Common sense door building

Without a doubt, one of the most convoluted things about building a Challenger is the doors. In theory it should be easy and they should fit snugly because you are building them right on the plane. In reality though the fit and finish can be neither fitted nor finished.

After building my first door I soon discovered that the instructions were useless and when I called for a replacement set of materials to re-make my first failed door I vowed that I would find a better way so that others would not have to waste time and material to learn this. I sat down at the computer, searched a thousand photos, asked a lot of questions in chat groups and came to the conclusion that someone had to put this down on paper.

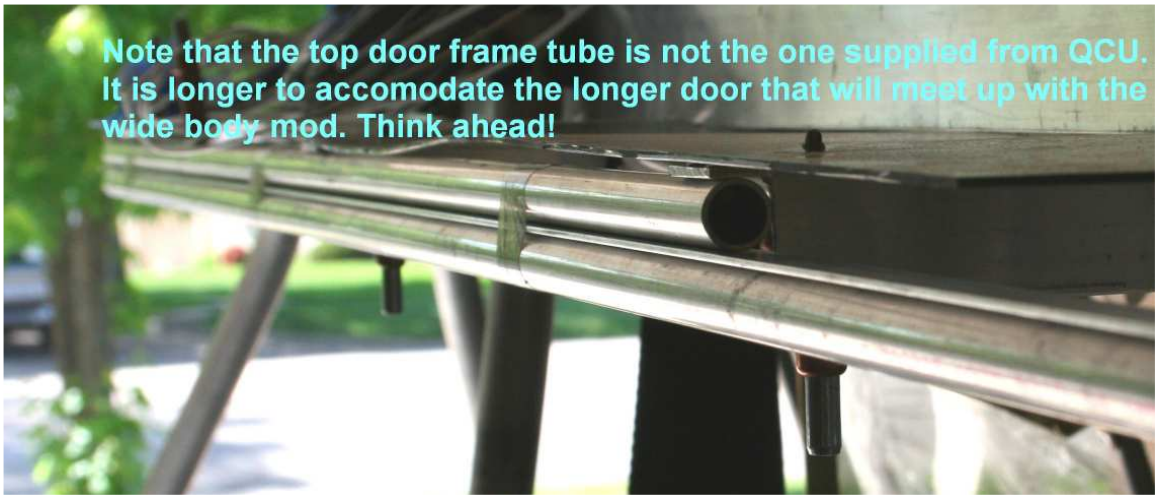
On my first attempt with the original instructions the very first thing I did was to layout all of my materials and instructions so that I had a clear plan. Instantly there was a fly in the ointment! I was building a clipped wing special and both sets of instructions that I had were for either the lower rail two seater or the new LSS model and neither set of measurements fit my application. So what to do? I started asking online and looking at photos. Ask one question, get hundreds of different answers.

The first mistake when building the doors is to assume that an inanimate object like a piece of half inch aluminum tubing is going to stay right where you tell it to even when you try to tape it into place so my advice is to abandon the tape. But how are the tubes going to stay put? Easy, we are going to rivet and clamp them into place and then put the lexan on. Trust me, it will all be much clearer shortly. Don’t get me wrong, we will be using strapping tape as a temporary measure but we won’t rely on it to hold things together.

So lets get started. First things first. These stupid measurements! Forget them for now because by placing certain pieces in certain places we won’t need to measure very often. One thing we do need to measure is the top tube of the door frame (2D-TF or just D-TF for a single seat). The instructions say to move the front of top door frame tube ½” back from the front of the 2D-TF and taping in place. (This is going to get confusing so look at your instructions and photos for clarification)

By doing this, as suggested in the instructions with tape, our first problem with tape appears. How the hell do you make that tube stay put? It just hangs there like a wet noodle flopping around.

First solution. Go to my favorite airplane building store Ace Hardware and buy a length of ½” aluminum angle that is 4 ft long and tape it to the top of the 2D-FT as shown in the photos. The angle rests nicely to the top door frame.



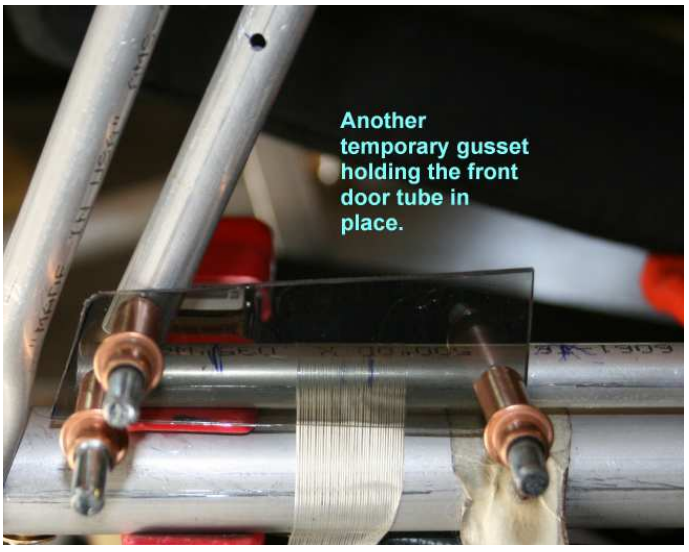
Now that we have the top door tube secured we can prep the bottom door tube. It comes supplied as a straight piece of tubing that needs to be bent to match the top rail on the fuselage. If you have the lower side rails bend it to match your plane, in the photos I have the high side rails, just to clarify.

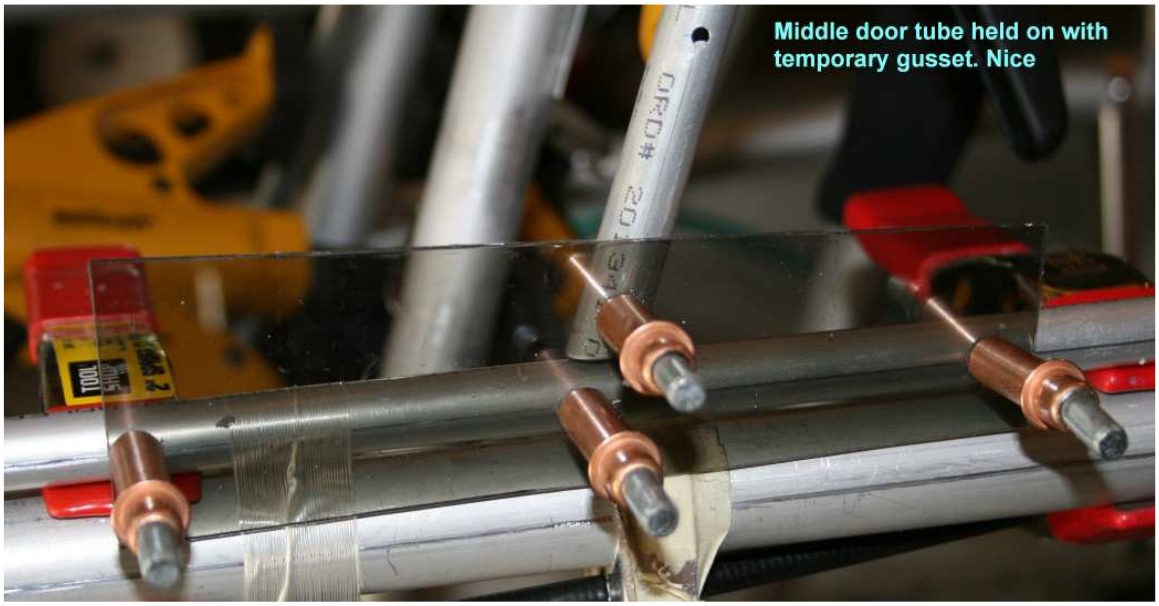
Use clamps so that you can rest the bottom door tube on top of them and then tape them down TIGHTLY so that the outside edge of the door tube is flush with the outside of the fuselage tube. Put the handles of the clamps inside the plane so that they don't interfere with the door building process.

Now we can start to place the three (3) upright tubes in place. Here is where the simple comes in. None of the tubes are cut to proper length but don't worry about that just yet.

Let me introduce you to the magic of temporary gussets. Greatest thing invented when it comes to building Challenger doors. A temporary gusset is made from scrap lexan because we need to see through them for proper placement. They are a few inches long by a few inches high. How big you say? Scraps, they are made from scraps, look at the photos.

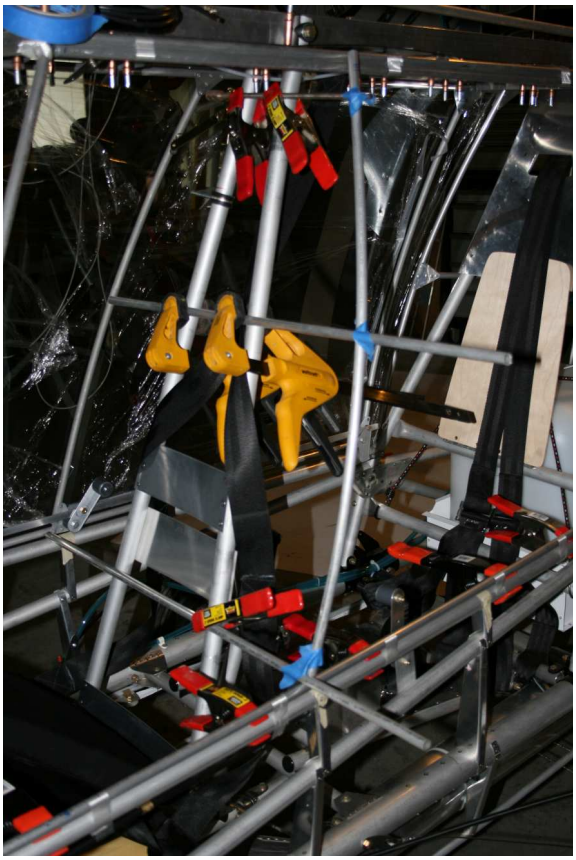
What we are going to do with the temporary gussets is to assemble the door with them, first with Cleco's and then with rivets. Yep, we are going to rivet the door together and then put the lexan on top of it all, but don't worry, the temporary gussets will get drilled out when the time comes. This is so cool.





You might note that the door tubes are now marked and cut to proper length - more on marking the middle tube shortly This was done by temporarily attaching each vertical door frame to the bottom frame tube with a temporary gusset and marking the top of the tube where it needed to be cut to fit.

I predrilled the holes in the tubing at the gusset locations and now we lay the scrap lexan onto the frame and, because we can see through it, drill right through it where there is a hole in the aluminum tube! No need to measure it out. EZ PZ.



Now for the middle piece. Instead of measuring and marking the top and bottom tubes for location I simply lined up the middle tube with the down tube that makes up the seat back for the front seat.

To do this I clamped some straight pieces of tubing to the front of the down tube and then lined up the middle door tube with the pieces clamped to the down tube. The photos will clarify this.

As you can see I taped the tube in place but this was only temporary while I marked and cut it to length. So yes, there is a use for tape.

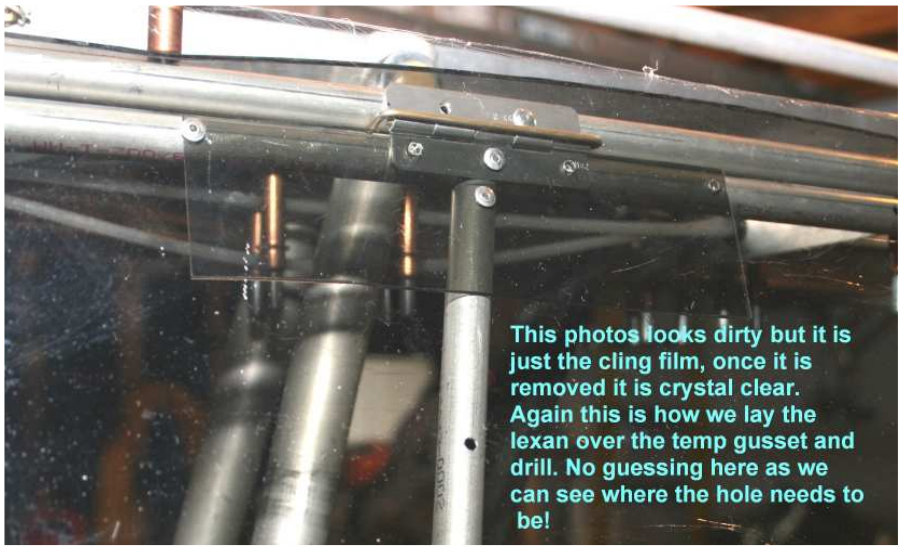
Once it was marked and ready, and drilled, I started installing the gussets. I clecoed the temporary lexan gussets on the outside and the aluminum gussets on the inside. Once all of the gussets, and door hinges, where installed I could actually remove all of the strapping tape and open the door to check for fit and function. Now all I have to do is rivet all of the gussets, both inside aluminum and outside temporary, and install the Lexan door.

Now here is another very handy hint. Remove the protective paper from the lexan so that you can see through it, which makes it much easier to line it up and drill the holes needed. However and this is MOST IMPORTANT! Once you remove the paper the lexan becomes extremely vulnerable to scratching so we need to protect it and yet still be able to see through it.

Lay the lexan on a flat surface and peel off the paper and immediately cover it with stretch wrap. As soon as you get the cling film on the lexan use a paper towel and press the bubbles out from under it. You will be amazed at how clear it goes. Now that the lexan is protected we can clamp it to the door frame.

The following photos will show how this works. It would have been better for the factory to NOT cut the door because it doesn't line up worth a damn, however it is big enough to work with and use.

If you clamp it at the bottom first it works out better for you. If you can find someone to help you it will make this one task so much easier, trust me!



Once you get it lined up it is easy to see through for marking, cutting and drilling.

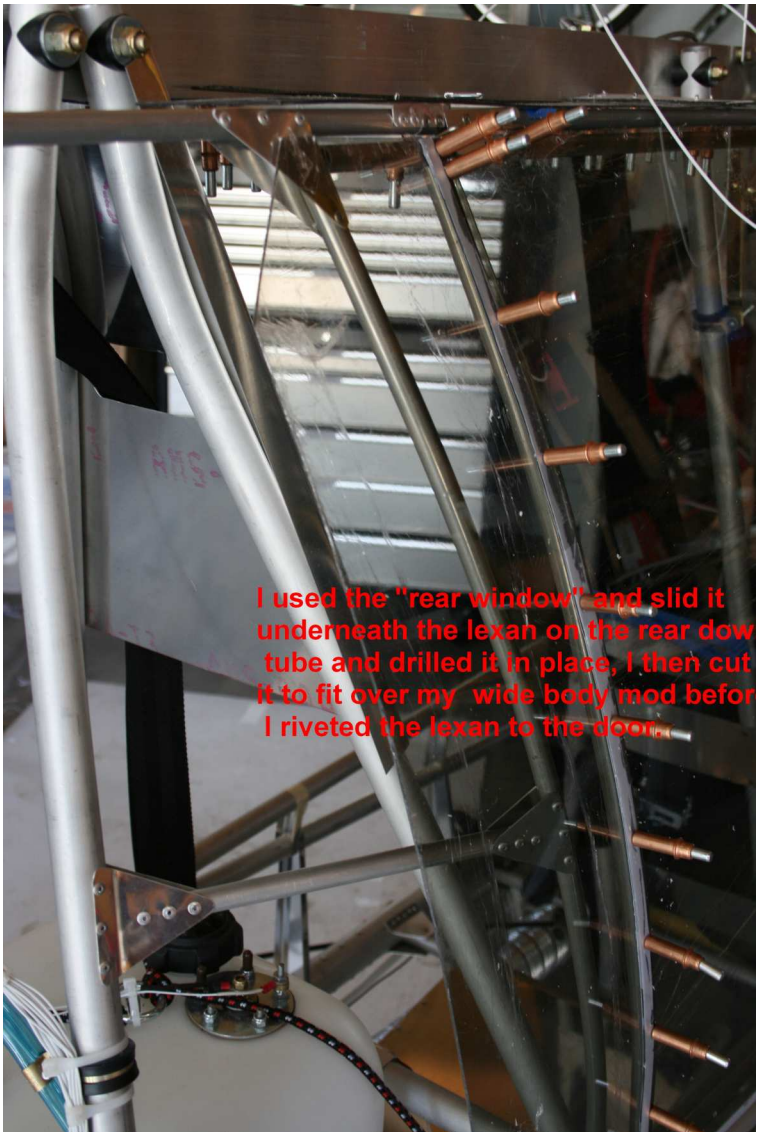
When the lexan is marked and cut you can start to drill the holes. As you drill out the rivets you can remove the temporary gussets as the door lexan will now take it's place.

When finished drilling remove the lexan, clean and de-burr the holes, paint your tubes etc., then you can permanently rivet the lexan in place. Remember to follow the sequence in the original instructions to keep the lexan from buckling.

This is the easiest way that I have found to do this and for those that say that they have always done it this way or have and easier way, my question to you is "then why haven't you written this down?"

I have seen some sites that describe how they did their doors but this way was a snap.

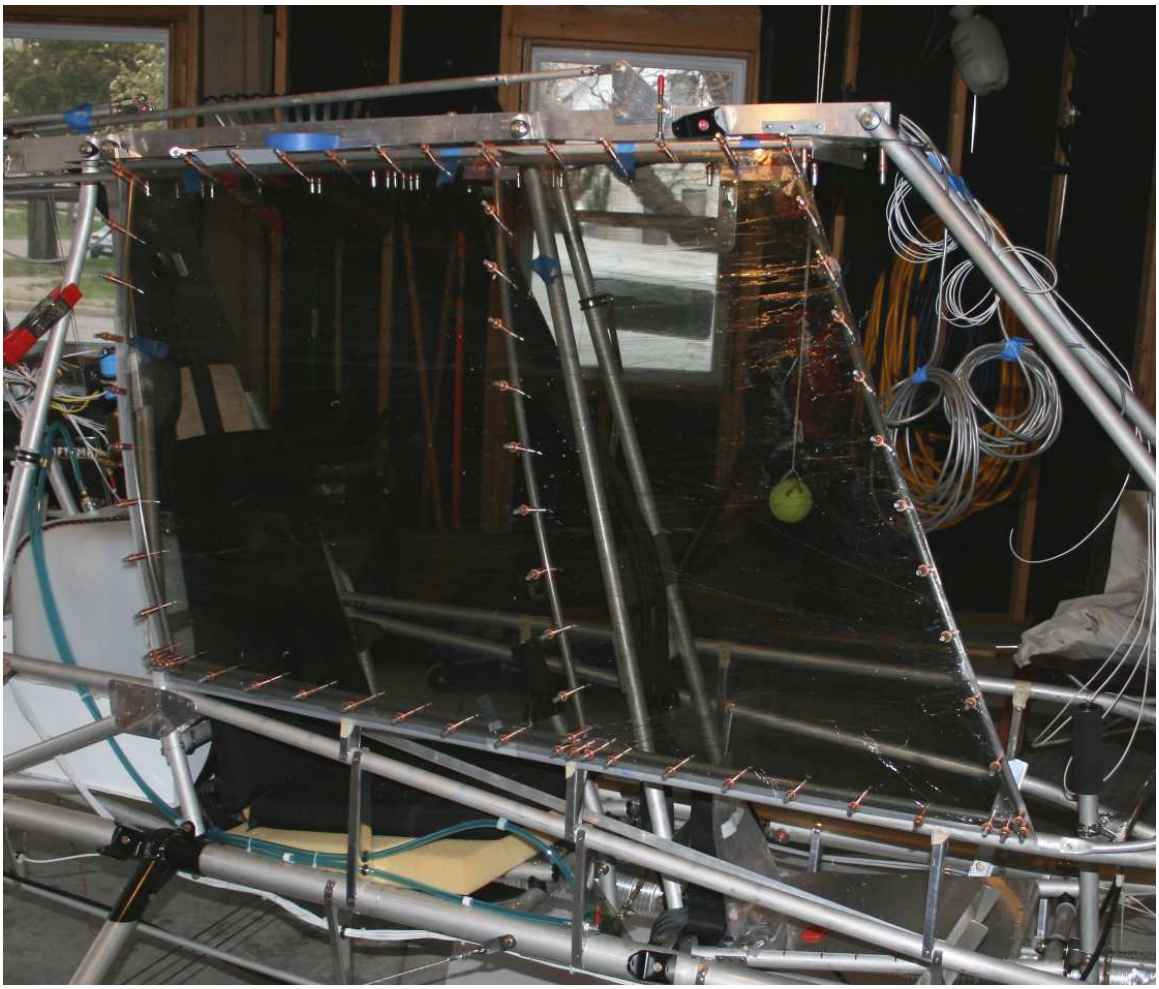
Don't forget that when installing the gussets on the inside to use the gussets for the door latch system, now would be the time. I also finished out the door by putting door trim around the edges that I bought at Autozone and plastic coated foam (sliding patio door seals) on the inside lip for a tight seal. As an aside note I also built up an overlap at the windshield bow to get a good seal there.



One more note: If you are not building the wide body modification you can ignore the photo on the left. And good luck getting that rear window to line up and be flush which is one of the main reasons I built the wide body mod, I wanted a nice fitted plane/door that would seal up a bit better.

If you have any questions, my name is Chris and my email is

checkn6@yahoo.com



When you firmly clamp the top and bottom door frame tubes the rest is easy if you rivet the temporary gussets in place. Really!