Stall warner matchdrilling - 12/06/2012 - 9h

Category: 2.4. Main Wings
Published: Sunday, 17 June 2012 13:12
Hits: 1823

Various tasks completed.

Spend a lot of time scuffing the ribs for the leading edge and some smaller parts that need to be primed.

I'm counting down towards the next priming session. After the priming, I will be able to rivet the skins on the wing. Finally again some work ahead that will lead to permanent structures.

Before I can prime the skins, there are some minor tasks left to do. One of them is to install the stall warner hardware in the leading edge of the left wing.

The stall warner is a small device that triggers a sound when the airflow over the airfoil goes wacko (turbulent). In this case, a small vane in the leading edge of the wing is drawn up and triggers a microswitch that generates a audible warning beep in the cockpit.
I also have the angle of attack warning on the dynon system and using the dynon pitot mount so I don't really need this stall warner.
But, the leading edge skin already has the cutout for the stall warner access door and some drilled holes in the leading edge skin.
If I have to go through the trouble of closing those up, I may as well install the device in there. The weight is negligable and a backup stall device is not extraordinary luxury... safety first !

The stall warner kit comes with a doubler plate for the leading edge skin that will get some nutplates rivetted on that will be used to close the access door with #6 screws

Since the kit comes pre-punched and the hole is cut, you can skip half of the instructions provided in the kit. (the kit is also used on already completed aircraft where the access door and positioning still has to be done by the builder).

Clecoed the access doubler plate and matchdrilled all holes #40. I used a #40 reamer this time. I will always do that from now on prepunched holes as the reamer create beautifull holes.

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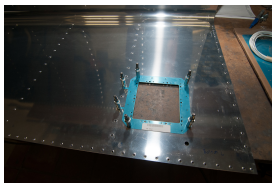
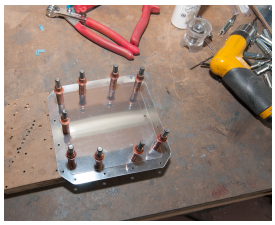
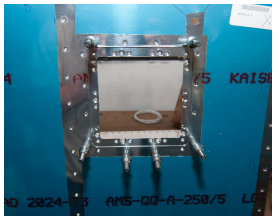


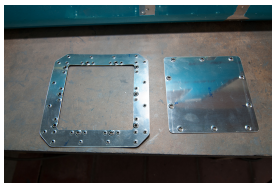
Then clecoed the access door to the access doubler plate and matchdrilled for #6 screws.



Then reinstalled it on the leading edge to see how it looks.



Then dimpled the plates for the #6 screws and dimpled #40. Carefull with the force on that squeezer when you make the #6 dimples in the access doubler plate. The plate distorts a bit on the inside as the dimple pulls in the alumnum while forming the dimple.



Once the doubler plate was ready, had to matchdrill the small rib that goes in the bend of the leading edge and that will hold the microswitch and vane.

To do this, I had to make sure the leading edge curvature was in the

Phoca PDF

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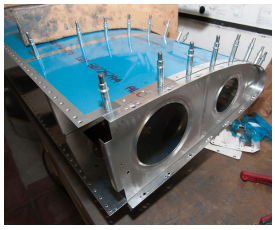
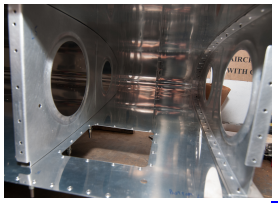
correct form so I installed the two inboard ribs including the joint plate that hold tank to leading edge. I didn't test this yet with the dimples made but the fit looked really good.

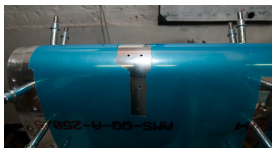


Then inserted the small stall warner rib and matchdrilled #40.



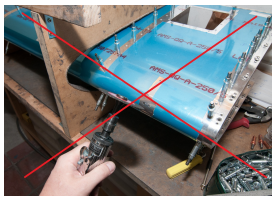
The next step is the most scary one when you read the plans. In reality, it's really a non event and doesn't take more then 15 minutes to do.

The 2 holes in the skin are already prepunched. The whole idea here is to enlarge the holes to #10 and then cut away the material between the holes.
Don't take you #10 drill ! Start by enlarging gradually. I first drilled 1/8 to #30. Then took the needle unibit step drill and enlarged to 3/16". This is just below the size of a #10. Then took the #10 and easily did the final drilling.



The picture below is a NONO ! Don't use the 3" cutting disc in the die grinder to cut the material between the 2 holes. Guess how I know ...

When you cut the material with this disc, the disc diameter is to wide and I hit one of the sides of the drilled hole making a little mark.



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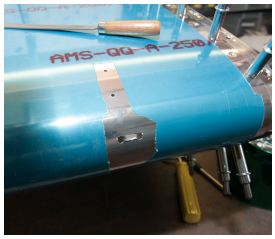
I stopped immediatly and used my dremel tool with smaller cutting disc and then finished it of with a small file. Then sand the corners smooth.
I was lucky and managed to sand away the little mark by enlarging slightly into the hole.



You don't see the difference and the result is now a very good looking opening

That was it for the work on the stall warner. All the rest will be done when rivetting the leading edge. The leading edge skin can now be primed.

Final job before priming is making the scarf joint where the skins overlap on the spar side of the wing. The outboard skin overlaps the inboard skin for little more then an inch.
That means that you now have 2 times 0.032" material and this creates kind of a 'bump' in the middle of the skin which isn't that nice.

The idea here is to file away half of the size of the skin in an area about 2.5" wide in both directions. There is then a transition that goes gradually down in size toward 0.016".
2 times 0.016" is again 0.032"... get the point?

First thing to say about this : it is not easy. so take your time.
This procedure is purely for cosmetic reasons.

I used the 3M ROLOC disc on the die grinder to polish away the material.

Then realised I made a mistake by dimpling te material already so I pushed back the dimples with the flat dies in the pneumatic squeezer.

Measure often with the caliper and go easy with the machine tools.

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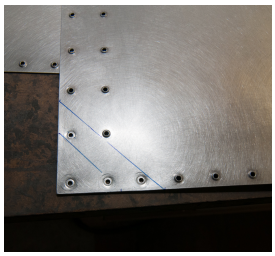
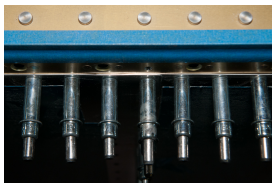
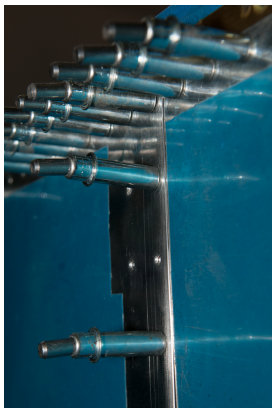
Once material is gone... it's GONE... and FedEx loves shipping these big plates.



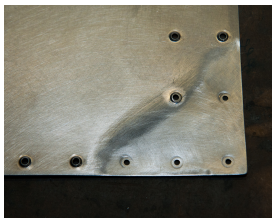
Here is the result. You can still see the overlap a bit... but it is much better then what it was before. The next picture shows the top view at the main spar.



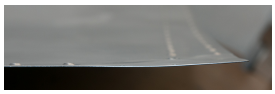
And the same setup in the other direction



The material looks like this when it's finished.



and a view of the edge



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All done, next job will be cutting the hole in the left skin for the piot mast. I had to resend my pitot mast to the supplier because it had some cracks in the aluminum weld. I'm expecting the new generation version of these masts (the blue ones) in the next days.

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