

# Portland RVators

Issue 94.6

June 1994

## May meeting

The May meeting of our group was at Mike Seager's hangar out at Vernonia Airport in where else, Vernonia, OR. Since this was a morning gathering, a wonderfully disgusting array of Cinnamon Rolls, cookies, etc. was waiting alongside the coffee pot.

The air was calm and cool, the grass freshly mowed, the shop neat and clean (one of the side benefits of hosting a get together, says Mike!), the only detraction being that I had to drive the 30 miles to get there. We totally lucked-out on the weather, as the next day dawned with gray skies and rain.

Since I did drive-in, I arrived half an hour early so I could at least watch the arriving aircraft land (am I nutty about airplanes?). Let's see if I can remember them, somewhat in order of appearance: Tim Skinner & ? (sorry, clodding-it again!) in a clean, partially polished Cessna 150. RV-6 underway. Tim's buddy (I AM good with names, ain't I?) in a neat little 1941 Airknocker Champ that he restored. Randall Henderson and Rion Bourgeois in their co-owned (along with Ken Scott & others) Citabria. It looks like they had stopped fighting over the stick by the time they needed to land, at least. RV-6 & -4 builders, respectively, well into their wings. Bob Dutton in a pretty RV-4. Actually, this RV-4 belongs to Chapter 105 member Leonard Thompson who has lost his medical. Bob is sacrificing time in his own Musketeer to keep the -4 in flying condition for Leonard. What a humanitarian! (Lucky stiff may be more accurate!)

Frank Justice & Charles Kaluza in Frank's Cheetah. Frank is nearing the end of his RV-6 wings, and Charles is progressing on an RV-6 as well. Bill Kenny chauffering Brent Ohlgren in a good 'ol cub. Brent was pretty happy about his first ever ride in a cub. Both are finishing-up wings on RV-6s. The Rainey's in their RV-6A. Norm was able to give me some quick pointers relating to my flap adjusting/fitting. It's been a little over a year since the first flight for them. Can you believe that they are considering a new RV project? Already? Dan Delano in his extremely well-traveled RV-6. His was one of the first completed in our group. It's really great that him and the Rainey's and others continue to show-up at our group get-togethers. Not just the fly-in ones either. They faithfully come each month, just for friendly chatting and to share their knowledge.

Evar Eyres & Lee McDaniels in Evar's RV-6. Lee is a big dude and looked a bit squeezed. He should have put that seat-back into the fully reclined position. Lee manufactures RV-4 engine mounts & flies a HIGHLY modified RV-4 (big engine, inverted systems, spoilers, etc.). Evar's RV-6 is almost a year old already, and this is the first time I've seen it with the white with metallic blue & grey striped paint scheme. Sharp paint-job Evar! A Cessna Cardinal also showed-up, not sure who was flying-it tho.

Altogether we had 30-some show-up. We had a short discussion about our June Fly-in, then most everyone blasted-off for the Schrock Fly-in down by Corvallis.

<b>Next Meeting:</b>	
<b>Place:</b>	Scappoose Airport (1S4) West Hangar area
<b>Date:</b>	June 11, 1994 (Saturday!)
<b>Time:</b>	10 am (or earlier to help!)

## General Business:

### T-shirts:

All set for the fly-in. Be sure and get yours. They are the same light grey-ish shirt as last year, but the logo has color in it. Should be a hit! \$10 for members, \$12 otherwise.

Don't forget EAA Chapter 105 Meeting  
7 pm Thursday, June 16  
Twin Oaks Airpark

## EVENTS CALENDAR

**3rd Annual Northwest RV Fly-in, sponsored by the Portland RVators** - Saturday June 11 at Scappoose (1S4) Oregon. Come-out & see some RVs, have some lunch. Starts 10am, eat at noon.

Coming-up June 24-26 at Twin Oaks, is the **1994 Oregon EAA Fly-in**. It's Chapter 105's turn to host, and should be an opportunity to see a large selection of different types of homebuilts and the great Ch105 facility. There will be food, camping, facilities, etc. **Don't miss it!!!**

**Troutdale AirFair** - This annual event will be the same weekend. This is a large, structured 'Airshow' with demonstrations, displays, etc. Check the rags for details on arrival times. Free admission for homebuilts that fly-in for display each day!

**Vernonia Jamboree Fly-in** - August 5-7 at Vernonia Airport. Live band hangar dance Sat nite, breakfast Sunday morning,

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**Builder's Tips:**

*Thanks to all who share them with us!*

**Wing Fuel Tank assembly in forty easy steps:**

*Art Chard*

At one of our bldrs grp mtgs about 3 years ago, Art brought-in a fuel tank and shared these tips with us. We thought it about time for a reprint. Art uses MEK for cleaning parts before ProSealing, but, BE CAREFUL! Don't let it touch your skin or inhale it - BAD STUFF. Always use gloves, eye-protection, and a respirator.

Almost the entire tank is drilled while it is assembled and strapped to the wing, including all the holes that attach the rear tank baffle to the skin. These directions are NOT intended to substitute for the plans, manual, *or thinking*. Read them carefully & use/adapt what works for you. (I used these ideas to do my tanks. I had some help from an experienced wing bldr who said these tips made my tanks better than any they had ever done, so they DO help.)

1. Separate the ribs. Smooth the edges of all the flanges. Be careful to remove any burrs around the notches in the flanges near the tips. Be sure the tips are properly formed and straight.
2. Make a template that locates the various holes in the internal tank ribs and use it to mark hole positions on all the ribs. Cut and deburr all the holes.
3. Check the tank skins for square. Deburr and polish the edges and radius the corners. Make sure the tank and leading edge skins are the same size (it is OK for the tank skins to be longer, trimming them to fit later is OK).
4. Mark rib positions on rear tank baffle. Determine rivet spacing (3/4" end ribs, 1" internal), drill only the baffle.
5. Determine the spacing of the rivets that attach the tank skin to the ribs and lay it out on the rib flanges. Flute and straighten the ribs.
6. Center ribs on the baffle, aligned on the rivet holes. Drill the ribs. Deburr ribs and cleco in place on baffle.
7. Place the assembly on the wing spar. Use blocks beneath the baffle to align the tip of the tank skin to the tip of the leading edge skin (using strips of wood the length of the baffle works well here).
8. Use wooden spacers between the tank ribs to hold them in place. A length of wire run down each side of the spacers and twisted together at the end will hold the assembly firmly.
9. Make and install a spacer between the outboard tank rib and inboard leading edge rib.
10. Place tape on both the baffle and spar (about a 6" length) near outboard end to keep baffle from moving.
11. Install tank skin over ribs and clap in place with rubber straps, band claps etc. to check fit.
12. Remove skin. Make a template of the spanwise rib positions at the base and the tip of the rib.
13. Re-install skin, clamp firmly, and use the templates to mark the position of the ribs. Use rivet spacing templates (remember, 3/4" spacing on the end ribs!).
14. Drill on side of the skin to the ribs starting at spar edge of rib. Put clecoes in each hole for the first half of the rib and then remove every other one and use it in the upper half, repeat for other side.
15. Mark out the location of the rivets that connect the skin and the rear baffle. Measure very carefully! There is less than a 1/4" to get these rivets in over a 4' length.
16. Mark out the #8 screw holes that hold the tank to the spar and leading edge. Drill these holes to 1/8" (#30) so that when you are done Prosealing the tank, you will be able to place it back on the wing in the jig while the Proseal cures. Platenuts may be installed and the clecoes inserted into them., BE SURE THAT THE HOLE LOCATIONS DO NOT INTERFERE WITH THE SPAR STRIPS, BOLTS, ETC. THAT MAY BE BEHIND THE SPAR FLANGE. CHECK BEFORE YOU DRILL!!! ?
17. Mark the fuel drain and filler locations. These will be cut-out after the skin is removed, but making them while the tank is on the wing insures you get them in the right place,.
18. Remove clecoes from top of tank. Reach up behind the skin and mark the rib location on the inside of the tank skin. This will help you locate the stiffeners that are installed on th'e bottom of the tank.
19. Remove skin from tank, deburr all the holes. Remove the spacers from between the ribs and deburr the ribs. Cut the filler neck and drain holes.
19. Cut the access holes in the inboard tank ribs per plans. Drill the hole for the vent line. Make and install the.063 backing ring and platenuts. Make the hole cover at the same time and drill the screw locations in assembly with the rib and backing ring so that you are sure all the screw holes line up.

21. Make the large attach angles. Make backing plates that match the rib contour. These will go on the inside of the tanks, riveted to the tips of the end ribs, and extending about 4 inches back from the tip. Use .040 for the outboard rib and .063 for the inboard (these are not in the plans, but are a good addition as they add strength to the tips and better surface area for Proseal at these critical rib-tip locations).
22. Make .032 stiffeners for bottom skin. Cut-back each upright flange at 45 deg so you can get a bucking bar to the ribs.
23. Dimple all skins and ribs, EXCEPT for the holes that attach the skin to the rear tank baffle. Countersink those.
24. Clean (!) all rib flanges, stiffeners, and skin. Roughen the mating surfaces with a stainless steel welder's "toothbrush" (or red scuffing pad).
25. Sort-out rivets by length and clean. Arrange clean palettes for mixing Proseal. Have plenty of wooden popsicle sticks for spreading and applying Proseal. Mix half a cup of Proseal.
26. Begin by back-riveting the stiffeners to the bottom of the tank skin. Put all the rivets through the holes and tape them in place. Spread a layer of Proseal across the stiffener positions on the skin. Apply Proseal to the bottom of the stiffener and set it in place over the rivets with hand pressure. Back rivet in place. This is the easiest part of the tank, & you will probably have some Proseal left over. If so, you can rivet the tank drain & filler neck in place.
27. Don't forget to put a 1/2 x 3/4 soft aluminum tab on the front of the filler neck to hold the vent line. Use one of the filler neck rivets to hold it.
28. Rivet access plate ring in place, using the rivets that attach the platenuts. You don't need to Proseal this part.
29. Proseal and rivet the T605 (T405) attach angle and it's .063 backing plate in place.
30. Proseal an .040 reinforcing tip plate to the inside of the outboard tip rib. Proseal & attach the 3/4 x 3/4 x .016 angles to the inside rear corners of the end ribs. Put a 3/16 rivet or cover plate over tooling holes in end ribs.
31. Rest the skin on top of the cradle stand. Proseal and install the center rib. Use 3 clecoes to hold it in place, 2 in the bottom at the tip, 1 in the top. Repeat the pattern for the rest of the ribs, then add clecoes every other hole, working aft. When the clecoes are in place, put the tank into the cradle.
32. Insert clean rivets into the open holes. Use a rag to clean away the Proseal that oozes out. Drive these rivets, but do it carefully. You really don't want to drill out rivets at this stage!!
33. When the rivets are all driven, use a popsicle stick to make a nice fillet of Proseal along the tips of the ribs and the inside of the end ribs. Clean the outside of the tank, and the outboard rib where it joins the leading edge.
34. Install the 1/4" aluminum vent line. Wrap the soft aluminum tab around it and Proseal it in place. Check the tank carefully for any gaps in the Proseal.
35. Fit and test sender units. Be careful of that one-way hole pattern in the sender! Remove and store.
36. Tape the line of rivets that attaches the back baffle to the skin. Put a layer of Proseal along the skin where the baffle will contact it. Layer the ends of the ribs generously with Proseal, especially the end ribs. Slide the baffle into place & clecoe it with #30s in ribs & screw hole & #40 in the baffle. Put #40s in every other hole.
37. Place clean 3/32 rivets in the open holes. Clean away any excess Proseal and squeeze the rivets. Install the 1/8" pop rivets in the ribs.
38. Clean all the excess Proseal off the skin flanges and back baffle and clecoe the tank to the wing (the wing is still in the jig) using the screw holes. If you don't clean-up carefully, you may stick your tank to the wing.
39. After a week or so, (longer in cold weather) you are ready to slosh. Take the tank off the wing and seal the tank by covering the large access hole with a piece of truck inner tube (available along any highway), remove the drain and plug the fitting with a 1/8 pipe plug, remove the flop tube if installed and plug the hole in the rib. Plug the vent tube with a cap. Use a funnel to pour a quart of slosh into the tank.  
Re-install the filler cap and slowly rotate the tank so the slosh reaches every nook and cranny. Keep the tank sealed. A slight but definite pressure will build inside as the solvent evaporates out of the slosh so NO AIR PRESSURE IS REQUIRED.
40. Crack the filler cap to relieve the pressure, but keep the cap on the tank. Remove the slosh by removing the drain plug and slowly pouring the slosh out the drain. Rotate the tank so that all the slosh has a chance to work it's way out. Don't rush. Blow a burst of air through the vent line to make sure it is clear. After a few days, install the sender, drain, and flop tube. Dimple the rear line of screw holes for #8 screws. Install the tank on the wing and countersink the forward line of screw holes in place. Install wiring for the senders and screw the tank to the wing.

**Fuel Sender - gauge compatibility:** *From an RV-6A builder on the network.*

As promised.... a follow-up to the tank sender/gauge tests mentioned in my 5-13 posting

I took my sender from Van's, and measured it's resistance vs. angle after adjusting the end stops to 33 and 240 ohms. I found it to be non-linear, with a greater resistance change vs. angle at high resistance (Full). This gives it

a greater sensitivity near Empty which is good. Approximate readings are as follows (angle was a bit hard to measure accurately ... is probably +/-1.5 degrees).

Ohms	Angle	Ohms	Angle
33	0	63	8
87	18	106	28
132	38	161	48
208	58	243	67

I then took a WESTACH Dual Fuel Gauge #2DA4 (\$62 from Aircraft Spruce) and wired it to two variable resistors, & simulated the fuel sender from the above resistance curve. I also translated the readings to sender float angle.

Ohms	Reading	Angle (degrees)
241	EMPTY	0
164	1/4	19
106	1/2	39
67	3/4	57
33	FULL	67

This was done at 12.3 VDC supply (the battery from my Terra handheld), and to check supply sensitivity, I added 3 volts to make 15.3 VDC, and could see NO change in the meter reading anywhere in the range. This is better than most direct reading gauges (the Westach has internal electronic circuitry, unlike Vans single tank gauges).

Conclusions, the Westach #2DA4 dual gauge will work with Van's senders, in spite of the catalog warnings to only use the same brand sender. The gauge looks like an Aircraft 2 1/4 inch instrument instead of an automobile type, and should save space on the panel by showing both tank fuel levels in one instrument. The gauge reads the same over a wide range of supply voltages. The gauge and Van's sender combination has more sensitivity in the lower half of sender travel... which is good for our application. Full and Empty are indicated correctly if the sender is adjusted to 32-34 ohms and 235-245 ohms at the float arm limits.

Cost is not exorbitant (although quite a lot more than Van's std units). Internal lighting is available cheaply. Sometimes you get lucky!! My original intention was to build some electronics to make this gauge and Van's senders compatible., none is needed!

This is the way I am going to do my fuel indicator, with the gauge mounted just above the fuel selector on a sub-panel (in place of the large manual trim knob -1 am going electric for elevator trim). I am also thinking of low fuel warning lights next to the gauge driven by float switches in the fuel tank access panel.

happy gauging ..... Gil Alexander #20701 RV-6A

## Project Status:

Randall Henderson

(Instead of project status, Randall submitted this nice write-up of a popular local event):

**Schrock Fly-In** — If you missed it — too bad! You'll know better next time. This was a good old-fashioned fly-in, with a barbecue, pot-luck, contests, prizes, and lots of airplanes, including several RVs.

After the builder's group meeting at Vernonia, Rion and I piled into the Champ and motored out of there. We stopped in at Twin Oaks for fuel, then took off south for Schrock's, just ahead of 3 RVs. About 5 minutes after take-off, we're putt-ing along at 80 or so mph trying to climb over the Newberg ridge, and right off our wing come the 3 RVs, one after the other, climbing out at about 160 or so. It was so cool! We almost turned around so we could go back and work on our own projects. By the time we got as far as Salem we heard them on the radio entering the pattern at Schrock's, near Corvallis.

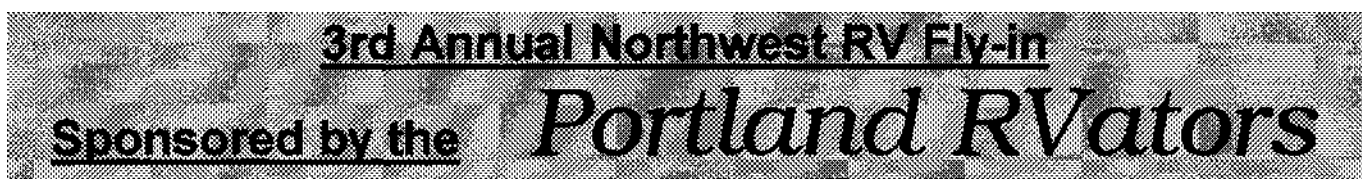
The Schrock's have a beautiful place, with a smooth, straight grass strip leading up to a large grass parking area, with a pole barn and hay shed situated slightly above and offset from the runway, making for a terrific viewing area. Jim's a building contractor, and made the strip himself. Too bad he doesn't currently have a plane to fly out of it! (he's building an RV-6)

Several members of the group showed up, including Rion Bourgeois, Ken Scott, Steve & Tracy Harris with Christopher and McKenna (who was actually born 2 days later! Congrats Harris's!), Jerry & Linda Springer, Frank Justice. Norm & Donna

Rainey, and Dick VanGrunsven. The fly-in was lots of fun. Good food and plenty of it, even though we arrived kind of late. Among the RVs present were Springer's RV-6, Van's demonstrator RV-6T, Rainey's RV-6A, Ken Melvin's RV-4, and others.

By the time the contests started in the afternoon the crowd had thinned a bit, but there were still plenty of people to participate and watch. Rion, Ken and I all signed up for the flour bombing, and as luck would have it, my name came-up first. Having never done such a thing before, I had to take off without getting any feel for just how best to proceed. Oh well, at least I managed to hit the ground with the thing. Mike Seager made a run at it in his Mooney (he's between RVs at the moment), and Steve Harris took his turn in his Tri-Pacer, with Rion Bourgeois as Bombardier. Rion, in the Champ, somehow managed to place second, and I'm afraid we'll never hear the end of THAT. There was only one RV entered in the contests (wish I could remember his name), and he won the flour bombing with an interesting tactic — while the rest of us set up for slow flight over the target at minimum safe altitude and just tossed the bag of flour out the window more or less over the target, this guy pretty much dive-bombed the thing at high speed, released his bomb straight at the target, and pulled up into a steep bank to depart the target area. It was quite a sight. How about that, *another* thing RVs do well! Total performance!!

How are the rest of you doing on your projects? (Thanks for the updates Randall.)



Everything is basically ready. See you all there, **Saturday, June 11.**

- > **All members bring a big bowl of cold salad, like potato, pasta, or macaroni.**
- > **VOLUNTEERS NEEDED:** (Be an active participant and volunteer!)
  - To sell our T-shirts (sit at a table for 1/2 hour)
  - To help set-up (show-up by 9 o'clock)
  - If you missed the sign-up sheet, just look for Norm Rainey.
  - To park and greet arrivals (1/2 hour shifts)
  - To help tear-down (stay till the end)

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**Don't Want Ads:**

Let us know what you got but don't want, or vice-versa. Ads are **FREE.**

HOT TIP! — Randall was in Costco the other day and saw a Devilbiss ProAir II, 4hp 30 gal compressor for \$280 (120v), and a 60 gallon upright 5hp (240v) for \$360!!!! Check em out.

Radios for sale:

KX170BwithKI211(VOR/GS)	asking \$1500	KX170B with KI201 (VOR)	asking \$1200
KR85 ADF Indicators and Ant.	asking \$800	Aero Mechanisms Enc Alt.	asking \$275

All equipment is yellow tagged and fully operational. Bob Flansburg, 696-7206

Duckworks Landing Lights. Retro-fittable, light, easy installation. Kits start at \$69 (discount for Ptd RVators). Don Wentz, 503-696-7185 for info.

2 new RMD Wingtip (in the fiberglass tip) landing light kits. Sell for less than new. RV-4 jigs no longer in use -Aileron, flap, rudder, elevator - all available for loan. Brent Anderson 503-646-6380

Std RV-6 elevator trim control knob/cable. Slightly used, sell for \$\$ less than new, Evert Eyres, 503-648-3564. Wanted

- Avery dimple tool, borrow or buy for the RVS restoration project. Gary Standley - 591-9040

RV Interiors - Variety of fabrics, vinyl's, and leathers available, also foam densities, including FAA approved materials. Contact Bill Welsh of Interior Motions (seats start at \$325/set) 813-725-2463