be quite mallable, more like copper than brass. I think the screws would be faster and easier to use than rivets. My feeling concerning the forming of the edges is that they are preformed by a sheet metal die stamping process?"

"My prop carving up to this point has been limited to experimentation. My immediate goal is to carve some realistic full size replicas of WW I types for decorative purposes."

This shows Al Clark's prop duplicating machine-homemade and in the background the Lemie bandsaw which uses Volkswagen wheels and spindles giving it a 24 inch throat. The prop carving machine he calls a kite machine and we are asking him for more details. Also shown is the layout and fuselage welding table for his tailwind.

DRAG/ANTIDRAG SYSTEM

From Nicholas D'Apuzzo, technical counselor of Ambler, Pennsylvania.

Nick supplies aircraft tie rods, drag/antidrag, flying and landing wires. We have received a request from a gentleman who wanted to build his own drag/antidrag system. The previous owner of this aircraft apparently purchased wires that were too long and cut the threaded portion off of one end. He then used a die slightly too large and cut about a half inch of thread on the wires, slipped the nipple on which slid right over the threads, and screwed on two jam nuts, both of which were too big. The purchaser asked if it was possible to then silver solder the assemblies together and Nick, of course, disagreed with that procedure and suggested he purchase new wires. Silver soldering is strong but as Nick commented to him, drag/antidrag wires are primary structure and the use of silver solder which is a form of brazing, is specifically prohibited as a repair in this case. Nick suggested that the buyer obtain a copy of the Advisory Circular AC 43.13-1A, Acceptable Methods, Techniques, and Practices, Aircraft Inspection and Repair.

EDITORS NOTE: The Aircraft Repair Manual includes AC 43.13-1A, and AC 43.13-2 and is available from EAA at $10.95 plus $2.00 for mailing. Ask for stock number 2137074.

Engines

MANIFOLD PRESSURE GAUGES

From Rollin Caler, Technical Counselor #1277.

You may consider adding a manifold pressure gauge to your homebuilt even though it doesn't have a supercharger or a controllable propeller. Some of the advantages are as follows:

1. POWER AVAILABLE FOR TAKE-OFF: Just glancing at the manifold pressure gauge on preflight can give you a very good idea of the power available for take-off. Engine power and aircraft performance are rated at sea level atmospheric pressure (29.92" Hg). This pressure decreases about one inch of mercury per thousand feet. The manifold pressure gauge is an aneroid barometer like the altimeter but measures the pressure in the intake manifold. If your gauge reads 24" Hg sitting on the ramp at an airport of higher elevation, your pressure altitude will be around 6,000 feet.

2. POWER AVAILABLE FOR INITIAL CLIMB: With full power, the manifold pressure gauge will read one or two inches of Hg. less than when the engine is not running. This means that a ramp reading of 24" of Hg. wil change to 23" or 22" on take-off and initial climb. If your aircraft has less than average rate-of-climb, you may want to make prior tests at lower elevations by taking-off with less and less power until you determine the minimum manifold reading that you feel is safe under good conditions. Less than ideal conditions, including windy weather, will require more power. Tests of this kind will make the initial forty-hour test period more meaningful.

3. HIGH ALTITUDE FLYING: If your normal cruise manifold pressure is 19" Hg, you can advance the throttle at your present altitude to see how much power is left. If it reads 22" Hg, you can then estimate about what altitude your maximum and cruise manifold pressure will meet.

4. CRUISE POWER: If your aircraft is usually flown at 19" Hg on cross country flights, it is much quicker to set that power upon leveling off after climb-out by use of the manifold pressure gauge than by using the tachometer. Fuel consumption will be fairly consistent with a particular manifold pressure.

5. SAFETY: At cruise, the tachometer reading and the manifold pressure gauge reading should read the same as on previous flights under the same conditions. Engine problems may require a higher manifold pressure for the same RPM.

6. CONCLUSION: The manifold pressure gauge will not replace the Koch chart, aircraft owners manual, computers, etc., but the reading is instantaneous and meaningful.

ENGINE PERFORMANCE LAWS

Do you get the feeling that your engine is not putting out the power it used to? Maybe age is not the problem, but that simple maintenance can correct some of the following conditions. Exhaust leaks can be checked by wrapping a rag around a vacuum cleaner outlet and insert it in the tailpipe securing it with duct tape. The connection doesn't have to be leak free. Make sure your exhaust valve is closed on the cylinder you are checking and you can use a soap-and-water mixture in a spray bottle. Leak check the entire exhaust system. The same procedure can be used for intake systems using the vacuum and soap suds method. We have to assume you have checked the obvious power robbers such as pulling the intake filter and cleaning the ignition wires. You also want to look for worn baffling and be sure that the baffling is sealing tightly, you don't have a hot engine or hot cylinder.

ENGINES - LEAD FOULING

The following are tips taken from Avco Lycoming Service Letter L192A. Copies of the complete letter are available from Information Services - EAA.

After a flooded start, slowly run the engine from high power to burn off harmful lead deposits then reduce the engine to normal power. When parked for any reason avoid closed throttle idle, set the engine at 1200 RPM. The fuel contains a lead scavenging agent that only functions with a spark plug nose core temperature of 800 degrees F. or higher. To have this high a tempurature, you must have a minimum of 1200 engine RPM. Use normal recommended leaning techniques at cruise conditions regardless of altitude and relean the mixture with application of alternate air or carburetor heat. Avoid fast, low power let down from altitude whenever possible. Descend with power when practical. Try to avoid closed throttle landing approaches whenever possible using a slight amount of power. Keep the cylinder head temperature range up by using normal power and leaning. Swap the top and bottom spark plugs every 25 to 50 hours. Top plugs scavenge better than bottom. After flight or ground operations and before shut down, go to 1800 RPM for 15 to 20 seconds, reduce to 1200 RPM then shut engine off immediately with mixture control.

OIL ANALYSIS

I have seen a note in an aviation publication that the O-360-E model engine is having some problems with the tappets and cam and that metalurgy tests on the oil have indicated metal in the oil from tappets and cams with less than 1000 hours of service in seminole. Another good case for metalurgy tests of oil on a routine basis, particularly in new aircraft and rebuilt engines.

MECHANICAL TIP - SUPER GLUE

Forest Products Laboratory of Madison, Wisconsin doesn't recommend the use of super glue. However, we know it is being used by some as a temporary glue to hold the parts together while they are being worked on. The following tip comes from Jim Edmonds of Lake Charles, Louisiana.

He says that the gap filling thicker super glue sets up in 30 seconds when squirted with a mist of freon. As Jim says, he checked with the FAA and found they don't know how super glue will hold up over the decades. Model planes use it, but they don't usually last long in one piece! It can be used to hold almost anything in place including metal. There are solvents that will also dissolve it and the freon goes under names like "Hot Shot" and I would suggest it as a tempory vise to tack glue things in place while you are working on them and definitely not as structural glue.

Fuel Systems Operations

FUEL PUMP SHORTAGE

AC diaphragm type fuel pump, P/N AC 41272, is used in conjunction with Bendix PS-5C pressure carburetors on quite a few acro aircraft. If you know of any builders who are using the pressure carb, advise them that the fuel pumps are no longer manufactured. One source is Electronic Manufacturing Associates located in Los Angeles, telephone (818) 998-2527. Most recently the going price is $315.00 each retail, $235.00 each wholesale. I don't know of any other pump that is suitable for the pressure carb other than this particular individual one. If any of you have any ideas, please pass them along as these pumps are currently in very short supply.

FUEL PUMP NOTE

Make sure you are not using the wrong fitting on your mechanical fuel pump! Some have a tapered thread, and some have a straight thread with an O-ring and locknut. If you have any questions, you might take your pump to an A&P mechanic and let him/her determine which fitting to use!

TESTING FUEL TANKS

Testing fuel tanks has always been a problem. If you use air it is pretty much of a hazard. You have all heard the old saying "Close only counts in horseshoes", I'd like to add a little note to this that close only counts in horseshoes, hand grenades, and testing fuel tanks with air pressure. Following is a tip from Lee Stevens.

In the past I have found it hard or impossible to get an air regulator for the two or three pounds PSI testing of a fuel tank. My boss, who was an engineer, suggested that I use water. This is what we came up with. A garden hose attached to the fuel tank, the tank and hose filled with water. We raised the open end of the hose above the tank to 69 inches for 2-1/2 PSI, and 97 inches above the tank for 3-1/2 PSI. The 97 inches really made the aluminum tank swell so I know it works.

Maybe this will help keep someone from blowing up a new tank with air as I have done, trying to guess to get 3-1/2 PSI.

ATTITUDES

Many of our technical counselors follow building projects very closely and become pretty close friends with the builders they help. When a builder is coming up on a first flight, it might not be a bad idea for the builder and his friend to think about attitudes and emotions. The builder/friend may be experiencing some fairly strong emotions from whatever cause prior to that first flight. Maybe it is time for a little additional operational counseling on delaying the flight, about a week or two until things smooth out. If the person is under some stress due to a personal or business problem, delaying a flight test a week or two is probably a good idea. If they've got another situation that is bothering them, the person is motivated to fix, first of all, that which hurts the most and that can be a problem with first flights. Builders shouldn't have any more on their minds other than the business at hand as they approach the first flight. In the same vein, EAA does have a manual titled "Pilot Reports and Flight Testing", a quantity of which we have on hand. Only .99 cents plus $2.00 for mailing, ask for stock number 2116520.

EAA® TECHNICAL COUNSELOR NEWS

WITTMAN AIRFIELD

OSHKOSH, WISCONSIN 54903-3086

BULK RATE
U.S. POSTAGE
PAID
PERMIT NO. 1
RANDOM LAKE, WIS.
53075