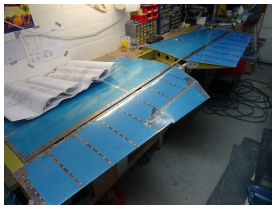
18/05/2019 - Drilling elevator horns VA-146 - 3H

Category: 3.11. Empennage mounting
Published: Thursday, 13 June 2019 12:43
Hits: 1328

After resting on the shelf for years, it's finally time to get the dust off the horizontal stabilizor and start thinking of mounting the empenage to the fuselage.

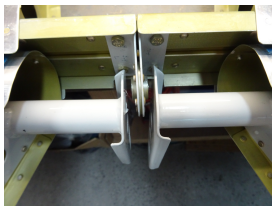
Very exciting step.

First I mounted both elevators to the stabilo to check on the positioning on the elevator horns. These things are welded and they are never exactly the same. So you have to make an evaluation on which horn is the most aft and start drilling and measuring from that one. Forward and aft is important, but don't forget also to check for vertical differences. My buddy builder Hugo had his miss-drilled and ending up below edge distance because the second horn ended up higher than the first leaving him with insufficient edge distance. As this is a critical part of the build process involving control surfaces. You better measure everything twenty times.



Looking at the horns, I realised that I never actually drilled the top holes in the horns that connect an AN4 bolt through the rotating VA-146 hinge bearing.

So first thing first, let's drill those holes. The two elevator horns connect through the VA-146 bearing hinge with an AN4 bolt. Washers are positioned between the horns and the bearing in order to leave no gaps.
As you can see in the picture below, the right side willl require more washers than the left side.



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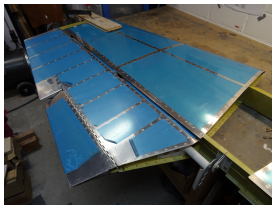
Removed the right side elevator and decided to start with the pilot side elevator. Clamp the arm firmly so that the stabilo and arm are in perfect alignment.



First you nee to create some kind of bushing that ensure you are drilling perpendicular to the bearing.
I used some vent line tubing which almost fits the 1/4 hole in the VA-146 hinge bearing. I made sure it was straight and had to grind of a little of the outside with sanding paper in the drill press in order to have it slide nicely in the bearing.

Then you slide in your improvised bushing and drill a hole which equals the inner diameter of the vent line tube.

Eh voila, here is the first pilot hole.

Repeat the same process on the passenger side elevator. Remove the

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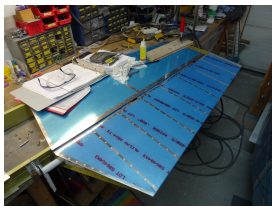
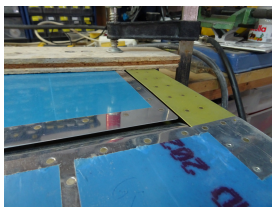
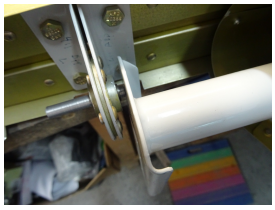
other.



Clamp the arm in place for alignment.

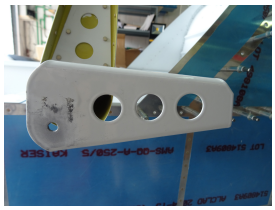


insert the drill bushing again and drill the other side pilot hole.



Eh voila, numero duo...

Finally enlarge the both holes to 1/4" for an AN4 bolt and deburr the hole smoothly.



back to measuring on the horns. I first levelled the stabilo on the work bench.

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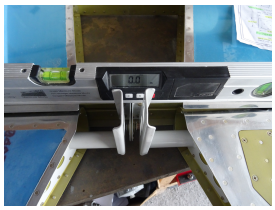

This is what I see on the vertical alignment. Quite a bit of distance in both directions.

This is a hair scratching thing. Vans wants you to use the aft most horn, which is in the image the right one, but the highest one (low in the picture as it's inverted), is on the left side.
So I would have to measure the distances as on the plans on the right horn but also take into account the vertical distance which is hard to measure precisely. I have to think about a way to make sure I can predict this alignment correctly without having the risk to have to redo one of the elevators. Miss drilling here means either welding and closing the hole and redrill, or worst case scenarion, rebuild the elevator completely. There's no way you can take the horn of and put a new one on without completely opening the elevator again.

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