Assemblage left stabilo 03/01/2011 - 07h45

Category: 1.1 Horizontal Stabilo
Published: Monday, 03 January 2011 22:09
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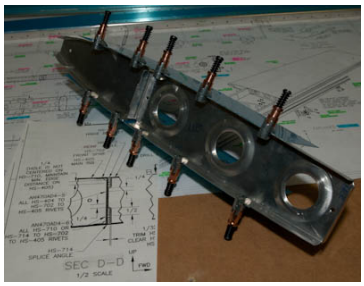
Today was a very exciting day. Today, I started the assebly of the left side of the horizontal stabilo. It was the first time an aircraft piece really got shape.

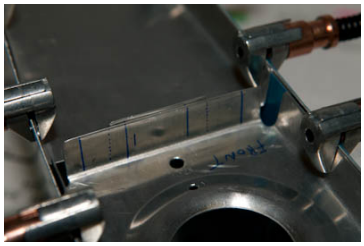
Let me first give some good news. The front spar question to Vans some days ago came back with a positive response. The relief notch is a bit bigger then usual but perfectly usable. Few... I got away with that one...

Now back to assembly. Putting it all together has only one problematic work to do. The positioning of drill holes in the HS405 and HS404. These parts come with no pre-drilling at all because you have to position them according to the skin and drill them accordingly.

On top of that, the attach points to the front spar make that you need to have minimal edge distance to all edges in all pieces. That is, to HS710, HS714, HS404, HS405 and HS702. The most difficult is to match HS404 with HS405. I did this by first mating the two parts together using some scrap aluminym sheet to simulate the skin and clamping it all together and then marking the minimal edge distances and optimal rivet spacing between the two parts.



Here is a close up of the same. One word of warning. If you notched HS404 according to the plans, DO NOT follow the dimensions on the plans for rivet positioning !!! You will end up below minimal edge distance on HS404 if you do.
I marked dimensions on the plan with a straight line on the picture below. The minimal edge distance is the small straight line marking next to it... As you can see, a big difference ! Drilling like that will ensure respecting minimal edge distance and is ok with rivet spacing.



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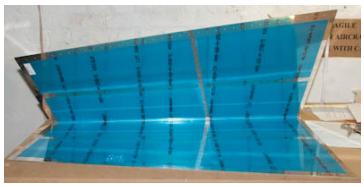
Next step was to prepare the skin of the left side of the horizontal stabilo. The aluminum comes with a blue plastic cover to protect the skin. The aluminum used for this airplane is 2024 T6. Hard and corrosive, covered with a pure aluminum layer. The aluminum layer is very sensitive for scratching so you want to keep the protective plastic on as long as possible. When attaching skins to ribs, you need of course the exact distances so the plastic must be removed partially. You use a soldering iron to melt away the plastic and create bands of plastic.On the outside, leave the plastic on during matchdrilling. It should only be removed there until you deburr the holes.



To faciilitate work later, put a center line on the skeleton in the places where the skin is not predrilled.
Once the skeleton is clecoed together. First the attach points to the middle rib are enlarged to #21. Then the skin is put on and clecoed in place.
The top side is easy. The bottom requires some help. Be carefull with these. They are fragile and we don't want to accidentally make bumps in them. After all, this is what keep us in the air.

Same view from the outboard side. This is the place where later on the polyester wing tips will come.

Then the most difficult part comes. The HS405 closing pieces (with the holes in it)is not pre drilled by the factory. First you have to make sure that the edges are straight and flush and the flanges are perpendicular to the web. In the picture you can see the little nothces made between the rivet holes.
This part is really important as the flanges need full contact with the skin and the edge of the 405 needs to be nicely aligned with the outside of the skin (HS601PP). Keep it all in place with cleco clamps.

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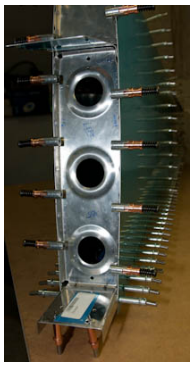
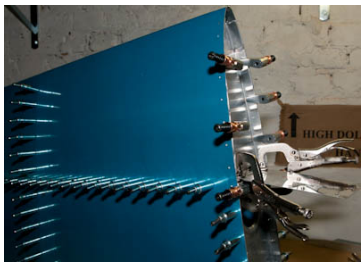


If all is mounted correctly, you can see the blue centerline though the holes of the skin as in the picture below. Drill and cleco from the center rib towards the inboard side of the plane as you go.

All holes drilled and ribs attached to the front flange



Then add the HS405 nose rib on top of it and over the front spar attachment.Make sure you have the one you marked as left.Cleco clamp it in place and then make sure the the bottom flange of HS404 and top flange of HS405 are flat against the front spar. I used vise clamps to pull them together. You will need to form the flanges first as they are not perpendicular attached to the front spar but with a light bend.

Most difficult part of the entire stabilo comes next. Take you time ! You need to drill through the 405, 404, 710, 712 and 702 front spar. The manual subscribes that you need to do this with an angle drill but I found the head of the angle drill still too large to make a good edge distance on the flanges. So I decided with the second best option which is the 12" long aviation drill bit. It was a good choice. But I should have removed the rear flange to get a nice perpendicular attack angle at the drilling. 2 holes are not really perpendicular and have a bit of an angle. so the rivet will not be fully flush here.
In the picture below, the 4 copper horizontal placed cleco's are the

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once we are talking about.
Then continue drilling uptowars the tip to fix the HS404.

Once all that is done, you can start matchdrilling all the remaining holes through the skin.

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