



CHAPTER 42 NEWSLETTER

March, 2005

Anchorage, Alaska

Monthly newsletter from Chapter 42 of the Experimental Aircraft Association

FROM THE LEFT SEAT

After so many months of winter it is very refreshing to see and feel the warmth from our neighboring star. It is so very easy to start thinking of spring at this time of year. And spring means the annual Aviation Trade Show is soon to be a reality.

Chapter 42 will again have a booth at the Trade Show. We need volunteers to help staff the booth. Please contact Jim Moss, 243-5151, and set a time when you can be available.

Jack Brown has arranged our monthly meeting with a guest speaker and the subject will be fuel delivery systems. Thanks, Jack, I am sure this will be a very informative event. More details of the where and when are in this month's newsletter.

The RV-9 in my shop is still being worked on a little each day. Currently I am working on the wings and will be for quite awhile. I have been doing all of the necessary small parts it takes to build the fuel tanks and have finally got them to the point where I need to Pro-Seal them together.

Black Death, Black Goo, and many other unprintable names have been used to describe Pro-Seal. If you don't know, Pro-Seal is a synthetic rubber fuel tank sealant. It is a two-part substance that is used in the construction of fuel tanks and, when properly applied, it is supposed to keep the fuel from leaking out, which is good.

John Davis was so kind to let me come by his shop one day and watch him do a little tank sealing. The general idea is to only place the sealant where you want it so you start out being very careful using all sorts of sanitary procedures. But first a drop goes off course and lands on the floor, and then you step in it, then you step on a paper towel. Then you get some on your gloves, then on the tools, and then you can't let go of the tools. Pretty soon you look like a tool tree. And remember, you are supposed to be wearing a respirator, so you can't scratch the itch on your nose, which is probably good because with the screwdriver and cleco pliers stuck to your hand you would most likely poke your eye out.

Another fun item I got to try out this month was a "Fly Cutter." Jerry Patterson was kind enough to lend me his tool of death for an afternoon of hand mutilation. What an interesting tool, actually it does work and did produce some acceptable holes, amazingly, even right where I wanted them to be. Thanks Jerry, I will try and clean all the blood off the fly cutter before I return it.

Hope to see you at the meeting.

Mike

NEXT MEETING

Our next meeting will be Tuesday, March 22nd at 7pm. We will meet at the UAA Aviation complex on Merrill Field. Paul Herrick, UAA instructor, will give us a presentation. The subject will be aircraft fuel systems. Paul has agreed to visit us again in the future to discuss aircraft engines, service and overhaul. Come hear about fuel systems this month.

For those who have not been there before, the UAA Aviation Complex is on the east end of Merrill Field. Turn west off Airport Heights onto Merrill Dr. The building is on the right and the room location will be identified by signs once you are inside. If no signs you may have to (oh, no!) ask for directions.

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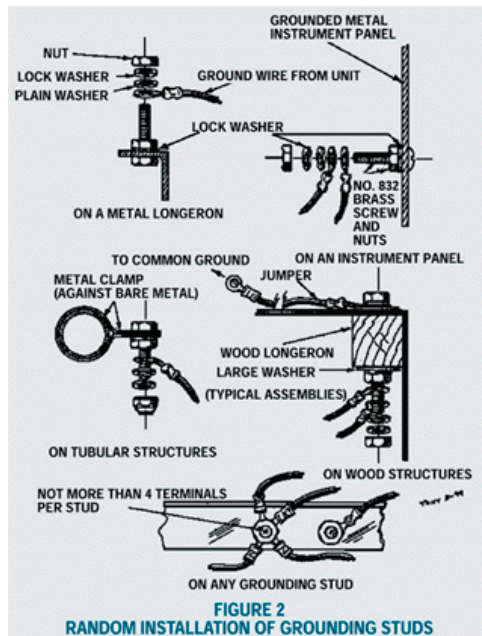
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If yours is an all-metal homebuilt, its electrical system can be made up of single-wire circuits. That is, only one wire will be needed to magically connect each electrical unit or device to its electromotive force . . . the battery or alternator.

In other words, all electrical circuits can be completed through the aircraft's metal structure, to the battery or alternator, without having to install separate current return cables.

Typically, single wire circuits rely on the aircraft's metallic structure to serve as an electrical conductor (wire) or device when connected at any point to the metal structure is correctly referred to as being "grounded."

One-Wire Circuit vs. Two-Wire Circuits Electrically, one system is no more effective than the other. It is only when you consider what is involved in installing the electrical system that you really see the differences.



The big advantage of a metal aircraft, as far as electrical installations is concerned, is that single-wire circuits are simpler and easier to install than the required two-wire circuits in wood and composite aircraft.

Naturally, this can result in a significant saving in money and weight for the metal aircraft

builder, as well as a reduction in the amount of work and installation complexity.

However, it is not so lopsided a comparison when you consider the fact that most of your single-wire circuits will still require a terminal connection to ground. So, unless a unit is automatically grounded through its case on installation, at least a short connector cable will be required to the nearest ground terminal block or stud.

Even so, that is still much better than having to run long duplicate wires from, let's say a tail light, all the way forward to the nearest ground terminal block.

Establish A Good Engine Ground The first electrical connection to make as soon as the engine is mounted is the one to establish a good engine ground.

In most aircraft, you do this by connecting one end of a heavy cable, or metal grounding strap, to some conveniently located bolt on the engine crankcase. The other end of the grounding strap should terminate on some solid part of the aircraft's firewall structure.

Note - This cable/grounding strap must bridge across the engine mount's non-conducting rubber shock mounts . . . rubber, as you know, makes a lousy electrical conductor.

This engine ground strap, in a metal homebuilt, serves to tie the engine and the entire aircraft structure together into a single common electrical ground. In a wood or composite aircraft, however, you will have only thus far established the engine and firewall as grounding points. For this reason, and for your own convenience, you should run additional conductors to establish additional grounding points.

I would suggest one of these to be the instrument panel. In addition, one or two conveniently located ground terminal blocks should be sufficient to complete the ground return circuit in a wood or composite aircraft.

For A Good Ground . . . Before making any kind of an electrical connection, all paint, primer and, yes, anodized surface film, must be scraped off, or otherwise removed, to provide a smooth, resistance free, bare metal surface. Be sure each connection is properly assembled with washers and is tight and secure.

Common Grounding Faults Here are the most common troublemakers: 1. A missing, disconnected or corroded engine ground strap; 2. A connection made to a high resistance surface; that is, the presence of paint, corrosion, primer or anodizing film prevents making and establishing an effective ground; 3. An electrical unit is not grounded. Some electrical devices (solenoids, relays, senders, etc.) are grounded through their cases. If the unit is not attached to a metal grounding surface, a separate grounding connector must be installed to the nearest electrical grounding point; 4. A loose or poor connection at the battery negative terminal or starter terminal can be the cause of engine starting problems; 5. A plus (+) cable becomes disconnected and drops down making contact with a metal grounding surface. If you're lucky, a fuse will blow, or a circuit breaker will pop. The worst case scenario? Wires get hot and burn, smoke fills the cockpit, and avionics self-destruct; 6. A voltmeter with a poor connection to ground experiences a resistance which will give the gauge a false low reading; and 7. Electrical senders (oil pressure, fuel pressure) with poor ground connections will give false low readings.

That Notorious Magneto "P" Lead When you first install the engine, your magnetos will be "hot," and ready to fire the plugs with the slightest movement of the crankshaft (propeller). They will stay that way (hot) until you connect the P-leads to the magnetos, thereby, electrically grounding them through the ignition switch.

Some builders have trouble remembering that when the magneto switch is ON, the P-lead is ungrounded (in effect, "separated" from the magneto) and the magneto is "hot." Therefore, anytime the P-lead (wire) becomes disconnected, or is broken, the magneto becomes hot! And it makes no difference whether the ignition switch is ON or OFF.

The breakage of a P-lead in service can take place most any time due to the effects of ordinary vibration and/or clumsy maintenance. So . . . unthinkingly turning the propeller, even a little bit, without assuring yourself that the mags are grounded, can turn the act into a lethal event.

Incidentally, one clue that you may have a broken P-lead would be a zero rpm drop on one magneto during your engine runup (magneto check).

Part II of this article will appear next month...

FLY MART



Free to members. Contact Tim to place an ad: tim@timrittal.com or 907/248-2249.

FOR SALE: Tools for sale: 9"x20" metal lathe with tooling, \$650. Milling machine with tooling, \$650. Buy both together and pay \$1200! Julian Smith, 694-7881 (hm) or 250-7945 (cel).

FOR SALE: Acrosport 1 (see photos below), an acrobatic bi-plane for REAL flying! \$60,000. Herb Williamson, 345-3431.

WANTED TO BUY: Lycoming 0360 engine with CS prop or able to take one. Tim Rittal, 244-4472.



Acrosport 1 for sale (see Fly Mart above)

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CHAPTER 42 OFFICERS

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VICE PRESIDENT Gale Partch	345-4554 callme3@pci.net
TREASURER Rob Spoo	384-2021 robspoo@hotmail.com
SECRETARY Mike Luther	278-3222 luther@pci.net
DIRECTOR OF COMMUNICATIONS Tim Rittal	248-2249 tim@timrittal.com
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TECHNICAL CONSULTANT Cliff Belleau Tom Lawhorn	333-2215 (hm) 248-7070 (wk) 333-7849 tomlawhorn@hotmail.com
DIRECTORS AT LARGE Jack Brown Jim Moss Chuck May	248-1060 243-5151 345-4703
MONTHLY MEETINGS	4th Tuesday of most months

2005 Alaska State Aviation Trade Show and Conference

May 14th & 15th, 2005

Our space is confirmed, #173, the same corner as always. You will all have badges, indicating team members. Dee would like to have our one hour presentation defined and structured by the end of March. We are free to use any media we like and arrange any format of our choosing. All this has to be brought together because, in the first part of April, the big push for advertising will begin and she will have 20,000 booklets printed for the show.

Suggestions: Slide show of projects, CD/Video of Oshkosh, EMO class: "How to" information, dancing girls, etc. Other ideas?

Please think of something constructive we can offer for the more than 20,000 visitors we expect for the best show ever!

Thanks, Jim Moss



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FEBRUARY'S MEETING by Tim Rittal

Once again we were lucky to have Lou Nagy (at right) from UAA Aviation as our guest speaker. This time around Lou talked about antennas for aviation. He brought with him several examples of the many types and sizes of antennas, talked about where they go and what they are supposed to do. If you thought you were going to get by with a simple hand held with its own built-in antenna, think again. Transponders, ELTs, maybe a GPS... each has its own requirements and characteristics.



We learned that some antennas can knock out part of the effectiveness of others if positioned poorly. Lou did his usual great job of explaining the theory, telling some war stories and answering all the questions folks wanted to throw at him. It was informative and useful. We owe another round of applause to Lou for his willingness to share his time and knowledge with us. I am sure we have not seen the last of him.

After talking about electrical things the past few months, we thought the Electrical Grounding article on page 2 may be helpful. Part II's in April.

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