

# Portland Area RV Builder's Group Newsletter

Issue 92.5

January 1993

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## December Meeting:

Just before Christmas, we met at Bill Kenny's shop. Bill is coming along nicely on his wings. Ken Scott's RV-6 that is also at Bill's shop is looking like it should fly in the not too distant future. Don Wentz demonstrated the easy installation of one of his landing light kits in Ken's wing. The instructions must be more than adequate; Don kept referring to them as he did the installation!

Speaking of meetings, we need some volunteers to open their shops to well meaning and curious fellow builders. It's easy; just drop myself or Don Wentz a note indicating when you would like to host a meeting. If you have a particular topic or guest speaker you would like to invite, that's even better. It really is valuable to have other experienced builders come look over your work and provide constructive criticism and tips to avoid the same mistakes they made.

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## Next Meeting

Since we didn't get around to setting up a meeting this month, and the EAA chapter 105 is moving into their new home at Twin Oaks, we decided to invite the RV builders to the EAA meeting this month. I believe this month will be that annual video—fest with several different aviation related video topics going on at once. For those RV guys, Carl Hay is building his RV in the EAA hangar.

There is a lot that the EAA has to offer and those of you who aren't already members, I would encourage you to come to the meeting and check it out. Not only is the local chapter a valuable resource, but the national organization represents the sport aviation pilot better than any other.

**Place:** EAA chapter 105 hangar at Twin Oaks Airpark

**Date:** Thursday, Jan 21.

**Time:** 7:00 PM

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## Calendar & Miscellaneous

- Don't forget, EAA Chapter 105 meetings are every month on the third Thursday, 7:00 PM. Twin Oaks airpark.

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## Builders Tips

How about this simple new builder's trick I thought up while trying to figure out my fuse plans:

Use colored highlighter pens to color code labels and associated details or section lines on each plans sheet. For instance section line A—A' and its associated drawing label might be yellow, B—B' green, and "Detail C" orange. It really makes it easy to find things quickly and easily on the sheet when one's eyes can navigate by color—particularly with some of the more crowded and complex sheets. With all the time I've spent looking at the plans, I wish I'd done it sooner!

Earl Brabandt

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## All Those Hoses - Ken Scott

When you get past all the metal pounding and into installing the engine, you will find that the light grows dim and the trail faint. There are no explicit directions in the construction manual since Van's doesn't know what engine you will be installing. It takes serious study to divine the arcane mysteries of plumbing a Lycoming correctly. Many hours will spent poring over such Biblical sources as Tony Bengelis' Firewall Forward and the Aircraft Spruce Catalog.

One of the biggest questions on my engine was hoses. Where do they come from? Does a stork bring them? Are oil hoses, fuel hoses, and vacuum hoses all the same? Can you make your own or must they be manufactured in a specially equipped shop?

I considered the question and decided that if possible, I'd make my own. I knew what would happen if I didn't — — — no matter how I measured and calculated, at least half of the hoses I ordered from some remote source would be wrong. Immense amounts of time would be consumed going

back and forth to the hose maker getting things done over. Besides, it's just a question of plumbing; ever seen a plumber in action? He dumps a huge gunny sack of fittings on the floor and takes what he needs as he goes. He doesn't try to figure everything exactly ahead of time and then go buy exactly the right stuff. He's been there. He knows.

I decided to be a plumber, too, and when I was at SunNFun last April I bought a big baggie of hose fittings, all sizes and types, for about 10 cents on the Aircraft Spruce dollar. Even then I ended up short on a couple. I was able to get them, and the hose itself, from Columbia Airmotive, delivered UPS the next day, right the first time, for less than ACS prices. I liked that.

With the engine hung, I was able to measure hose runs. The best tool for this is some light flexible wire. I used about 10-12 feet, in three sizes, of Aeroquip 601 hose, with the braided stainless jacket. The hose was measured for length by straightening the wire and laying it along side the hose. After wrapping the hose with several thicknesses of masking tape at the cutline, it was cut to length with a Norton wheel in a die grinder. (I tried a hacksaw, too, but it just chewed up the stainless braid. A frayed end is no good, you must have a clean cut to install the hose ends.)

A series of directions for installing hose ends is pictured in the ACS catalog. These, as it turns out, are directly out of the Aeroquip catalog, which has more detail and clarity. All those evenings of perusing old Sport Aviations paid off here, because I remembered a story of a fellow building a Barracuda who made all his own hoses (over 90 of them!). He had gotten into trouble by not using the mandrel Aeroquip calls out. Without the mandrel, little stiff curls of rubber had been dragged out of the hose wall by the fitting, and no amount of blasting with compressed air dislodged them. They acted like little flapper valves, giving him fluctuating oil pressure and screwy hydraulic action. Not good! I didn't spring for the expensive Aeroquip mandrel (this might be something the Builders Group could consider as a tool bank purchase...) but instead dipped into a number drill set and used the closest fitting drill bit shank. Without using this, I got exactly the little rubber half moons described in the article. With it, I got almost none. You can hold the hose up to a bright light, sight through it, and see the little devils.

After a couple evenings work, I had all the fuel hoses made up (I used one inside the cockpit too — — much tougher and easier to route than the aluminum tube in the kit), big hoses for my firewall mounted oil cooler, even some pretty little hoses for my manifold and fuel pressure lines.]

Now doubt set in. A year and a half or so ago, I wrote up an incident for Van's RVator wherein an RV—4 pilot had a oil cooler hose pull out of a fitting and deposit him, despite a nice job of flying, upside down in a plowed field. No injuries, but a lot of things to fix. The pilot had built his own hoses and tested every one to 90 psi with his air compressor. They had held up fine for 50 hours, then pop! and look for a field. Hmmm.

As I was reviewing this story, Canadian RV—6 builder Eustace Bowhay visited, gripped me by the elbow, and earnestly implored me to have all my hoses, by whomever built, tested to 1000 psi. Now, Eustace has about 3000 hours in Beech 18s on floats and that's just a little more than 10 percent of his total time. When Eustace talks about airplanes, I listen. (An aside: Eustace says that his RV—6 is the best all around airplane below 10,000 feet he has ever flown. This from a man who for many years owned and commuted to work in a P—51.) He told me any good engine shop could do this.

Maybe in Canada. It took me two weeks, and about fifteen phone calls, but I did finally find a place that would pressure test hoses. About two miles from Hillsboro Airport. Up til 9 in the evening. And they wouldn't take any money (if you go there, try and make the man take a buck — — he's worth it.) The name is:

NORTHWEST HYDRAULICS

21550A NW Nicholas Court

Hillsboro, OR 97124 690-5855

George Davais is the proprietor and the guy who tested my hoses. I got a complete tour of his impressive business, an education, my hoses tested to 1500 psi, and a handshake. Twice. Because the hose I had built for the pressure side of the oil cooler, the one that could loose a lot of oil overboard in a big hurry, leaked around the fitting and had to be rebuilt and retested.

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## **Installing Van's air filter by John Ammeter, Puget Sound RVator**

After flying my RV—6 for 2 years without an air filter felt it was time to install Van's after market air filter. I had been putting it off since working with fiberglass is not one of my favorite pastimes; in fact, one could say I built an aluminum airplane solely because of my phobia about fiberglass and

the problems with resins (actually there were a few other motivating factors in the choice of an RV-6).

Recently, I was flying up the river valley towards Arlington airport when I heard a loud "bang" and saw a blur of feathers fly over the canopy. After landing, I found the remnants of another bird about 4 inches away from the air inlet to the engine. Luckily, it had not entered the air inlet. Since I did not have an air filter, the bird would have ended up in the venturi of the carburetor. That would have stopped the engine. RV's are excellent aircraft but do not compare well with most sailplanes. If I had had an air filter installed the bird remnants would have been contained in the air filter box.

Vans instructions for the air filter assembly are on a par with most of his instructions. He always assumes I should know more than I do. After reading the instruction sheets over for the fourth or fifth time I felt I was ready to tackle the job. I wasn't worried about the aluminum part of the installation but, unfortunately, I had to modify the fiberglass cowling. First I glued a foam block in the canopy in the air intake.

After installing the lower cowling back on the aircraft (along with the upper cowling) I was able to cut away the foam (using a hacksaw blade and a rough cut file) and form a streamlined "tunnel" from the cowling to the air intake on the air box. Now all I had to do was fiberglass the inside of the "tunnel". Easier said than done. Anytime fiberglass gets within reach of me I break out in a cold sweat. How was I going to be able to glass the inside of this tunnel and get it smooth at the same time?

At this point inspiration hit me. Probably everybody who has worked with fiberglass already knows this but it was a revelation to me. How to force the

fiberglass to form itself to the tunnel and to the curved opening in the cowling? What I needed was some way to apply an even force to the entire surface of the fiberglass. A short trip to the local drugstore provided a supply of party balloons. The balloon designed to look like the torso was ideal. With the small area in the tunnel area and the two larger volumes on the outside of the tunnel the balloon applied an almost perfect pressure to the fiberglass. The resin didn't stick to the rubber balloon so, after curing, the balloon was easily removed. The inside of the tunnel was smooth and the edge of the fiberglass was smoothly bonded to the canopy. With a little sanding the job was done and done well.

I highly recommend the air filter assembly Van's Aircraft offers. It solves the problem of air filtration without the attendant restriction of air flow other air filters can cause.

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## Trading Post

- leading—edge Landing light kits for RV4/6/6A. Retrofittable, easy installation. Single kit \$69 + shipping, fits either wing. Complete kit includes plexiglass lense, halogen light, all mounting hardware, detailed instructions. Don Wentz, 50641 Firridge Ave, Scappoose, OR 97056 503-543-2298 for info/photos/price list. Discount for Ptl'd Area RV Builder's Group.
- Aluminum RV—6 Fuselage jig. Kit includes all aluminum, rivets and hardware needed to build one jig, plus plans and manual. \$550 plus \$40 for crating. DJB Engineering & Development (215) 866—6913. (I have brochure and more information if anyone is interested-- Steve.)

# ASSEMBLY INSTRUCTIONS

<Scanned AEROQUIP hose assembly page out of the Aircraft Spruce and Specialty Co.>

**You are better off ordering the \*\*\*FREE\*\*\* Aircraft Spruce and Specialty catalog, than trying to read a scanning of a copy of a scanned page.... [AD].**

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