Z-Brackets drilling - 7/1/2011 - 3h

Category: 2.5. Fuel Tanks
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Continued workon drilling the Z-Brackets.

I decided to go the Dan Chekoway method for match drilling the Z-Brackets. The Vans manual tells you to drill all holes, mate, and later elongate the holes if the match is not perfect. I didn't like that idea too much so I have followed the positive stories from other builders on using this alternative technique where the match would be perfect from the first time.

The method is documented very well on many websites so I won't go in too much detail about it here. I found the website of Jason Beaver very helpfull. Here is the article.

First, you need to make a centerline on one side of the z-brackets. For one Z-bracket, make a hole 1/16" shifted from the centerline towards the edg. The idea here is to be able to put a wrench on this bolt head when installing.
For the other 6, shift the hold 1/16" towards the web of the Z-bracket. The idea behind this is to put the holes on the other side a little to the outside too so that you will have better access with the pop rivet tool later to attach the z-brackets to the tank baffle plate.

The picture below shows what I ended up with for the center and outboard z-brackets.
The nutplate can still go on on the other side without being interfered by the web.
Make sure that the hole is very nicely centered or you will have problems with the nutplate ears on the outer holes if you are offsetted.
I am really wondering if the offset neets to be 1/16". It seems a lot and I'm scared that the edge distance of the pop rivets that needs to be .250 on the other side won't be met. I think 1/32 should be enough and would have made me feel more comfortable.

Important Update 7 Feb 2012:

Don't drill off center. If you do it, go 1/32" or less. In this case, you will end up with 0.200" edge distance from edge of bracket to edge of hole. Nominal would have to be 0.125 * 1.5 = 0.188"

So with 1/32" you would be fine. But I kind of go with another guys remark on the forum: this is a place where you have to modify the tool, not the airplane. Next time I would drill them all just center

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and see later how to rivet them).

I ended up redoing 2 of the z-brackets where I had 1/16"off leading to 0.178 edge distance. I know I am nitwitting on this, but better be safe then sorry in a piece where later on, it will be almost impossible to redo.

I'll get back to this when I really mate and everything is snug in place.

I preliminary layed the baffle plate on the z-brackets after installing them to the spar. I was trying to see where the holes would come out.

For the inboard bracket, the positioning of the top pop rivets looks fine. So there the outboard shift is ok.

On the inner z-brackets, I find the hole pretty much to the edge. I measured about .230 from the red marking on the flange to the edge where the minimal edge distance for 1/8" rivets should be .250

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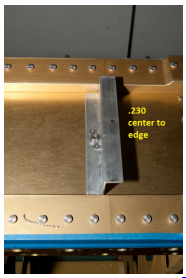

I contacted Vans about this and here is what Scott had to say about it

Hello, for the 1/8" fastener/rivets, your edge distance should be 3X. It's a bit under sweeps but the loads on these rivets are mainly tension and the shear loads would not be much in the direction of the sky e.g.

On the AN3 bolts he said

Try to get the AN3 holes close to centerline in the flange. The flange is narrow enough so that you won't be able to get the nominal 3/8" e.d. recommended for an AN3 bolt even when it's centered.

I'm gonna see what this gives when actually drilling the Z-Brackets to the spar once all is ready and will take a decision then to re-order or replace or not.

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