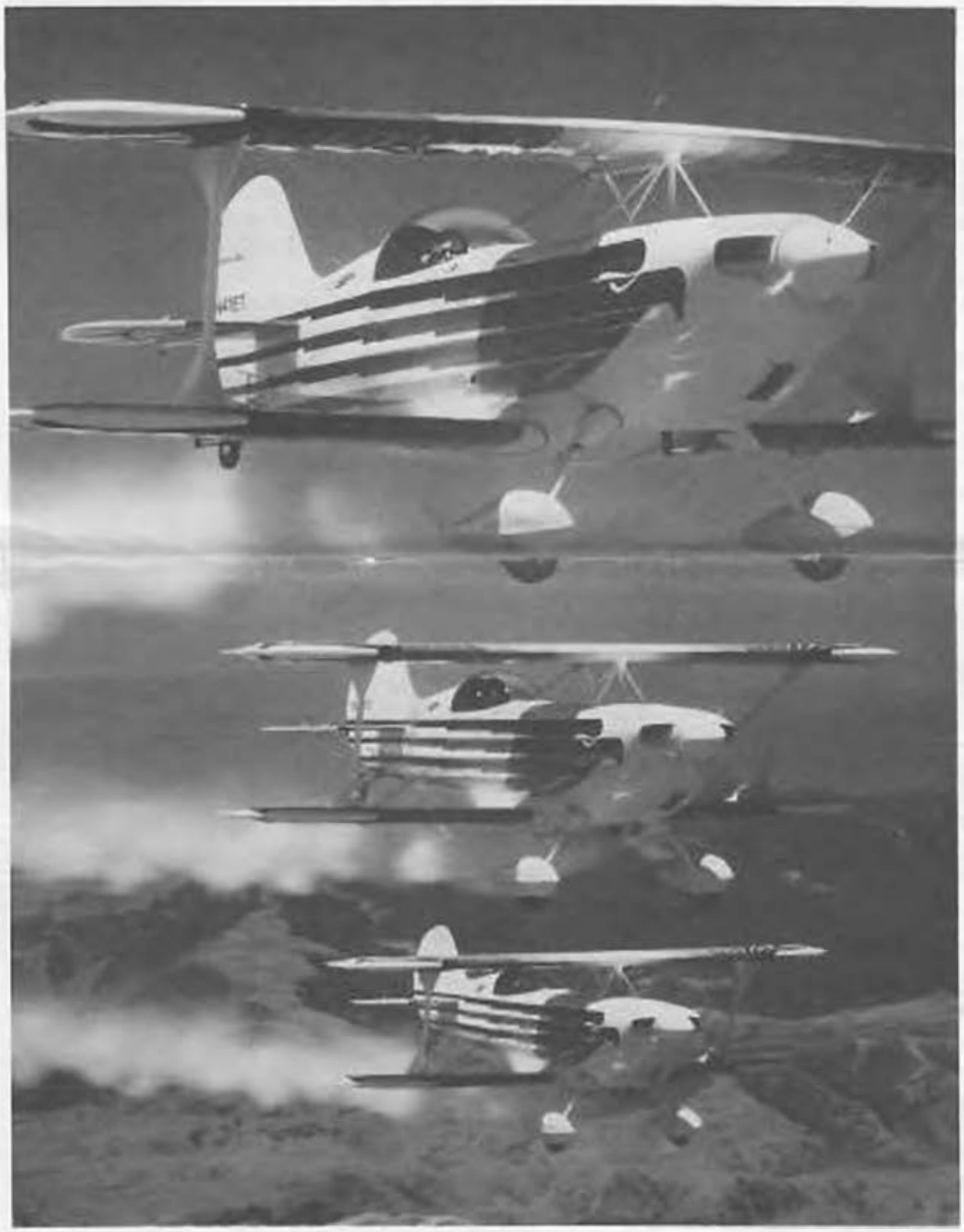
EAA TECHNICAL COUNSELOR NEWS

FEBRUARY/MARCH 1986 PAUL POBEREZNY: PUBLISHER, BEN OWEN & ANN RUBY: EDITORS



EAGLES AEROBATIC FLIGHT TEAM

The Eagles Aerobatic Flight Team takes its name from the airplane it flies: three perfectly matched Christen Eagle I sport biplanes. This capable unlimited-category aircraft is powered by a 260 hp Lycoming engine, and it performs at a weight of 1262 lbs. With its distinctive "Eagle" emblem as part of each airplane's dramatic paint design, the Team and their Eagle I's have thrilled airshow audiences with one of the most popular formation aerobatic performances.

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

Editorial

YEAR END SUMMARY OF THE 1985 TECHNICAL COUNSELORS

As you know, we have asked you to complete a rather extensive application and also an activity report for 1985. After reviewing your qualifications, I'm a little bit stunned by the high level of skill, experience and accomplishments. It's a little like being a teacher to gifted adults who know more than you do. I know that you won't let me get away with any mistakes in the newsletter!

First of all, there is no such thing as an "average" Technical Counselor, as your qualifications and experience are really quite varied. However, the "average" Technical Counselor age is 57 years, our oldest being 80 and the youngest is 28. Many of our Technical Counselors are in the mid and late 70's and still active. In activities, the average Technical Counselor will go out and visit aircraft some 12-13 times a year, plus putting on the occasional or even monthly programs at the Chapter meetings, and on rare occasions, send a Technical Tip to EAA Headquarters for consideration for the Newsletter. Our Technical Counselors have no trouble at all in meeting what we consider the minimum qualifications for a Technical Counselor, and those are simply that he make 3 project visits per year, present 3 Chapter programs per year, or that he submit 3 Technical Tips to EAA Headquarters, or any combination of 3 of the above. The one exception to this rule is those volunteers who work so diligently at the Oshkosh Convention. Those are the basic requirements to stay active in the program.

As far as experience and knowledge, 62% of the Technical Counselors who have revalidated are aircraft builders, and they have averaged a total of 1.9 aircraft completed each. Half of our Technical Counselors are A&P mechanics, (some hold just an A or just a P license). Fully 70% of the Technical Counselors have completely restored an aircraft, and only 5.6% of the revalidated Technical Counselors haven't either completely built an airplane, don't hold an A&P or related license, or aren't aircraft restorers. However, those 5.6% have been very heavily involved in activities and they are quite capable of passing on information on aircraft building.

As far as the duties of the Technical Counselor, most of us are quite familiar now that we have a very informal activity, with the exception of the visit reports that we ask the builder to sign the first time we visit his project. We don't seem to have any great trouble in convincing Technical Counselors not to sign log books or other paperwork, but we do seem to have a little difficulty in getting all of you to fill out aircraft visit reports! We would appreciate a little closer attention to this detail of having a visit report sent to us, as it does provide you with a measure of protection.

When I was a kid, working with Dad's tools and learning how to do things, the other kids used to call me the "popular mechanic" because I had a lot of friends who would ask me to fix things. I prided myself on my ability to fix almost anything. However, in reviewing the applications that you all have sent in, I can only say that I wish I had the experience level, skills and accomplishments that many of you have. It is quite possible you don't realize what a unique segment of society you represent — you who are capable of working with hand and mind, and building and repairing practically anything that flys.

In addition to this high skill, Technical Counselors are endowed with the interest and ability to pass these skills on to others, and to do so in a helpful and encouraging manner for the highest of ideals.

Congratulations to all of you who have done so much to help their fellow man in 1985! We know it is appreciated by them, and it certainly is appreciated by the entire aviation movement.

Ben

Operations

THE AEROBATIC "HORMONE"

From EAA Chapter 105 Newsletter, Portland, Oregon.

There's nothing like a good set of aerobatic maneuvers to get the old blood flowing. And a lot of other things, too.

The thrill of aerobatics is undeniable, as is the conclusion that aerobatics can really get the adrenaline flowing. Now a study reveals there may be other hormones on the move as a result of the G forces sustained in aerobatics.

Using an elaborate centrifuge setup, investigators have found that people exposed to 6 G's in the "z" direction (sitting position) pump out a hormone known as cortisol. Gz acceleration is head-to-foot, the type that happens, for example, when a pilot pulls up sharply in a maneuver. Cortisol might be said to be the aerobatic hormone, since measurements of several other hormones under the same conditions remained the same as they were at 1 G. The rise in cortisol production is tied to the rise in acceleration — the higher the acceleration, the greater the peak concentration of cortisol.

Cortisol is a hormone produced by the adrenal glands in response to stress. Researchers at this time have no explanation for why radial acceleration should produce such a profound change in this one particular hormone.

Another study, though, suggests the use to which such a finding might be put. Air Force researchers have discovered that the service is losing a lot of very big, very expensive fighter planes because the pilots are suffering loss of consciousness (LOC) that lasts for up to 20 seconds and occurs at relatively low G loadings (3 to 4 Gs). These episodes often include periods of brain seizure activity, as a result of the profound hypoxia. So far, five F-16's, an F-5 and an A-10 have been lost to LOC. The suspicion is that there have been a lot of other losses that got blamed on something else.

While the period of unconsciousness is 15-20 seconds, the period of reduced mental capacity may be much longer — plenty of time for any airplane, even a slow-moving one, to get into trouble.

The only relatively sure cure for LOC would be to recline the seat back to an angle of 60 degrees or more. Barring that, the next best hope is to come up with something that detects LOC and puts the plane into automatic, wings-level auto-pilot status, and blood chemicals may one day prove to be the detector.

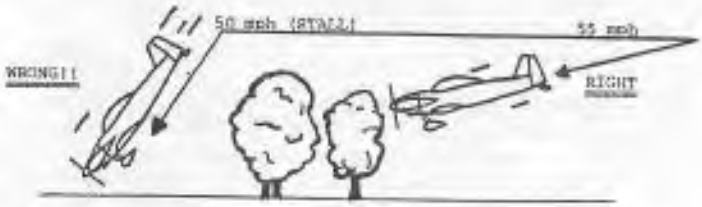
Meanwhile, non-fighter jocks of slow-moving aerobatic planes might keep in mind that these findings on loss of consciousness point to a problem which can emerge under

G conditions they, too, attain. While the rapid rate of onset found in an F-16 may be lacking in a Citabria, pilots should be far from complacent about feeling it can't happen to them.

DON'T STALL IN FORCED LANDINGS

From Chapter 551 Newsletter in Minnesota, as taken from the RV-4 Newsletter

Please fly safely. Aviation image and insurance rates are at stake . . . in the event of a forced landing, the key words for survival ar DON'T STALL. A stall too near the ground to permit recovery will usually result in greater damage and



injury than would occur if the aircraft hit the ground at its glide speed and angle. It is a normal tendency for the pilot to slow his aircraft to its minimum speed to reduce damage during a forced landing. But, an aircraft which has stalled is temporarily out of control, and in a nose down attitude. While it was at minimum speed at the time of the stall, it may have gained considerable speed by the time of contact with the ground, and even if it didn't, the contact angle is steeper.

Injuries in an aircraft crash result from rapid deceleration. The shorter the stopping distance, the greater will be the deceleration rate. If the aircraft contacts the ground at a steep angle, the stopping distance will obviously be short, and the deceleration great. If the aircraft hits the ground at a shallow angle, its stopping distance will be greater. And, even if the contact speed was higher, the deceleration rate will be less, and the landing will be more survivable. A number of factors, such as the smoothness of the terrain and obstructions (trees, boulders, buildings, etc.) on the terrain will further affect the survivability of a forced landing, but the bottom line is still that a controlled crash is better than a non-controlled crash.

Thus, the two most important words for a pilot faced with a crash landing are **DON'T STALL!** If an accidental stall should occur during the early stages of the emergency, (just after the engine quits or while trying to turn back), an intimate, subconscious knowledge of stall recovery will be invaluable. But, as contact with unfriendly terrain becomes imminent, these words should echo through a pilots mind. **"DON'T STALL! DON'T STALL! DON'T STALL!"**

A SAFETY LIST TO CONSIDER

By EAA Technical Counselors of Chapter 565 in South West Florida. Submitted by Robert D. Stephenson, Technical Counselor #919.

(1) **BEFORE EACH TAXI TEST OR FLIGHT TEST**
- (a) Inform control tower of your intentions.
- (b) Inform airport management of your intentions.
- (c) Always think safety, fire trucks, ambulance and other air traffic.
- (d) Have at least two full-time observers.

(2) **THE FIRST TEST FLIGHT SHOULD HAVE**
- (a) Chase Plane
- (b) Radio contact is best.

(3) **INSPECT THE AIRCRAFT BEFORE AND AFTER EACH TEST PERIOD**
Check for loose fasteners, connectors and deformity in the air frame skin.

(4) **A CHECK LIST FOR EACH TEST PERIOD OF NOT MORE THAN 6 ITEMS**
Then land and inspect the aircraft. Go thru the testing one step at a time.

(5) **PREFLIGHT THE AIRCRAFT WITH AT LEAST ONE OTHER PERSON WHO HAS AIRCRAFT KNOWLEDGE**

(6) **KEEP A LOG ON THE FINDINGS OF EVERY TEST**

(7) **ASK OTHER AIRCRAFT BUILDERS WITH THIS TYPE OF AIRCRAFT:**
- (a) About flight testing.
- (b) To go for a ride and fly it.
- (c) Talk about the center of gravity.
- (d) Weight and balance.
- (e) Fuel systems.
- (f) Effectiveness of controls.
- (g) Landing gear and wheel alignment.

(8) **AN AIRWORTHY AIRCRAFT IS THE SAFEST TO FLY!**
This is a list our Safety Committee has been working on. We are trying to help the indivudal who thinks he doesn't need our help. Make them think!

BELTRAME "COLIBRI" 18-h.p. Beltrame engine. This interesting tail-first light plane is of Italian origin.

OPERATING LIMITATIONS

Some of you may not have seen the Operating Limitations that usually apply in amateur built aircraft upon its completion inspection by the FAA. The following is the latest and most updated Operating Limitations, it will cover the aircraft both during and following its testing period. There is no need to contact the FAA following the testing period any more, as all of you are aware. If you have any questions regarding the Operating Limitations, I would be happy to try to answer them for you. The applicant sends a letter in requesting the final visit, and this is the letter referred to in Item 1. The testing period will be either 25 or 40 hours, as before, and, of course, the geographical area in Item 2 will apply only during the testing period. Under Item 5, acrobatics will either be permitted or not permitted, depending on what the amateur builder requests. Under #9, the repairman/builder's name will appear, and the inspector may issue other Operating Limitations he feels are necessary.

Date:_____

(Operations, continued)

EXPERIMENTAL OPERATING LIMITATIONS

Make:_____

Model:_____

Registration Number:_____

Serial Number:_____

1. No person may operate this aircraft for other than the purpose of operating amateur-built aircraft to accomplish the flights outlined in the applicant's program letter dated _____, describing compliance with FAR 21.193(d), and made available to the pilot in the aircraft. Additionally, this aircraft shall be operated in accordance with applicable air traffic and general operating rules of FAR 91, and all additional limitations herein prescribed under the provisions of FAR 91.42(e).

2. Unless it is shown that this aircraft has operated satisfactorily in compliance with FAR 91.42(b), as evidenced by the documentation of (_____) hours time-in-service in the aircraft log.
   a. All flights shall be conducted within the geographical area described as follows:
   b. No person may be carried in the aircraft during flight unless that person is essential to the purpose of the flight.

   Compliance with FAR 91.42(b) shall also be recorded in the aircraft log with the following or a similarly worded statement: "I certify that this aircraft is controllable throughout its normal range of speeds and throughout all maneuvers to be executed; and the aircraft has no hazardous operating characteristics or design features." The entry shall include the aircraft total time-in-service, the name, signature, pilot certificate type and number of the person making the certification, and the date.

3. The pilot-in-command of this aircraft must, as applicable, hold an appropriate category/class rating or have a flight instructor's log book endorsement.

4. This aircraft shall contain the placards, markings, etc., required by FAR 91.31(a).

5. Acrobatic flight (that is, an intentional maneuver involving an abrupt change in the aircraft's attitude, an abnormal attitude, or abnormal acceleration not necessary for normal flight) is _____. Only those acrobatics/maneuvers which have been satisfactorily executed during the flight test period and documented in the aircraft log are permitted after leaving the assigned test area.

6. The cognizant FAA Manufacturing Inspection Office must be notified and their response received in writing, prior to flying this aircraft after incorporating a major change as defined by FAR 21.93.

7. This aircraft shall not be operated for glider towing or parachute jumping operations.

8. No person shall operate this aircraft unless within the preceeding 12 calendar months it has had a condition inspection performed in accordance with Appendix D of Part 43 and found to be in condition for safe operation. Additionally, this inspection shall be recorded in accordance with Limitation 10 listed below.

9. Experimental aircraft builders certificated as repairmen, or _____, FAA-certificated mechanics holding an airframe and powerplant rating, and appropriately rated repair stations may perform condition inspections in accordance with Appendix D of Part 43.

10. Condition inspections shall be recorded in the aircraft maintenance records showing the following or a similarly worded statement: "I certify that this aircraft has been inspected on (insert date) in accordance with the scope and detail of Appendix D of Part 43 and found to be in condition for safe operation." The entry will include the aircraft total time-in-service, the name, signature and certificate type and number of the person performing the inspection.

Issued by: _____

Safety

QUACKENBUSH NAILED BY CHEMICAL EXPOSURE

By Guy Veasey, from the Orange County California, Chapter 92 HANGAR FLYER.

We have all been warned before. Bill Buethe, Jim Warkington and Bill Northey have all given their horror stories of what various chemicals can do to the human system. Now we have another.

Frank Quackenbush, longtime active member, looked terrible Sunday, June 13, at Placentia-Linda Community Hospital. He walked slowly with a cane and hiccuped continuously as a result of liver damage. He nearly died earlier, but fortunately, the worst occurred while in intensive care under expert medical attention.

It began Memorial Day weekend while doing a hurry job doping the tail feathers of his Vagabond. No rubber gloves or forced ventilation. A hand cleanup using the Poly Stits reducer seems to have triggered the event. First, a headache, followed by severe dizziness. Fortunately, Patricia was at his side and got prompt medical help. Frank passed out and has little recollection of the five days in the intensive care unit.

Frank is now recovering at home. He emphatically points out that Poly Stits is not the culprit — lots of warnings and instructions on how to safely use the stuff. The doctors also told him not to take Tylenol when using these types of chemicals.

Mid-airs and impacting the earth are not the primary threat to the well-being of our members — carelessness in using modern chemicals is!

Visit Report

Corby Starlet spar jig, 1 piece wing spar still in the jig. Being built by Newsletter Editor, Vic Boyce for "Ole" Oleson of Reno Nevada.

Editor Vic with the Corby spar.

The preceding photos are not from an actual visit report, but were sent in by the Corby Starlet Newsletter Editor, Vic Boyce.

The lower right hand photo is a Corby Starlet being completed by Kim Jones of Australia.

Gilbert Hausler, a Technical Counselor from Phoenix, Arizona, started counseling Al Ross on this KR-2 in May, 1979. He has visited it 8 times since then, and feels that Al did an excellent job on it. Al says he constructed it in about 5 years. The empty weight is 586 lbs. with a Revmaster 2100-D engine and Warnke Almost-Constant-Speed prop. Among the many modifications are: Gull wing doors with lexan windshield, Fowler flaps with dropping ailerons, Servoed 3-axis trim (for eventual autopilot installation), heel brakes and dual controls. Takeoff is quick and climb about 1200 fpm. The plane is very responsive in the air. Wheel landings are easy (after the first 20 hours!) and the flaps are very effective.

Al Ross with his KR-2. First flight was October 12, 1985 after about 6 hours taxiing and doing liftoffs and landings on the runway.

Technical Tips

UREA FORMALDEHYDE GLUE

Article from Corby Starlet Newsletter, Editors Vic and Pat Boyce, 510 NW 46th Terrace, Plantation, Florida 33317, telephone (305) 581-8835. Written after attending a woodwork and glue forum at the Lakeland Fly-In, presenter unknown.

It has been brought to my attention that some builders are still using Urea Formaldehyde glue, available under various trade names.

This glue has been banned for use in aircraft construction in Australia for about 20 years.

While employed as a Chief Inspector in Australia, a position designated and approved by the Department of Civil Aviation there was an investigation into the inflight structural failure of an aircraft due to Urea Formaldehyde glue failure.

I became involved when I brought to their (DCA's) attention the deteriorated glue in a Miles Gemini that was brought to me for inspection. This aircraft was built using Urea Formaldehyde glue in the primary structure, but due to the heat and humidity of the Australian climate, the glue had changed its characteristics. It had the appearance of brown sugar and the surface of the wood in the joints had rotted.

Slight pressure on the side of the wooden fuselage produced a number of "snapping" sounds as the glue joints failed. Eventually, DCA removed 27 aircraft from the civilian register due to Urea glue failure. Some of the aircraft were being built during WWII and some were built after the war. The glue failures occurred sometime after the aircraft were imported into Australia and were subjected to a different type of climate environment.

The same type of glue failure is noted in the publication, "Adhesive Bonding of Wood", by M.L. Selbo of the Forest Products Laboratory. This publication states . . . "A combination of high relative humidity and high temperature deteriorates Urea resin glue bonds in a relatively short time."

It is noted that the Howard Hughes Hercules "Spruce

Goose", made with Urea glue during WWII, is in good condition, but it has been kept in a controlled climate environment to prevent glue failure and deterioration. This would not be practical for an operational aircraft.

I suggest that you give careful consideration when choosing glues for aircraft construction — don't let "cost", "easy to use", "color", etc. influence you — get the best!

GLUE TESTING

More comments on gluing from Aeronautical Engineer and Designer of the VP-1 and VP-2 Series, W. Samual "Bud" Evans, follow: (RE: The "Craftsman's Corner" article — October '85.)

Forest Products Laboratory cleavage testing of a prop hub should not be construed as a means for testing most wood joints, since aircraft wood joints are designed in shear, not in cleavage.

If, in testing a wood joint in shear, the wood shears rather than the glue, then the joint is good, since the aircraft is designed to the wood strength, not the glue strength.

Any glue that will shear the wood is good enough, PROVIDED it will not deteriorate with time. Glues subject to fungus or water will, of course, not meet this requirement.

The point is that the method of testing shown is not to be recommended as a test for a normal glue joint. It would do very nicely in a case like the prop hub shown, where one saw separation and wanted to take a look at the surfaces involved.

I believe there is an old article in the EAA wood manual, (out of print), by myself which shows a very simple and successful means of testing for shear. I should also like to point out that laboratory glue tests and homebuilt glue tests are two different things. One should run some simple tests with a number of the popular glues and find out which shears the wood for him. I found that one of the most highly recommended glues turned out very poorly in my home shop conditions.

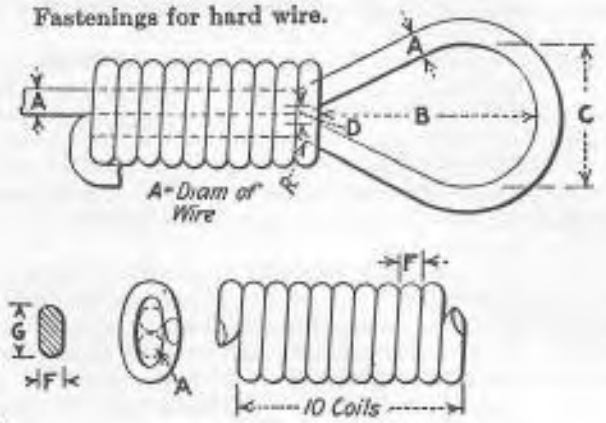
EDITOR'S NOTE: Copies of Bud's article in the Wood Manual are available to any Technical Counselor who would like to have them. The above letter is in response to a gluing article in the October 1985 SPORT AVIATION "Craftsman's Corner".

WIRE BENDING TIPS

Taken from "Airplane Standards of the S.A.E."

Response to the last Technical Counselor News on wire bending has been excellent. However, one feature that we neglected to mention was that although the actual wire itself is hard wire, that the coils used to hold the wire ends in place are done with soft wire. It is a little difficult bending piano wire into coils!

Fastenings for hard wire.



Loops

Size of wire A	Large loop 0.125	Small loop 0.125	0.102	0.081	0.064
B	5/16	3/16	13/32	13/32	13/32
C	29/64	13/64	9/32	13/64	13/64
D	9/64	3/16	3/32	3/32	3/32
R	13/64	9/64	9/64	9/64	9/64
Ferrules					
E	0.114	0.114	0.091	0.072	0.057
Gages					
F	0.130	0.130	0.104	0.083	0.066
G	0.260	0.260	0.208	0.166	0.132

HOW TO FLIP AN AIRPLANE

The following photos are from a Type Club within EAA, known as the **Replica Fighters Association,** Frank G. Weatherly, President, Headquarters: 2789 Mohawk, Rochester, MI 48064.

From Jerome Bickel of the 47th Sqdn., "Enclosed are some pictures of the way that I turned my P-47 over so that I could work on the underside. Perhaps some other builders might get some ideas from these pictures."

We see the airplane sitting on its landing gear and inverted cradle positioned in front of the airplane, ready to be turned over.

Six good friends, including one photographer, as the aircraft starts on its way around, using the plywood mount and the long piece of PVC drain pipe as its fulcrum.

Past the mid-point, and working well.

Airplane inverted and back in the garage. Ready for work on the bottom side.

Fuels

FUEL PROBLEM

From Chapter 260 Newsletter, Chicago Heights, Illinois

Burt Ellegaard had a tip for those who use car gas in their planes. He said beware of Ethanol in car gas, because Randolph product No. 802, tank sloshing compound, is dissolved by Ethanol. He said 3M product No. 776 produces the same effect.

AIRCRAFT MISHAP BLAMED ON GAS TANK SEALER AND AUTO FUEL COMBINATION

In March of 1985, a T-18 had some difficulty with the fuel system, due to auto fuel dissolving gas tank sealer. The auto fuel and the remaining sealer was drained out, aviation fuel was put in and the aircraft took off. The fuel line was clogged with sealant, causing engine stoppage and the pilot landed in a farmer's field. This was, erroneously, originally reported as engine trouble, later clearly identified as gas tank sealer being dissolved and clogging up the fuel lines. This was reported to us by the FAA man doing the investigation.

CHECKING FOR WATER IN THE FUEL

EAA's Chief Test Pilot, Jim Barton, reports that his Dad used to run a small airport in Illinois. They performed checks on the fuel in their tanks whenever they were filled by obtaining Litmus paste from a chemical supply house and spreading this on the fuel tank measuring stick. When it was put all the way down to the bottom of the sump, the Litmus paste would turn from blue to a purple color in the presence of water. The fuel supplier furnished this paste for their Galesburg operation. Litmus paper, of course, would work the same in any fuel tank.

Composite Corner

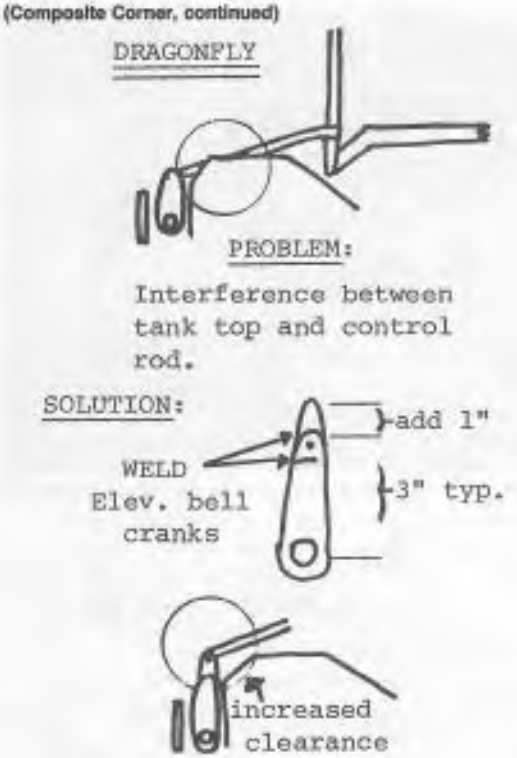
DRAGONFLY ELEVATOR BELLCRANK CHANGE

From the Dragonflyer Newsletter #20, published by Viking Aircraft.

MARK II BUILDERS ONLY — It will be necessary to make a minor change in the elevator horns as per the sketch here. The reason for this change is that when the anhedral is taken out of the canard, the elevator torque tube assemblies wind up much closer to the bottom of the airplane. The elevator horns must then be made longer in order that the pushrods connecting the control sticks to the horns do not interfere with the top of the gas tank. Those of you building your own hardware can simply extend the length of the elevator horn a little bit, per the sketch. Those of you who may already have Ken Brock hardware can extend the length as per the sketch. It has been noted by some builders that even on the Mark I, in some cases, there has been interference between the elevator pushrod and the top of the tank. The Prototype Dragonfly does have a couple of grooves in the top of the tank to make clearance for the elevator pushrods between the center stick and the elevator horns. It is acceptable on all Dragonflys to increase the length of the horns, per the sketch, if it'd make things fit a little better for you.

The result of this change is that a little more fore and aft movement is required of the stick to produce full elevator travel, but due to the fact that the airplane is quite sensitive to elevator movement, this is felt to be on the positive side,

(Composite Corner, continued)



rather than a negative side effect, since it gives you greater authority over the elevator and requires greater movement of the joystick to produce the same reaction on the elevator. Pilots used to flying spam cans are very prone to over-control the Dragonfly on the pitch axis when first getting in it.

BULLETIN BOARD

ABOUT SIGNING THINGS

I would like to refer you all to Advisory Circular 20-27C that provides guidance and information relative to the airworthiness, certification and operation of amateur built aircraft. In section 6.D.(6) I quote, "evidence of inspections, such as a log book entry **signed by the builder,** describing all inspections conducted during construction of the aircraft." What this means is that the aircraft construction log is signed by the builder and not by the Technical Counselor or by an A&P. The builder is the person primarily responsible for the airworthiness of the airplane, and probably knows that airplane better than any outside person ever could. **Some** FAA offices have asked us to have Technical Counselors sign log books. As the Advisory Circular stands now, this is not the right procedure. The procedure is for the builder to sign his own log books. Unless you have the insurance to protect yourself while doing this, we would definitely recommend against it.

SEND YOUR LETTERS AND PHOTOS

We would like to encourage you to send on any technical tips, photographs of aircraft you visit, your own projects, your own shop, or anything you think might be of interest to the readers of our newsletter.

TIPS ON FUEL MANAGEMENT AND BRAKE CARE

From Richard R. Bender, Technical Counselor #1584 of Chapter 130 in New York.

Fuel Management — One of our members suffered a forced landing on the third flight of his new Sonerai II. The engine simply stopped due to fuel starvation. He didn't trust the gauge, he simply knew from the flying he'd already done that he had plenty left for a half-hour flight . . . so why check the tank? **Why indeed!** Tear down after the resulting off-airport landing disclosed fuel had leaked out of a crack in the tank.

You can't manage fuel flow you can't control and don't even know about! Just because you haven't used the fuel it is naive to assume that it is still there! But more basically, especially on early flights of a new plane, inspect everything before you take off and again after you land — and **always look in the tank!**

Care of Brakes — If you do not use your plane much (and many of us fly less these days) there will probably be rust on your braking surfaces — especially if you tie down outside. That rust does not stop when it covers the surface — it continues to excavate pits that will eventually reduce brake pad contact area significantly. In a short time, the pads are riding only on the tops of the ridges between the pits. When this point is reached, you probably have less than 10% of what used to be your braking surface working for you; and you can't push hard enough on the pedal to get stopped. New pads help a little, it seems, but only until the surface rust wears away.

There are two solutions: 1) Fly enough to keep the rust polished away so pits can't start, or 2) Install Chrome plated disks or drums. (This is the only real solution.) I know what I'm talking about, having run my T-18 off the end of a runway and over onto its back. It now has plated disks.

CAUDRON C-46 RACER 340-h.p. Renault air-cooled in-line engine set a new world's record for landplanes at 314 m.p.h., and although it had about half the power of the other competing aircraft, it won the 1936 Thompson Trophy races at 264 m.p.h.