Closing the tanks - 03/06/2012

Category: 2.5. Fuel Tanks
Published: Tuesday, 05 June 2012 10:13
Hits: 1910

A long awaited day has finally arrived : the closing of the tanks.

After numerous hours of small final things to do (scuffing, fuel sender installation, flop tube sealing, trap doors, torqueing vent lines, ..) and lot's of checking and double checking, we finally came to the point that the tank can be closed.

Fred offered to come and help. He has a quickbuild so he didn't have to do this kind of work and he thought if would be an educational experience for him. Little did he know about the mess that was awaiting him.

I wanted to do both tanks at the same day to have the tedious job of cleaning cleco's only once. Try to do the same thing. There are a TON of cleco's to use in this process and cleaning them is a nightmare. In the beginning of the fuel tank work you need a couple of cleco's and there is little cleaning work. Later you need many to rivet the ribs and the repitition of cleaning them after every couple of ribs in each session gets really boring.
In the end, you need an army.

It turned out to be a marathon session of over 12 hours but we managed to get the job done.

The day started by preparing surfaces with silikon entferner (Zbracket, baffle, ribs and skin)

Then made a batch of 130 grams of sealant + 13 grams of accelerator. This turned out to be just enough. Made little extra to twirl the rivets in.

I followed the manual and made a 6/32 layer of sealant on the inside (passed the holes) on the skin. Not too wide, just enough to get it pushed forwards and make the fillet on the inside. Not too much because otherwise it will block of the water drain (small notch at end of rib bottom side).
Then applied sealant on the inner flanges of the outer ribs. Again, not too much, just enough to serve as fillet.
Put small blobs on the rivet holes on the inner ribs.

What's not in the manual, but I read that many people do it to avoid leaks, is to put a light layer on the flanges of the baffle over the entire length. I did the same on the place where the baffle meets the in and outboard rib.

Placed a heavy glob of sealant in each corner. Then I put the baffle in place. First put the topside in and then have the bottom side slide

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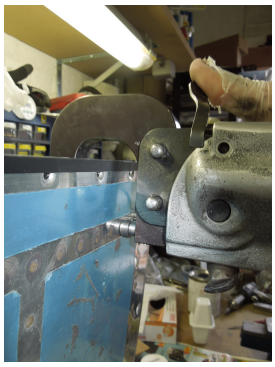
in nicely.

Then you cleco all ribs and skin to baffle connection points. This is where you really need 4 hands. In total time, it would take too long when you do this alone and the sealant would become too hard towards the end of the procedure.

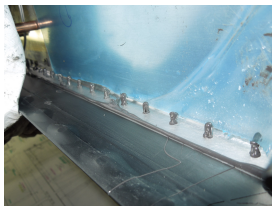
First you put in the pop rivets top and bottom side of the baffle. (the ones that are not on the z-brackets).

Once these are done, you can start rivetting the skin to baffle. The squeezer works great here. As you see, the sealant oozes out a little. This is good !
Some of the rivets are standing a little proud, but within acceptable range.
On the right tank, we had some problems with alignment of the baffle and skin making the rivets sit a little sideways. Here also, not the nicest but it will be no problem.



This is how the baffle to skin looks like with the way that I applied sealant.

Van's makes some remarks in the manual that says you should put c-clamps between the clecoes to get out excessive sealant. I did not notice any curtaining and also I don't see how you can get a c-clamp in between each cleco.



Some rivets squeezed, hundreds more to go.

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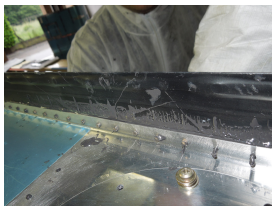

This is really teamwork. One takes out the cleco and puts a new 3/32 rivet in place. The other adjusts the squeezer, sets the rivet and checks the result. Again, time is critical when closing the tank.

After both rows or skin to baffle rivets are done, you rivet the Z-brackets to the baffle and ribs using pop rivets.
The z-brackets have a small flange and high web, so you need to modify a rivet puller by grinding off it's nose. (Thanks Hugo for letting me use yours).

Pay special attention to the orientation of the z-brackets ! The flanges all point outboard except for the outer ones. Look at the orientation of your tank and the flange direction when you do this. It will be really difficult on a closed tank to drill these out if you mess up.

Twirl the pop rivets in sealant before installing. It will look like this when set

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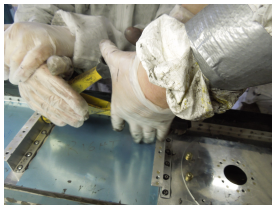
Fred pulled the nose of the puller down while I used both hands to snap them off in one single pull.



Then you use the squeezer on the AD470-4-4 rivets in the outboard ribs for the two outer most rivets. Pay attention to take the correct ones (I had to drill out 3 of them (one of them twice) because of not paying attention and probably also caused by fatigue).

The inner rib to baffle to z-bracket needs to be done with the rivet gun. No way to access with a squeezer there. They are AN470AD4-5 rivets and setting them was easy.

Then cleaned the outside of the tanks with aceton. You can really see that the sealant is hardening by the time you are able to do this. It get's tough to remove the sealant from the skin side. So do it immediatly after finishing the tank. Don't wait until the end when both are finished or you will have a lot of fun with the first.

Then clean all your stuff. The picture below shows the amount of cleaning work. Pay close attention to the huge amount of clecoes.

A little close up shot of the inboard top stide of the left tank.

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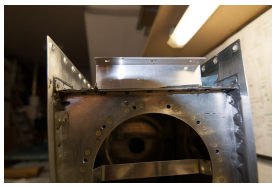
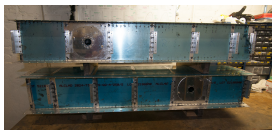
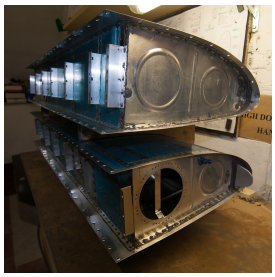


Both tanks finished. Only the access plates left. I will do those in the next days.





Next step here would be to pressure test the tanks. But I'm going to wait for at least 3 weeks before doing that so that the sealant has enough time to cure.

One more batch of sealant to make to cover the access holes and the tank sealant T-shirt will be burned !

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