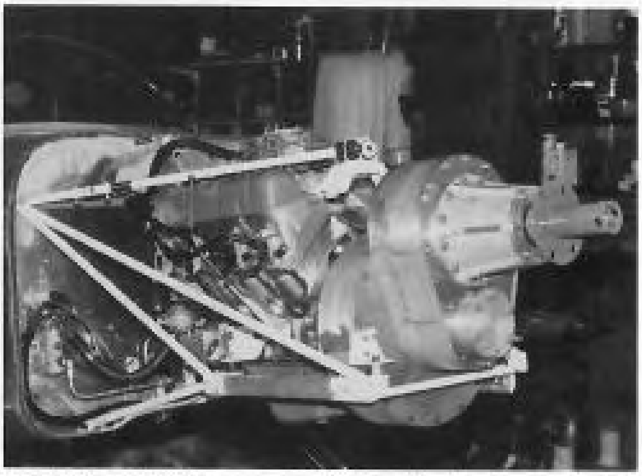
EAA TECHNICAL COUNSELOR NEWS

APRIL/MAY 1986

PAUL POBEREZNY: PUBLISHER, BEN OWEN & ANN RUBY: EDITORS

Butch Fraker of Toledo, Ohio, and his Mustang II project.

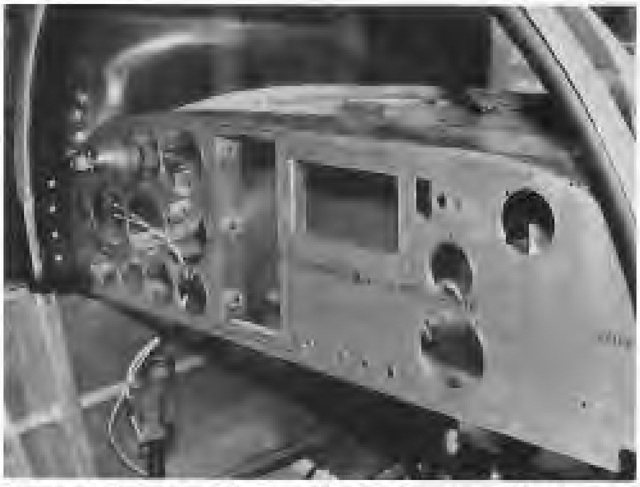


Buick 215 of 150 HP assembled by Butch, who is a machinist.

Technical Counselor, George Shanks, comments, "A very well built bird!"

Left side of the engine compartment shows the precision engine installation. Aircraft is about 80% complete.

Ivan Harvey, of Toledo, Ohio, is building this Mustang II. When Butch and Ivan do something on one bird, they go to the other and do the same thing.



Technical Counselor, George Shanks, reports on Mr. Harvey's project as "A very clean and well built aircraft." It is also about 80% complete.

Technical Tips

D.C. SWITCHES

From Art Bianconi, Technical Counselor #1216, Chapter 230 in New York.

Some years ago, I was fortunate to be able to work along side engineers from Underwriters Laboratories (UL) during destructive testing of electrical devices. It was part of my apprenticeship as a designer for a major electrical manufacturer and it was during this period that I acquired an appreciation for the vital differences between AC and DC ratings for switches.

I share this with you because I am growing increasingly concerned at the widespread lack of appropriateness most aircraft builders demonstrate when selecting switches for the cockpit environment. Each time a builder asks me to perform a pre-FAA visit to his aircraft, I carefully inspect the switches and to date, over three-fourths of the projects inspected have turned up AC rated or non-rated switches in DC circuits.

There is a large scale misconception that any switch can be used, as long as its current rating exceeds the maximum load in the circuit. "Current is current; what difference does it make whether it's DC or AC? Besides, I'm using a 125 volt AC switch in a circuit with only 12 volts!"

The differences in load carrying capability are dramatically non-linear and are best appreciated by carefully inspecting a high-quality switch carrying both AC and DC ratings. Typical of this is the roller and bar micro switch made by MICRO corporation (part #DT-2RV23-A7). Rated at 10 amps at 125 or 250 volts **AC,** the same switch can only carry .3 (that's three-tenths!) of an amp at 125 volts **DC.** If DC voltage is increased to 250 volts, the current rating drops even further to .15 amps! In real terms, this represents less than 1/60 of the original load carrying ability and all we did was go from 250 volts AC to 250 volts DC!

Those of you who can still remember the old Kettering coil ignition systems will recall that when the condenser in the distributor went bad, the points generally turned blue and melted down in just a few minutes. Cockpit switches don't have the benefit of condensers to absorb the electric inertia present in a DC circuit and as a result, the gap temperatures get hot enough to weld contacts, even those made with exotic high temperature alloys.

The reason for this is simple enough to appreciate: because AC current changes directions 120 times a second in a 60 cycle circuit, there are 120 times when there is no current flowing at all. The current actually helps turn itself off the moment it sees a gap and switch designers use this phenomenon to help reduce the cost of manufacturing AC switches. In DC circuits, however, the "push" is constant even when the points begin to open and the resulting arc is DC current's way of demonstrating its resistance to termination.

"But won't my circuit breakers protect me?" NO, they won't. Fuses and circuit breakers provide overload protection and a welded set of contacts will not, by themselves, cause an increase in circuit load. Furthermore, what often happened during UL testing was that the points welded shut making it impossible to open the circuit. Cycling the switch to the open position was often misleading: yes the lever moved, but inside the switch, the cam had separated from the welded points and, while it appeared to have interrupted the circuit, **the circuit was, in fact, still hot.** If the circuit involved was your fuel transfer pump or fuel boost pump and you thought it turned off when, in fact, it was **still running,** what would the consequences be? If it were a flap or elevator trim motor or a gear retraction device, how would a tripped circuit breaker save you if the activating switch was welded closed and in a mode other than what is required for a safe landing?

A DC rated switch will cost you about 3 times more than an AC rated switch, of identical current capacity. If your panel sports 10 switches (which is not likely) the difference will be less than $35.00. You've gotten this far; is it worth jeopardizing your investment or your safety by cutting corners with cheap or improperly rated switches?

HIGH-G PULLOUTS

From the Fly Paper, Chapter 3 Newsletter - 4/85, Queries section

In a recent aeronautical discussion with friends, the statement was made that a sudden pullout from a dive at six g's positive would pull the wings off, even if the plane were rated to six g's. I contend that a gradual pullout at the same six-g loading would not create a failure and would allow the plane to stand more than the six-g maximum load if the pullout were slow and gradual.

Does the abruptness of the pullout and the g buildup have any bearing on the airplane's ability to survive it?
T. P. Zimny, Newport, N. H.

Generally speaking, no. If the wing is rated to 5.7 g's, it should not break under a 5.7-g loading, no matter how abrupt the pullout. Conversely, a gradual pullout won't let you somehow "beat" the load limit. Metal breaks at a certain stress level, and the speed at which that level is approached is irrelevant. (Within reason, of course. There is no difference between a 10-second g-buildup and a three-second one, but there might be a difference between 10 seconds and 0.0001 second.)

But that doesn't mean an abrupt pullout is always safe if the g-level stays at 5.7 or below. The wing may not break, but other factors can come into play. An abrupt maneuver may overstress the tail. Surprisingly, tail loading may be quite low in a sustained high-g manuever, but sudden control inputs may overload it. And don't forget the pilot. A gradual buildup of g-forces is much easier to take, both physically and mentally, than a sudden wrenching load.

Recent wind tunnel research in France suggests that abrupt maneuvers may put excessive loads on the wings of some aircraft, even below its maneuvering speed. The maneuvering speed, or V_a, is defined as the speed below which full and abrupt control movement will not cause the aircraft to exceed its rated load factor - in other words, the speed at which the aircraft stalls at its rated load factor. (In most Normal category planes, V_a is just under twice the flap-up stall speed.) The idea is to give the pilot an airspeed envelope within which he is guaranteed the airplane will not fail structurally, no matter how severe the turbulence or abrupt the maneuver.

. The French research suggests that in some airplanes, particularly those with very clean wings, maneuvering speed may not be the iron-clad guarantee against over-stress we think it is. G-meter readings in CAP-10 aerobatic aircraft showed that stresses in snap roll maneuvers sometimes exceeded limits, even below maneuvering speed. Pursuing this mystery, the French found that during a snap roll, maximum wing lift coefficients were briefly much higher than normal. Therefore, the plane's effective stall speed during the maneuver was lower - and so, therefore, was its maneuvering speed.

As a result of that research, the maximum snap-roll speed of the CAP-10 has been reduced to well below the usual maneuvering speed.

Summing up, if the g-loading is the same, the abruptness of the g-buildup makes no difference. But very abrupt maneuvers, even below V_a, might overstress a wing or a tail for an instant. But an instant is all it takes. Moral: don't make an abrupt maneuver if a smooth one will do.

MURPHY'S MUTTERINGS ON CUTTING AIRCRAFT PLYWOOD

From EAA Chapter "96" Newsletter - Torrance, California

Anyone who has attempted to cut fir or mahogany plywood with a sabre saw has probably disappointedly watched great splinters picked up by the advancing upstroke of the sabre saw blade. There are various methods of defeating that result.

(1) The most satisfactory result is obtained by overlaying the primary product with scrap material, firmly clamped or even bradded to the lower piece. The pattern to be cut must, of course, be laid out on the scrap material. The splinters are then lifted from the scrap material rather than from the part to be used. This method is satisfactory for small parts or one or two large parts or repetitive parts. However, most of us do not maintain a large supply of scrap materials, and alternate methods may be preferable.

(2) Marginally satisfactory results can be obtained by laying out the pattern on the primary part, and then covering the cutting lines with good masking tape. The laid out pattern should be visible through the tape, but may have to be reinforced by drawing on the tape. It is suggested that the tape be wrapped around the starting edge so that the starting cut will not lift the tape and defeat the purpose of the method. The cut is, of course, made through the tape, allowing the tape to provide the support to the veneer. The success of this method depends on the tackiness of the tape.

(3) For a limited number of parts, a third method is suggested, which works well if you have a good eye for tracing lines with the saw. This method involves laying out the pattern, and then tracing the pattern with an Exacto knife, scribing well into or through the first layer of veneer. When the saw is advanced through the wood, the spinters are raised and then broken against the cut line, thereby protecting the primary part from damage.

Engines

AIRCRAFT ENGINES: BRAKE MEAN EFFECTIVE PRESSURE (B.M.E.P.)

By Ben Owen

Some basic information on BMEP that you may have overlooked. Most of us are familiar with the intake-compression-power-exhaust basics of the Otto cycle.

The length of the piston stroke is determined by the crank shaft throw. Basically, the crank shaft enables the piston to exert its pressure on the end of a lever that is **half** as long as its stroke.

That pressure goes as high as 2,000 lbs. per sq. inch for an instant after ignition, and falls to a negative pressure, or vacuum, when the exhaust valve opens. If the pressure on the top of the piston averages, say, 150 PSI throughout its downstroke, the engine is operating at a **BRAKE MEAN EFFECTIVE PRESSURE** (BMEP) of 150 PSI.

If the engine has a 4-inch bore, the piston has a surface area of slightly over 12 sq. inches. Thus, the total pressure on the piston will be 1800 lbs. If the engine also has a 4 inch stroke, the 1800 lbs. will work through a lever approximately 2 inches long (1/6th of a foot). Accordingly, it will apply a twisting force, or torque, of 300 ft. lbs. to the crank shaft; that is, a force equal to 300 lbs. hanging in the end of a lever 1 foot long.

The torque is sometimes given as lbs. ft., rather that ft. lbs., but these both mean the same.

The amount of effective pressure, or BMEP, depends on the amount of heat developed, and that depends on the amount of fuel burned. If an aircraft is operated with a flywheel, it can quickly be brought to red line, but it would be operating at very low throttle, using very little fuel and will not be developing maximum BMEP, torque and horsepower. If an engine is operated with a propeller enabling it to go to maximum red line speed and full throttle, the drag generated by the propeller will let the engine operate at its maximum horsepower, with a high torque and, of course, high BMEP. At full power, in this last instance, the engine will get enough fuel to develop enough torque to achieve its maximum horsepower.

In closing, the formula for horsepower arbitrarily established by James Watt (of the steam engine) is as follows:

$$HP = \frac{\text{torque x rpm}}{5252}$$

Some of the large piston engine aircraft I flew in the service had a device known as a BMEP meter that did average out the pressure to give you a reading. Assuming they all were calibrated the same, it was quite easy on takeoff of multi-engine aircraft to determine that you had full power output.

DETERMINING THE ACCURACY OF YOUR ENGINE TACHOMETER

From Anders Ljungberg, Technical Counselor #1690, Chapter 222 in Sweden.

For determining performance it is essential to have a correct tachometer in your airplane - but how do you know that it is correct? On the market, there are many sophisticated instruments you can use to calibrate your tachometer, but here is another way, which is simple, inexpensive - and accurate!

When it is getting dark, taxi your airplane to a position where you have a lamppost - or leave the hangar door open - so you have the light from a common gas bulb lamp, connected to the AC distribution system, in clear view. (A wire coil lamp will not do.) Place the airplane so that you see the light source thru the propeller disc - or, which may be better, get a reflection from the light in the running propeller. By changing the rpm you will find that at certain rpm's, the propeller seemingly stops - you are in phase with the frequency of the AC system.

On the North American continent, the AC system works at 60 Hz (3600 cycles per minute), while Europe has 50 Hz (3000 cycles per minute). In other areas you probably know the frequency.

A two-bladed propeller will seemingly stand still at the base frequency, i.e. 3600 rpm (which you seldom use) but also at half that speed, 1800 rpm, and half that, 900/2700 rpm. A three-bladed propeller has its points in thirds of the basic frequency, 3600, 2400, 1200 rpm.

AC frequency Hz	50		60	
Propeller type	2-blade	3-blade	2-blade	3-blade
Basic rpm	3000	3000	3600	3600
Usable rpm (more combinations may be found.	2250 1500 750	2500 2000 1500 1000	2700 1800 900	2400 1800 1200 600

Adjust your rpm to one of these frequencies and carefully read your tachometer. In this way, you will be able to note any deviation, if not correct. Use the table below, but note that there are other frequencies, too, which you can use if conditions are right.

MANIFOLD PRESSURE GAUGE

From Rollin Caler, Technical Counselor #1277, Chapter 163 in Las Vegas

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.

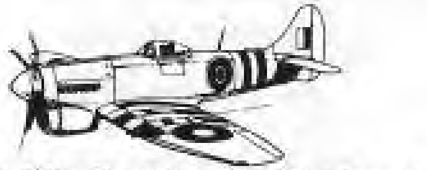
2. **POWER AVAILABLE FOR INITIAL CLIMB:** With full power, the manifold pressure gauge will read one or two inches of Hg. less than when the engine is not running. This means that a ramp reading of 24" Hg. will change to 23" or 22" on take-off and initial climb. If your aircraft has less than average 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 owner manual, computer, etc., but the reading is instantaneous and meaningful.



HAWKER "TEMPEST" 2,000-h.p. Napier Sabre H-type engine. One of the fastest and most formidable World War II fighters. Later models were used with considerable success against the buzz bombs in Britain.

Visit Report

Technical Counselor, Robert Eckstein of Brooklyn Park, Minnesota, has been visiting a project by Bob Norton of Plymouth, Minnesota. It is a Christen Eagle II. He states the aircraft is powered with a Lycoming IO-360 A1D of 200 HP. The aircraft is complete and ready for FAA Pre-flight check. He has personally counseled the builder since the start of aircraft construction, and performed complete inspections of all control connections and systems. His comments, "Grade A+".

Operations

TEACHING PILOT JUDGEMENT

Teaching pilot judgement may or may not be a possible endeavor, but at least the FAA is interested in attempting to see if this can be done. The following is from David Scott's "Washington Report", February, 1985, and may be of some interest to you who counsel builders on operation.

Last weekend and the early part of this past week was spent in preparing the Washington Report for the February issue of *Sport Aviation*. The subject of teaching pilot judgement is relatively new, as the FAA and pilot training schools have been investigating ways to teach this subject just over the past three years. It is generally agreed that approximately 85% of the general aviation accidents are attributed to poor judgement on the part of the pilot in command. In order to lower this percentage - the FAA, working with the Embry-Riddle Aeronautical University, the University of Illinois, the University of Ohio, Transport Canada and the General Aviation Manufacturers Association, have developed prototype training manuals for students and flight instructors.

These training manuals are based on the theory that there are five characteristics of human thought which lead to accidents. Examples are given in the manuals of actual situations where such characteristics are evident and the student is asked to choose from a list of five alternatives the action which best illustrates the error. Five opposing antidotes are given for each of the five errors:

Judgement Error
1. Anti-Authority
2. Impulsivity
3. Invulnerability
4. Macho
5. Resignation

Opposing Antedote for Error
1. Follow the rules, they are usually right.
2. Not so Fast! Think first!
3. It could happen to me!
4. Taking chances is foolish!
5. I'm not helpless. I can make a difference.

Preliminary results show that students who were exposed to the judgement training course scored an average of 85% in simulated judgement situations while those who had not taken the course scored an average of 43%. More details of this program were printed in *Sport Aviation* magazine, February 1985, Page 91.

SPITFIRE DEVELOPMENT

I thought you might like to see a mini-review of some of the Spitfire Development. As the Spitfire progressed from the early marks of the two bladed propeller, to engines with higher and higher horsepower, all the way up through counter rotating five-blade, aircraft required some specific changes about the three axis. Some of these changes are included below. If you enjoy reading about this, I will follow up with some of the changes in the development of the American P-51.

LONGITUDINAL AXIS - elevator - pitch

1. Horizontal Stabilizer area was apparently never increased.
2. There is excess horn balance, which lightened the elevators too much for heavier engines, and this was slightly reduced.
3. They went to a wooden elevator, which was lighter, with less tail down moment in the static condition, and increased elevator lightness.
4. The Spiteful version had an elevator tab that was 100% balanced, as the tab had previously fluttered off.
5. Bob weight was added to the stick to eliminate tendency of the aircraft to pull up too sharply when the elevator was applied. With bob weight, the aircraft didn't exceed the G limits in pullouts. The Mustang had a similar problem — bob weight significantly increases the stick force at higher G's. They also added down springs, which increased the stick forces.
6. They were very careful on Center of Gravity control, particularly when installing auxiliary tanks, using care to burn off fuel from aft tanks prior to combat maneuvering.

7. The Mark IV had the Center of Gravity at .321 Mean Aerodynamic Chord at gross, which was considered the maximum aft limit.
8. Cables passing through pressure bulkheads occasionally stuck, and this was found to be destabilizing. The solution was levers through pressure bulkheads, I believe.
9. The elevator was thickened in area to be more effective, and to make it slightly more thick than the area of the horizontal stabilizer immediately in front of it.

LATERAL AXIS - aileron or roll axis

1. The first had fabric covering on the ailerons, which was OK at a lower speed, but later on, ribs were added to eliminate the bulging fabric at high speeds and deflection.
2. As at very high speeds, two hands were required on the stick to roll, the ailerons were replaced with metal covered ailerons, which improved the high speed stiffness and significantly improved the rolling characteristic at high speeds.
3. The final marks had piano hinges, although these have to be carefully designed, they were very effective in improving aileron response.
4. Some of the marks had the tips left off, which was about 6' of the outer wing, as this significantly increased the roll rate.
5. Wing stiffness was increased on the aileron reversal speed of 450 mph to a theoretical aileron reversal speed of 850 mph, on later marks, and this also significantly increased roll response.
6. Cables used on the early marks were changed to push rods. This eliminated some of the problems with cable stretch, but unfortunately, the push rods occasionally stuck on the later marks, which lead to accidents, and corrections being made to the push rod routing.
7. The early fabric ailerons had "trim strips" due to wing heaviness on one side or the other. Basically, what this was is heavy string glued on to the top or bottom of the aileron trailing edge to decrease wing heaviness, as this monocoupe structure could not be twisted after it was finished.

VERTICAL AXIS - rudder - yaw

1. As more prop area was added, they had to increase the area of the rudder and the fin to offset the additional side area of the propeller.
2. They developed some problems with yaws as propeller size went up, decreasing the effectiveness of the airplane as a gun platform.

NOTES-

1. Increases in size of power went from Mark 16 (the last Merlin Mark), and the Griffon engine of higher power was used in the Mark 14 E and other Marks up through the Mark 24.

At one time in the Spitfire history, test pilot, Jeffrey Quill, dove the airplane to 500 mph, and was at that point, the "fastest man in the world".

HYDROPLANING COMMENT

From EAA Chapter 2 Newsletter, Fort Wayne, Indiana.

Dynamic hydroplaning will occur on wet runways at or above the following equation.

$$\text{SPEED} = \sqrt{(\text{TIRE PRESSURE})} \times 9$$

The implication here is to wait until your indicated airspeed drops below the calculated value before applying your brakes.

EDITORS NOTE: It is also easy to see from the equation that increasing tire pressure will significantly increase your braking speed while decreasing tire pressure will significantly reduce your braking speed on wet runways. For instance, at 100 PSI, you could start braking at 90 mph, whereas at 25 PSI, you have to wait until 45 mph to start braking. It is a pretty good indication of why high performance aircraft have such high tire pressures. However, on the other end of the scale, I have friends who purposely keep their tire pressures low, because they like the way the airplane feels at touch down with lower pressures. It is up to you.

Fuels

DRIPPING INDUCTION SYSTEM WHEN USING AUTO GAS

From the Cessna Pilot's Association newsletter.

The CPA is receiving an increasing number of reports of fuel dripping out of the induction system after shutdown when operating on auto gas. Some members report as much as a capful of fuel draining out of the induction drain.

A few cases have been thoroughly investigated, which has eliminated the normal carburetor problems that usually cause these sort of problems.

What may be happening is that fuel is being condensed on the induction tubes and draining back down after shutdown.

The Association would like to hear from members who have experienced this problem and any solutions they might have.

CHECK THOSE LINES!

From EAA Chapter 345 in Houston, Texas, by Paul Shinsky.

The day for the first flight had arrived. All the papers were in order and the Aeronca had been signed off. The engine had been run in as per specs. During the intervening time between official inspection and the first flight, several rebuilders, IA's, pilots and well wishers had all looked the plane over just in case some little thing had been overlooked. All gave the bird a rousing OK.

It was a beautiful day for the first flight after restoration. As we pushed this product of years of devotion and work out of the hangar, it seemed as eager to go, to climb into the skies again as we were. The roar of its engine start up was music to our ears as it was gingerly taxied down the strip with cameras snapping. The engine ran up perfectly, static RPM, mag drop, all indication "go", so full throttle and down the runway we went, headed for the blue. At lift off, the engine began losing RPM, so the throttle was cut and we came down at the end of the runway. On the ground another run up went OK, so off we went again. It was a perfect take off, trouble free flight and landing. That same day, others took it up and it performed like the champ it was. Still, when it was put in the hangar that day, the nagging question remained. Why did the engine lose RPM?

All the rest of the day and evening the question dogged me. Why the loss of power? Bright and early the next day, we were back to try again, and to our disappointment, there was again a loss of RPM at lift off. Back to the hangar we went and completely disassembled the carburetor. We found nothing wrong. The next time out the plane lost power as before. The problem had to be between the gascolator and the carb. Since everything else passed inspection, we took the flexible fuel line out and pulled it straight to see if there could possibly be any obstruction. There was! An imperfection in the fuel line hung down, restricting the gas flow. This was a new line from an aviation supply company. How many hundreds of feet of perfect line had been installed by the men there in the hangar that day? Maybe 500. Never did any of us check them before installation. There had never been any problems. Such a simple, unexpected quirk could have caused a bad accident. Alway check those lines! Pull them straight and look for obstructions. Just a simple check could save a life.

PLASTIC OPEN CELL FOAM AND FUEL TANKS

By Ladislao Pazmany of San Diego, California.

Dear Ben:

I used a "plastic" open foam-like material in my PL-4 prototype. It looked as a sponge with wide open cells. I think it was Safe-Foam. Shortly after I started using it, someone from Florida - Continental Airlines pilot, name: I remember "Dusty" Burrow - who used and had experience with this material, which he used in a small racing airplane, contacted me. He made a flight to San Diego to show me what happens with this material in presence of water. It desintegrates and clogs the filters. He had two forced landings. I removed the foam from the PL-4A tank immediately. I don't know what is Explosafe. The only thing I can assure you is that the foam I used was PLASTIC. Color was orange.

Sincerely,
L. Pazmany

Safety

PIPER SERVICE BULLETIN NO. 189

This is a mandatory service bulletin for the Piper requiring fabric to be stripped around the fuselage frame and the channel removed from around the tubes to see if the tubes have rusted. The photograph shows airplane work done by Ralph Bartholow, Jr., Technical Counselor #1595. It is pretty self explanatory as you can see the damage done to the tubing underneath the channel. The only tube that, I feel, would contribute to an unsafe condition, at this time, is the one that the pictures show. However, this airplane was one of the last 17 manufactured earlier. All tubes and angles should be removed per Piper Bulletin for inspection, replacement and corrosion proofing.

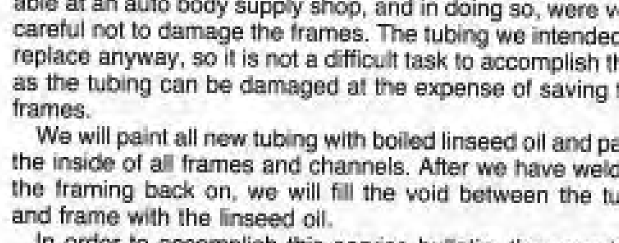
The pictures do not show how badly this particular tube is rusted. This tube is the one at the front door post and a concensus here is that it has lost nearly 50% of its wall thickness due to the heavy scaly rust. A sharp punch easily punctures the wall of the tube. If this tube breaks, the lower strut assembly acts like a fulcrum, and there goes your wing.

We elected to remove the angles and various frames that cover the tubing by using a thin grinder wheel, easily available at an auto body supply shop, and in doing so, were very careful not to damage the frames. The tubing we intended to replace anyway, so it is not a difficult task to accomplish this, as the tubing can be damaged at the expense of saving the frames.

We will paint all new tubing with boiled linseed oil and paint the inside of all frames and channels. After we have welded the framing back on, we will fill the void between the tube and frame with the linseed oil.

In order to accomplish this service bulletin, the covering, boot cowl, windshield, instrument panel and engine must be removed. We are ready to start reassembling this particular airplane and will be starting a Tri-Pacer on its completion.

I called 6 local owner of Colts and Tri-Pacers and had a meeting here last Sunday. None of them were aware of this problem, or its severity. Four of them had been told by their local A&P to throw the bulletin away, and seeing the condition of this one tube, they finally saw the light and brought their A&P up to see the plane. Most indicated that they were going to fly the 25 hr. limit that the service bulletin permits before complying with it. Personally, I would not go around the pattern in one of these planes until the condition was corrected. I feel that the strut fork problem all these many years has actually been this corrosion problem.



McDONNELL XP-67 Two 1,250-h.p. Continental engines. Experimental twin-engine high-altitude fighter with pressurized cockpit.

BULLETIN BOARD

CERTIFICATED FLIGHT INSTRUCTOR/MAINTENANCE TECHNICIAN OF THE YEAR AWARDS PROGRAM

The Certificated Flight Instructor/Maintenance Technician of the Year Awards Program is conducted at this time, and if you would like entry blanks for either, please contact me here at EAA Headquarters. Until next time!

Ben Owen
Editor

EDITOR'S NOTE

If you modify an aircraft engine, when registering the engine and your aircraft, list the aircraft engine as a "Smith Special" or some other engine designator, but definitely do not use the terminology "Lycoming" or "Continental". You should also put a tag on it, identifying it as a Smith Special or "Hot Rod #1" or anything you prefer. The reason for this is that if you identify your amateur built aircraft engine as an "aircraft engine" by a major manufacturer, any AD's to that engine will, therefore, apply. If you don't mind this, feel free to go ahead and leave the plate on, and identify it in your application for registration as a factory designator.

TECHNICAL COUNSELOR PATCHES

We sent all the Technical Counselors who have revalidated for 1986 their Technical Counselor shoulder patches. If you've lost yours, or need another for any reason, they are available from Ben Owen at EAA Headquarters for $2.50, post paid.

BD5J PARTS FOR SWAP

Edward J. Tilton, 1425 Milan Avenue, Coral Gables, FL 33134 has a set of wheels and brakes, master cylinders, pads, etc. for a BD5J he will swap for a set of Cleveland 5.00 by 500 wheels or the equivalence.

IN CLOSING FROM THE EDITOR

Keep sending in those signed visit reports. We suggest that you keep your copy of those signed visit reports in a personal file at your home. It could be important to you, liability-wise. Also, EAA Headquarters does maintain insurance on it's Technical Counselors. Hopefully, we'll never have to use it.

Experimental Aircraft Association

EAA TECHNICAL COUNSELOR NEWS

WITTMAN AIRFIELD

OSHKOSH, WISCONSIN 54903-3086

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