



## Chapter 4

### Fuselage Bulkheads

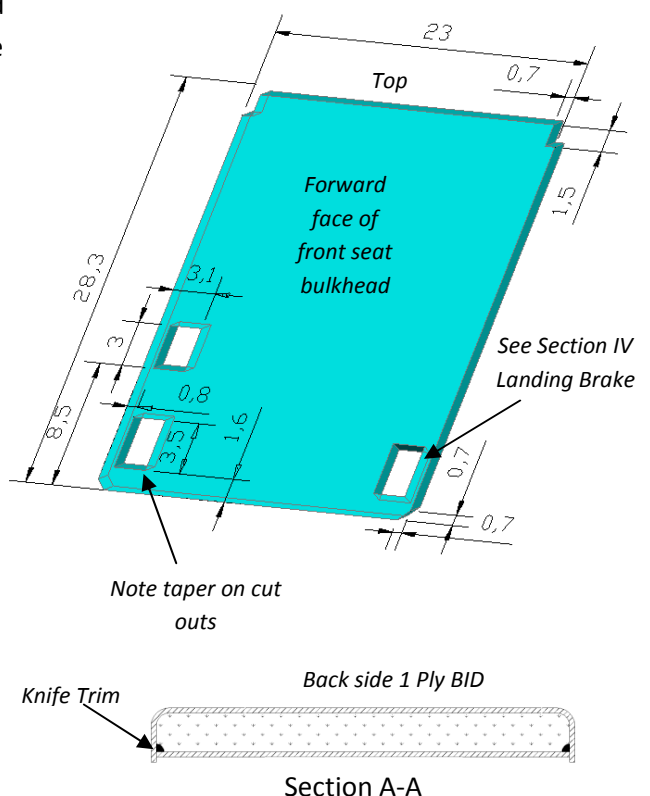
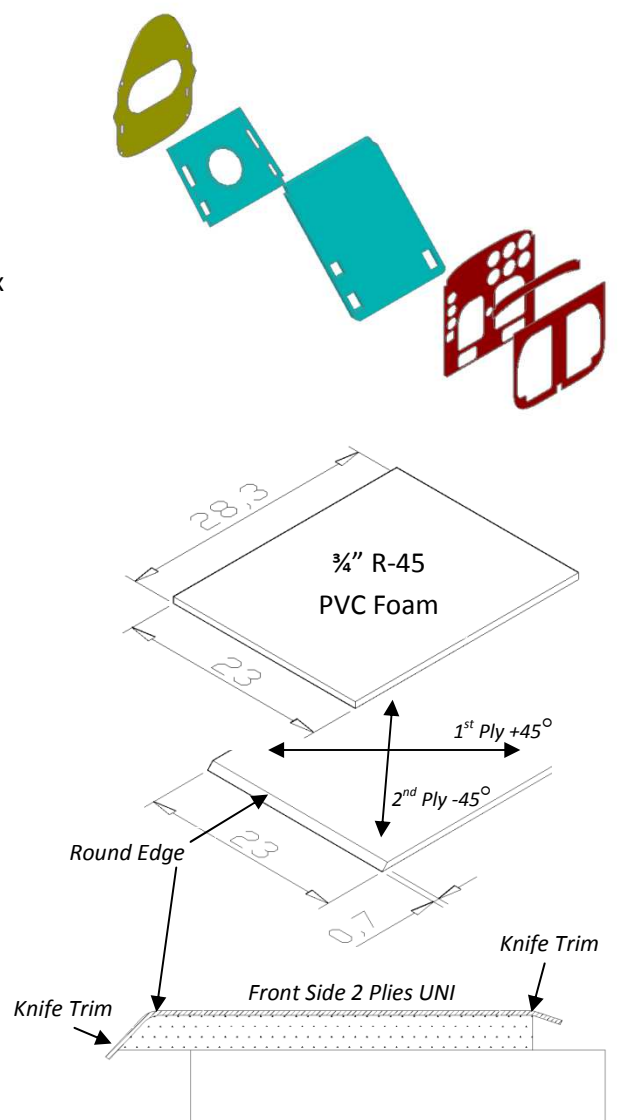
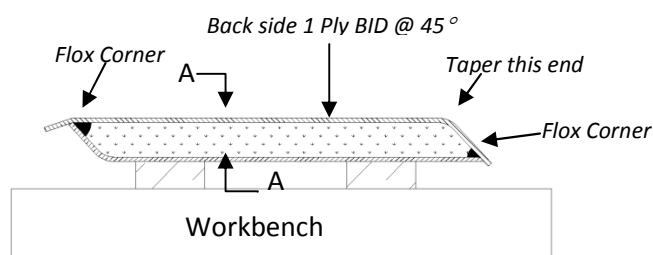
**Overview** – In this chapter you will manufacture the six bulkheads that go into your OpenEZ fuselage. These bulkheads consist of your front and rear seat backs, your instrument panel and the firewall. High density red PVC, 0.2" thick, is used in the instrument panel and other forward bulkheads. The seat back bulkheads are constructed from R45 PVC (such as Divinycell). The firewall is built from Birch Plywood. You will find that many of the short jobs in this chapter have long cure times in between so you may want to work on several of the bulkheads simultaneously or even start another chapter while waiting for the epoxy to cure. Approximately 20 man hours are required for the bulkheads.

**Step 1 – Front seat back.** Refer to Chapter 5 to see how the inclined front seat bulkhead fits in the fuselage. Cut a rectangle piece of  $\frac{3}{4}$ " thick R-45 foam 28.3" long and 23" wide. Taper and round one 23" end as shown. Glass this front face with 2 plies UNI at  $45^\circ$  crossing fiber orientation. Knife trim flush with the foam edges all around.

After cure, flip the seat back over then taper and round the other end (0.7" also) and round the side edges. The one ply BID @  $45^\circ$  glass skin on the back also folds around the side edges to meet with the glass on the front. Support the bulkhead up about 1" above the table so the glass edges can hang down unobstructed by the table surface. Use a  $\frac{1}{4}$ " flox corner all around.

*After cure use a fine tooth coping saw and notch the corners as shown to fit the fuselage longerons.*

**Note:** This last step may be left until fuselage assembly for trial fitting.

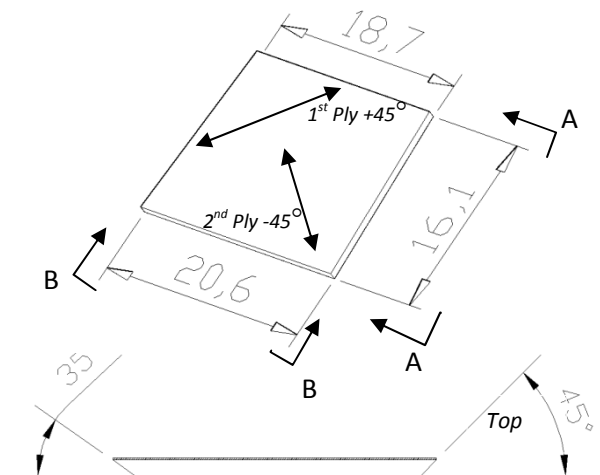


**Step 2 – Rear seat back.** This bulkhead serves as the lumbar support for the passenger and helps support the main gear attachment structure. A large hole in its center provides access to the small baggage area behind the rear seat. Cut a  $\frac{3}{4}$ " thick type R-45 block to the dimensions shown. Glass this front face with 2 plies UNI at  $45^\circ$  crossing fiber orientation. Knife trim all around flush with the foam edges. After cure use a fine tooth coping saw or knife to taper the top and bottom edges as shown. This allows the bulkhead to fit flush to the centre section spar at the top and the fuselage floor at the bottom. See also page 5-3 and page A5.

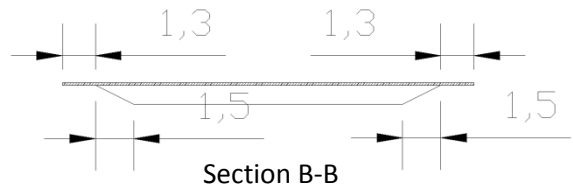
Now use a butcher knife and sanding block to remove the foam at the side edges shown. This provides a strong edge allows the bulkhead to sit back in the correct position in the fuselage.

Use your knife to remove foam from the rear to the front glass surface in an 8" diameter circle roughly centred in the bulkhead. Round all foam edges, sand the bare glass surface dull and glass with two plies BID using  $45^\circ$  fiber orientation. Knife trim all around the edges and cure. Use a knife or saber saw to remove a 7" diameter glass piece in the centre, which will become the access hatch to the baggage area. Remove a 0.7" x 1.4" piece in each lower corner as shown to clear the lower fuselage longeron. *Cut the holes shown to allow clearance for controls, electricals, cabin heat and landing gear removal.*

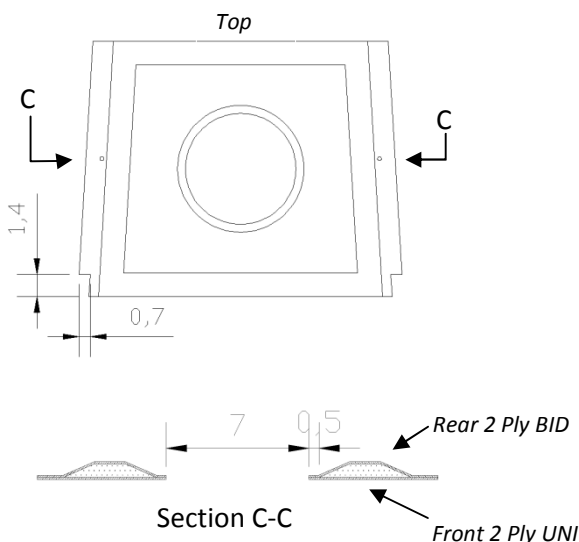
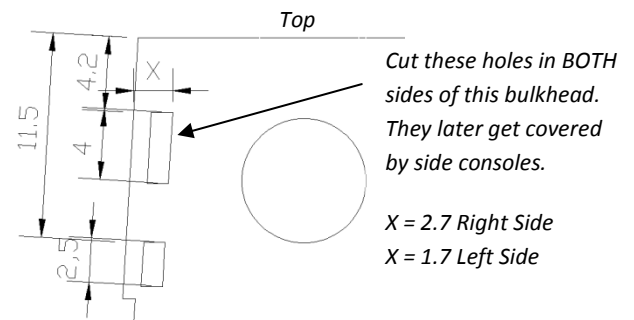
**Note:** This last step may be left until fuselage assembly for trial fitting.



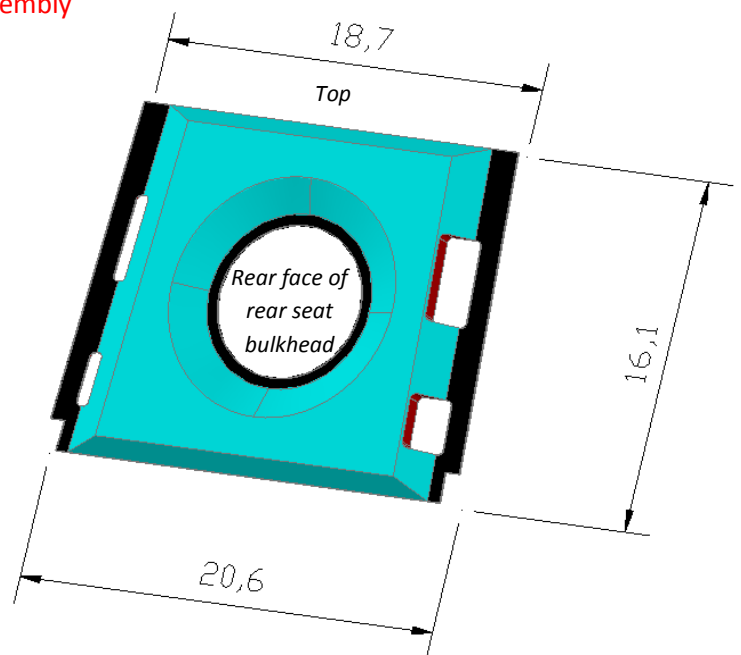
Section A-A



Section B-B



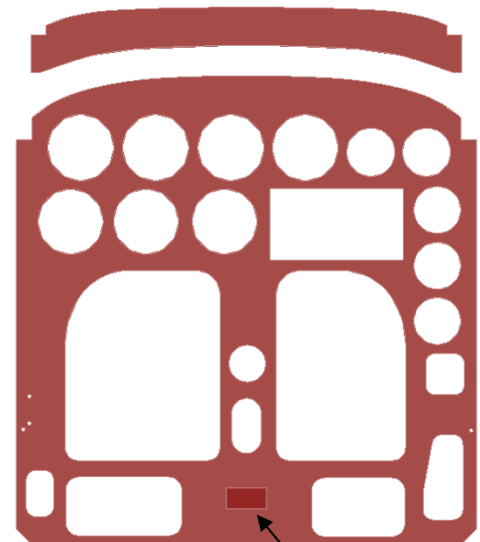
Section C-C



### Step 3 – Instrument Panel and two forward

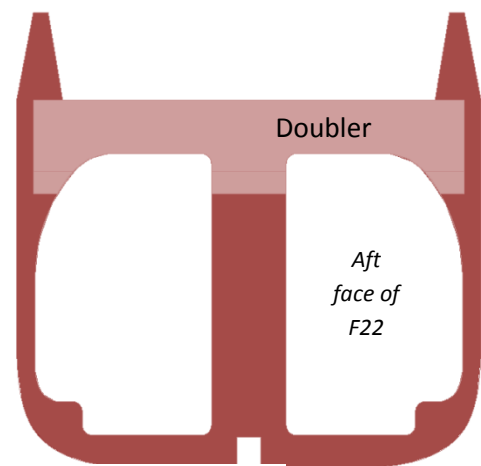
**bulkheads.** Full size patterns for the instrument panel, F22 and F28 are shown on template sheets A1, A2 and A3. These are made from R-250 high density PVC and are 0.2" thick. Cut and shape the bulkheads and doubler from the full size patterns. *Do not cut your instrument holes yet. They may be cut after both sides are glassed and cured and left for a later date when you have decided what instruments you will be using. Cutting them now reduces your chances of using technology that has been created in between now and when you are ready for instrument fit out.* Layup 2 plies of BID over the aft face of the pieces (fibre orientation isn't critical). You can save glass by laying up strips and overlapping the joints. With the 2 ply layup still wet press the doubler into position and layup 2 BID plies locally over it. Add a third BID ply to the instrument panel above the leg cut outs. Knife trim and let the layups cure then flip the bulkheads over and layup 2 BID plies on the forward faces (and add a third layup to the instrument panel above the leg cut outs again). Add 5 UNI and 4 BID additional plies local build-ups for the canard attachment in the areas shown. Knife trim and allow to cure. *After full cure you could cut your instrument holes with a fly cutter or hole-saw, but remember my advice from earlier.*

F28



Instrument Panel

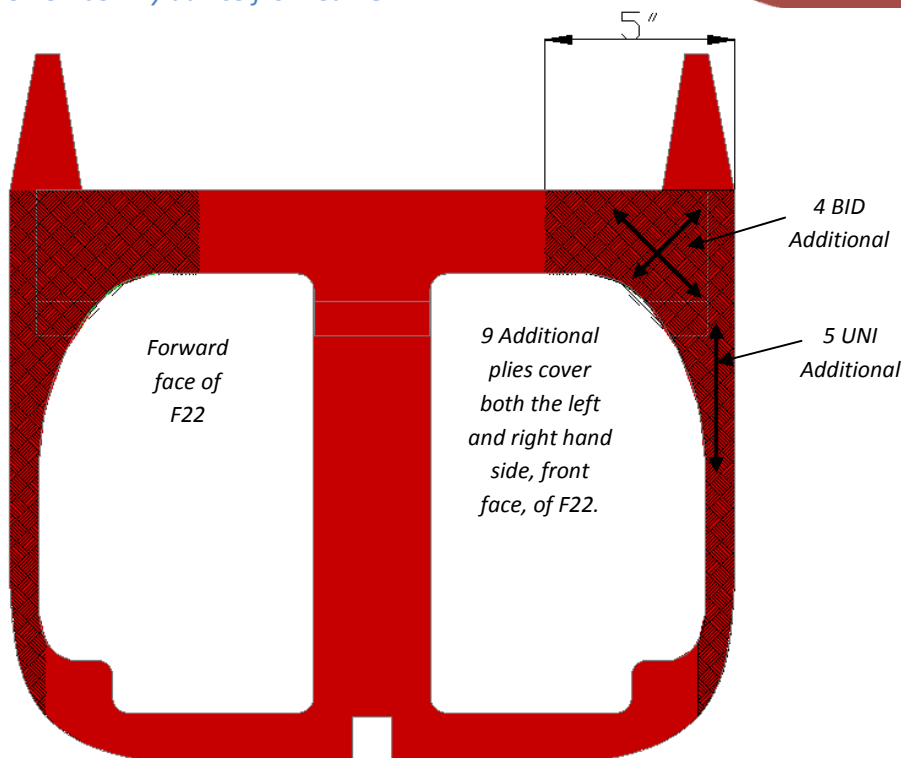
Install Plywood before glassing



Doubler

Aft  
face of  
F22

Peel Ply  
edges



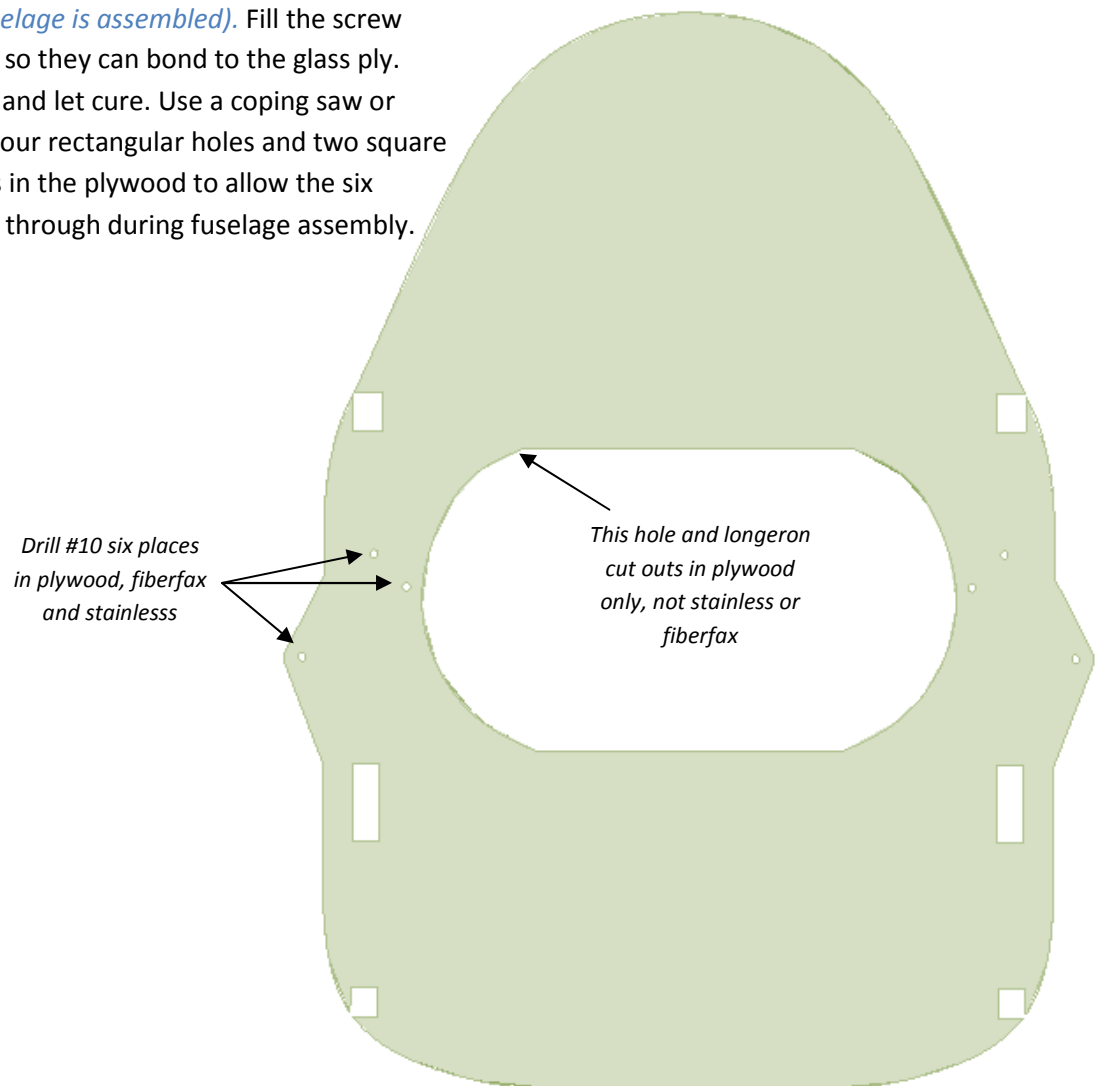
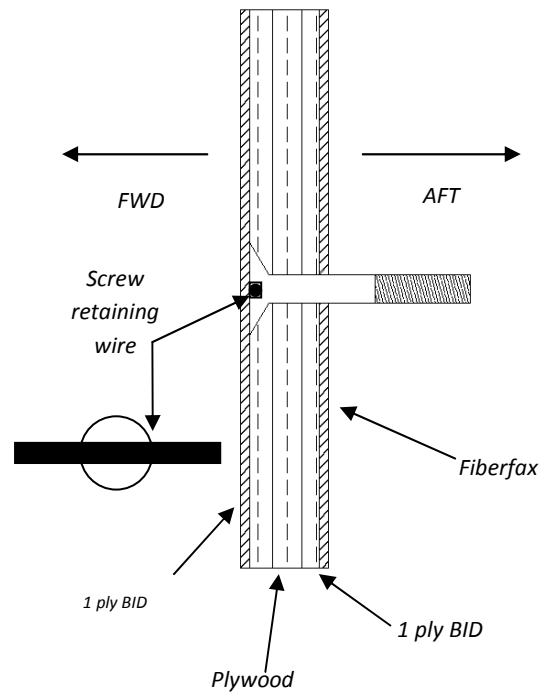
Forward  
face of  
F22

9 Additional  
plies cover  
both the left  
and right hand  
side, front  
face, of F22.

4 BID  
Additional

5 UNI  
Additional

**Step 4 – Firewall.** A full sized template is shown on sheet A4. Cut the plywood outline to shape. Layup one ply BID over the aft face, and while the layup is wet roll the 0.040 fiberfax sheet out flat over it. Trim the fiberfax to the outside contour of the plywood. Now cut the stainless sheet to size, being very careful of its sharp edges. Clamp the plywood over the stainless on your work bench and drill the 6 pulley bracket holes and notches for the 4 aluminium extrusions (shown on A4) through the plywood, fiberfax and stainless. Now set the stainless aside as it is not permanently installed until after the fuselage is assembled. Countersink the six holes for the rudder system pulley brackets into the forward face of the plywood. Epoxy six AN509-10R10 screws in position then layup one ply BID over the front face of the plywood. *You may wish to install small pieces of stainless wire into the screw slots which over hang into a recess you will need to make in the ply. This will stop them rotating because after assembly you cannot access the heads of the screws (covered by the spar when the fuselage is assembled).* Fill the screw heads with epoxy so they can bond to the glass ply. Knife trim the ply and let cure. Use a coping saw or saber saw to cut four rectangular holes and two square (0.7" x 0.7") holes in the plywood to allow the six longerons to pass through during fuselage assembly.



## Chapter 5

### The Fuselage Sides

**Overview** – In this chapter you will manufacture the fuselage sides of your OpenEZ. To do this 0.8" thick type R45 PVC foam is cut to size which determines your OpenEZs profile. The inside surfaces are contours (dished) for fuel gauges and for extra room near the front control stick. This inside surfaces receive 2 plies UNI skin and while the layup is wet the upper rectangular wooden longerons are bonded into position. The lower triangular longerons and some local strengtheners in the landing gear attachment area are then installed and the whole setup if left to cure. The area where the centre section spar mates to the fuselage is cut out and the main gear attachment fittings installed. The outside foam surfaces are left bare until after the fuselage is assembled in chapter 6.

