REPAIRING ENSTROM FIBERGLASS DOOR FIT - F-28F HELICOPTERS

Background; Often, following installation of the pneumatic door cylinders, the doors will warp and subsequently not fit the cabin door opening. This tutorial outlines a procedure to repair the fiberglass door so that it fits the cabin properly, and to modify the pneumatic door cylinder installation so that the issue will not reoccur.

The procedure will work to refit the 280 doors to the cabin but the bar that holds the pneumatic cylinder cannot normally be installed on the 280 door as there isn't enough room to clear the pilot's collective.

The door is first marked to indicate where it will have to be reshaped. This is best done on the helicopter. Then the door is removed and slits cut into the fiberglass channel to structurally weaken it. Gently heating the acrylic glass with a heat gun will allow the door frame to be remolded to fit the cabin shape.

The door frame can then be repaired and a bar added to the pneumatic door opener installation to prevent reoccurrence of the warping. With a bit of care, this procedure can be accomplished without damaging paint on the outside of the helicopter.

1. With the door on the helicopter, mark the area that will have to be reshaped using strips of masking tape placed on the door.

2. Use a die grinder with a 3” X 1/16” carbide cutting wheel to slit the fiberglass door frame channel. Take caution not to cut deeply into the flat section of the door frame.

3. In most cases the door will need to be reshaped in two places, in the font and aft corners of the door.

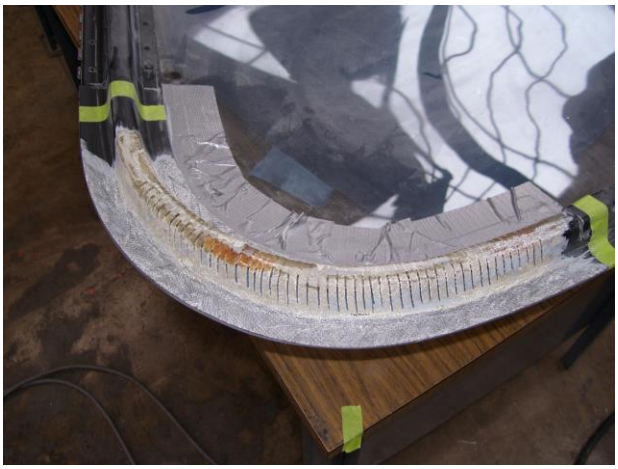
4. Use a heat gun to gently heat the outside areas of the door in the areas that were cut to reshape the door to the cabin. Start by holding the heat gun about 8 inches from the surface of the door and slowly move it in a circular pattern while moving it closer to the door; to warm the acrylic slowly and prevent over heating it.

   Wear a thin glove and constantly feel the acrylic to monitor the temperature of the glass.

You will be able to feel the acrylic soften and will eventually be able to reshape it to fit the cabin quite nicely. Don't be in a hurry, it is best to approach the necessary temperature slowly to prevent distorting the acrylic glass.

Once the door fits the cabin, remove the heat source and continue to massage the door with your hand to hold it against the cabin while it cools. It may help to use a 6'inch piece of 2 X 4 lumber to assist in this process.

5. Once the desired fit of the door has been achieved, the door can be removed and laid on a padded surface.



6. Mask off the acrylic glass, the outside painted surface of the door, and the door sill of the cabin to prevent contamination by the resin. Lay up three layers of 6 ounce bidirectional fiberglass cloth over the area of the door frame channel that was sliced. Install the door back onto the helicopter while the fiberglass is still wet and tape the door to the cabin to help hold the shape while the resin cures.

Normal fiberglass refinishing procedures can now be used to re-finish the inside door frame channel. Kyron Black Semi-gloss spray paint does an excellent job refinishing the inner door frame and matching the original color.

7. The next part of the project is to add a stiffening bar to the inside of the door channel frames to attach the pneumatic door opener. Installation of this bar will prevent the door from warping again in the future.

8. Install the door on the helicopter and align a straight edge with the pneumatic cylinder while laying it across between the forward and aft door frame channels. Mark the two door frame channels for the location of the bar.

9. Install a 10-32 rivnut in the forward and aft door frame channels.

10. Fabricate an attach bar for the pneumatic door opener from 2024T3 extruded aluminum angle (7/8 X 7/8 X 1/8) or equivalent.

11. Trim the extruded aluminum bar to fit between the door frame channels and pick up the position of the two rivnuts. Radius the cutouts at the ends of the bar to match the shape of the door frame channels. In the picture to the right, we were not able to get aluminum angle and used a piece of tubular extruded angle that had internal stiffeners.

12. With the door closed and the aluminum bar installed, collapse the pneumatic door opener and use it to locate the attach hole in the aluminum bar.

13. Attach the pneumatic door opener to the bar.

14. Check the operation of the doors and clearance from the collective and verify that there is no interference.