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Wingtip Hinge Attachment Procedure.

Background

The Van's stock method for attaching the wingtips the wings for the RV-7/8 is to use AN507-6R6 screws into nutplates attached to the inside of the wingtip flange (Outlines in Section H-H of drawing DWG 12 for the RV-7). I don't recall the exact number of screws, but 40 screws per side seemed to be about right, or 80 total screws. One thing I noticed on a lot of the RV's out there with nice paint jobs is the screws which attach the wingtips always looked stripped out. Also, some RV's seemed to have some puckering of the wing skin where the screws were attached. I decided to go the hinge route for the following reason:

1) Less time involved to remove the wingtips
2) Better appearance
3) Xx???

Parts Needed

(Qty 2) MS20257P4-6 Piano Hinge – 1.5" Opening Width, 0.040" Thickness, 6' Length
Aircraft Spruce Part Number: 03-00050-6
(Qty 2) MS20257P3-6 Piano Hinge – 1.25" Opening Width, 0.040" Thickness, 6' Length
Aircraft Spruce Part Number: 03-00049-6

The reasoning behind two different opening widths of hinges is I did not want to see the eyelets of the hinge where the wing and wingtip meet. The thicker hinge would be mounted to the wing side, and the thinner hinge would be mounted to the wingtip.

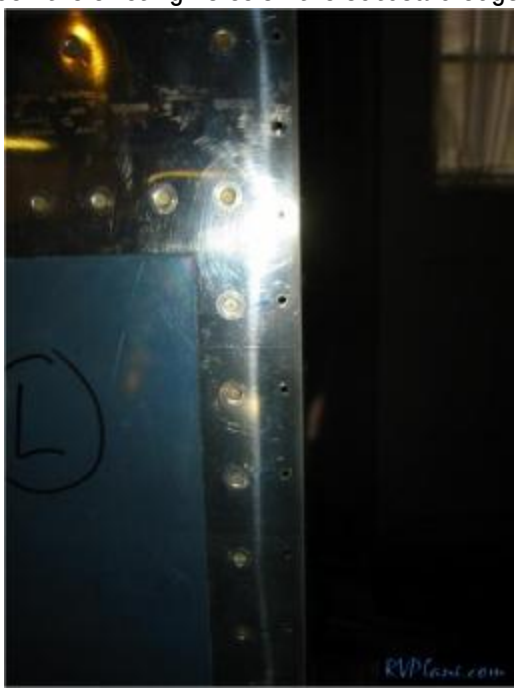
Instructions

1) Trim the wingtip so it fits onto the wing. My wingtips flange was too wide, causing it to not seat flush with the wingtip. This pic shows how the thickness of the flange varies along the length of the wingtip

2) Don't worry too much if the trailing edge of the wingtip is longer than the ailerons. This can be fixed later on by chopping the end of the wingtip off. The important thing is the general alignment of the wingtip here. Make sure the aileron is centered, and the trailing edge of the wingtip is aligned perfectly with the trailing edge of the aileron. Some trimming of the wingtips trailing edge is needed to cause the wingtip to fit.

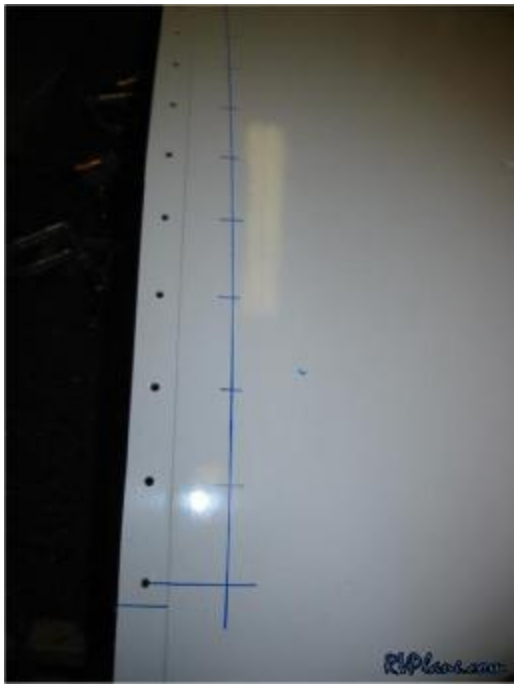
3) Tape the wingtip to the wing using duct tape and use the pre-drilled #40 holes on the outboard end of the wing to drill into the wingtips flange.

4) The default hole spacing for the #6 screws is too wide for a line of rivets. I used a rivet spanner to drill a new hole in between the existing holes on the outboard edge of the wing skin.

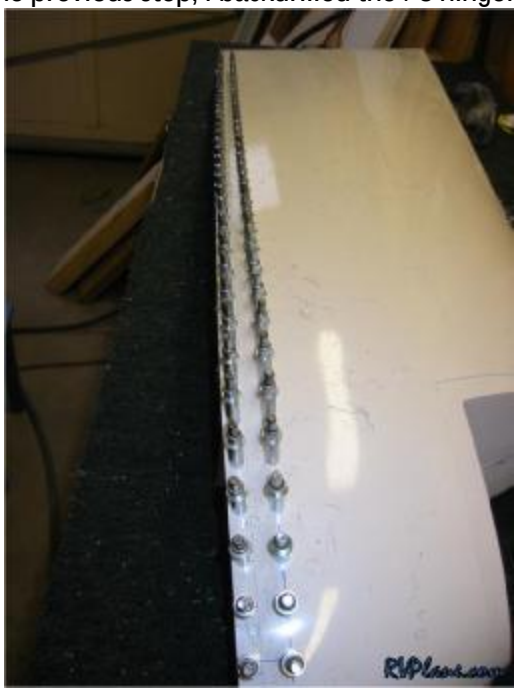


5) The next step is to drill the wider “P4” hinge into the wingtip using the existing holes:

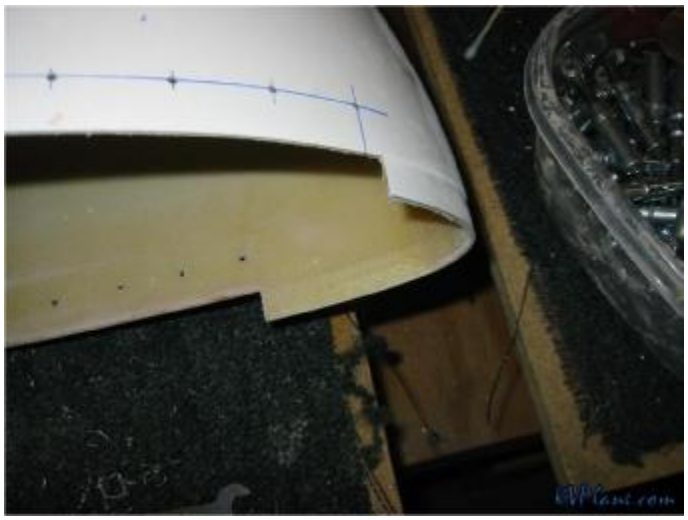
6) Next step is to drill the wingtip-side hinge – the thinner ‘P3’ hinge. To do this I started off marking where the rivet line should be, using the existing wing-side holes in the wingtip flange as a guide.



7) Using the marks made in the previous step, I backdrilled the P3 hinge.

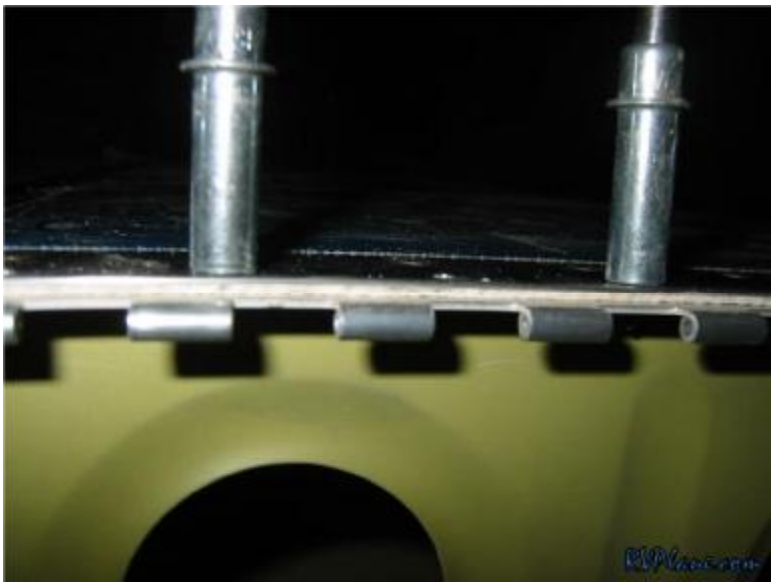


8) With all of the holes drilled in the hinges, it is time to remove the flange from the wingtip. This flange will be used as a spacer on the wing-side so the wing and wingtip are completely flush. I didn't cut the entire flange off – just the portion which had the hinge overlapping with it. I kept the leading edge flange attached to the wingtip.



9) Next step is to do a test fit. Here you can see how the eyelets of the piano hinge aren't visible in the seam between the wing and wingtip.

And in this picture, you can see how the flange from the wingtip acts as a spacer between the P4 hinge and the wingtip skin:



And the test fit. If the hinge pins don't easily go through the eyelets of the hinge, there are a few tricks:

1) Use BoeLube or some sort of wax as a lubricant
2) Slightly increase the diameter of the hinge eyelets. The method I used was I took a scape piece of hinge and heated up one side of it with a torch. Once hot. I used a hammer to slightly flatten the end. I chucked the other end of the hinge pin into a drill, causing this pin to act as a reamer.

10) Permanently attach the wing side of the hinge to the wing. I dimpled the holes in the skin and countersunk the fiberglass flange from the wingtip.

11) For the wingtip P3 hinge to be attached, the wingtip #40 holes need to be countersunk. I used pro-seam to also bond the wingtip hinge to the wingtip, since sometimes rivets can pull out of fiberglass.

12) In order to only allow the wingtip hinge pins to go so far into the wing, I installed #4 stainless steel screws in the eyelets of the wing-side hinges,

13) The final step is the method to secure the hinge pings to the wingtip rib. I used an old plastic cutting board. I cut it to contour the wingtip rib, and put a #12 hole in the middle of it which is attached to a nutplate.

I drilled two #40 holes in the plastic block for the hinge pins to enter. Here is the finished product: