**Right Tank Preparation - 27/01/2012 - 8h**

Category: 2.5. Fuel Tanks
Published: Friday, 27 January 2012 17:58
Hits: 1623

I took a holiday today so that I could make some progress on the fuel tanks. Tomorrow Hugo stops by to help me matchdrilling the fuel tanks to the wing using the Dan Checkoway method.

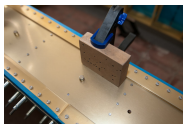
My 8 hours in the shop today turned out to be very productive.

First job was to finish matchdrilling the z-brackets on the spar side (AN3 bolts). I already drilled the center hole before so now it's time for the remaining two holes on the outside.
I read the manual a couple of times on the z-brackets and tried to merge the ideas there with the description of the checkoway methode. There is a very subtile remark in the manual that is easily missed but which turns out to be a very good method to drill these remaiing 2 holes in each z-bracket. When the z-brackets are in their normal location, you would need to reach into the wing and drill up in a cramped position. You will do this with a nr 12 drill so a hole is easily enlarged if not perfectly square on the hole.

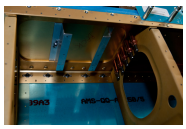
Vans suggest to turn the brackets to the aft side of the spar for this matchdrilling. Wonderfull idea. Make sure you turn them around in the right direction so that when you invert them, the holes are on the same side.

I attached the center hole with a short AN3-5 bolt and 4 thick and one thin washer. This will just engage in the nutplate on the other side without opening the nutplate. I only want to open the nutplate when I do the final installation.

Then you measure with a straight corner on the other side of the flange and thighten the bolt (lightly). I clamped another wood block from the rear side on the z-bracket to immobilize the hole thing.



Looking from the back side of the spar, this is how it looks like. The only place where you can not do this is for the most inboard z-bracket. That one will have to be drilled from the back in between the wing walk doubler ribs.(the reinforcement spar prevents the z-bracket to lay flat against the spar).





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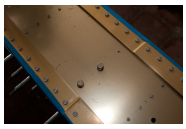
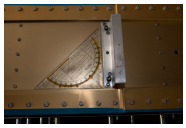
Then drill the first hole. Don't push the drill too hard when drilling, let the drill do it's work and use boelube

Once drilled, insert another bolt in the new hole and fasten it if a nutplate on the back. Remove the clamps and now you are ready to drill the 3rd hole. This is a guarantee for good alignment. ( I saw other stories on other websites of people who still had to elongate holes because of small shifting of the bracket during drilling.

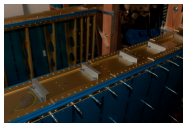


Remove and deburr the z-bracket and bring it back to the front side of the spar.
Et voila ! A perfectly drilled #12 hole and non enlarged holes on the spar.

To ensure you it's perfectly perpendicular to the side of the spar... here is the proof.
Another thing to mention: the nutplates are very close to the edge of the z-brackets. This is one of those locations where Van's doesn't care about minimum edge distance.
In the end, they are right, these rivets are just used to immobilize the nutplate but take no strengths.
The reason I'm mentioning this is because you need to make sure that your first center hole is absolutly center ! Going off center will bring the outer nutplate ear rivet even closer to the edge. Some people have had to scratch parts because of this. So be warned.



4 of them on the spar.





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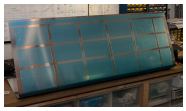
Top view with all z-brackets drilled and installed. Ready to receive the tank.

I couldn't resist to slide the tank in place on the brackets.
Lot's of cleco's. On first sight, this is going to fit very nicely.

This is really a very cool view. An actual wing in my workshop.

After the wing was on, I devynilled the right tank. Not the most exciting work but has to be done.



Then finished the remaining ribs preparation for the right tank. All cleaned and treated with sandpaper. Now they just need to be fluted.

As I had some time left, I did a job that I have been postponing for a while as I didn't have the means to drill out the tie down hole in the correct size. I visited my friend Geert this week at work where he has a huge benchdrill.

So now, I was ready to tap the thread in the hole for the tie down



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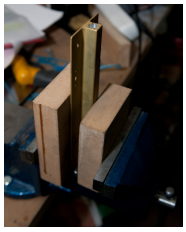
rings.

First clamped it all vertically in position.



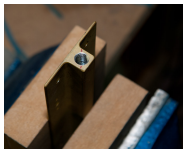
Then started tapping. The start is the most difficult. Keep the tap perfectly straight and apply light pressure as you engage in the workpiece.
Once you get the tap swivelled 3 to 4 times, there is no more way to adjust straightness. So go slow and precise on the first couple of turns.

Use lots of lubricant for tapping. Aluminum is the most difficult material to tap thread. Go half a turn forward, then turn back quarter turn and 'break the chip' .You will actually hear the chip breaking. Don't continue turning deeper if the pressure gets too hard. Better to remove the hole tap halfway through and then clean both hole and tap bit. Apply lubricant again and restart the tapping.

Applying too much pressure on both the way in or out will break the tap. Then you will have a real problem. So go slow and controlled.

You can see in the picture what happens if you bring the tap back out after being half way through. Lot's of aluminum slosh on the tap. You an air gun to clean it of and out of the whole.

A nice thread is the result.



When inserting the ring, the engagement is quite loose. I guess this



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has to do with the quality of the tapping bit. The ring thightens well at the very end when the end of the ring meets the tie down bracket. The threads thighten well then. I'm not really worrying about this too much.

I plan on leaving the tie down rings off the airplane when flying and keeping them in the baggage compartment. If really needed when parked, I will install them and tie the aircraft down.

Belgium is not Alaska and situations where an airplane really needs to be secured to the ground are really minimal or non existing..

Now that this was done, I rivetted the nutplates on the tie down brackets through the spacers. Could only do this on the right wing as the other plate still needs priming.

I installed a temporary working bolt on the nutplate and put 2 rivets through the nutplate ears. This secures the nutplate in place and then squeezed them with the pneumatic squeezer.

End of a productive day. Saturday, buddy builder Hugo stop by to help me applying the Checkoway method on installing the left wing fuel tank.



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