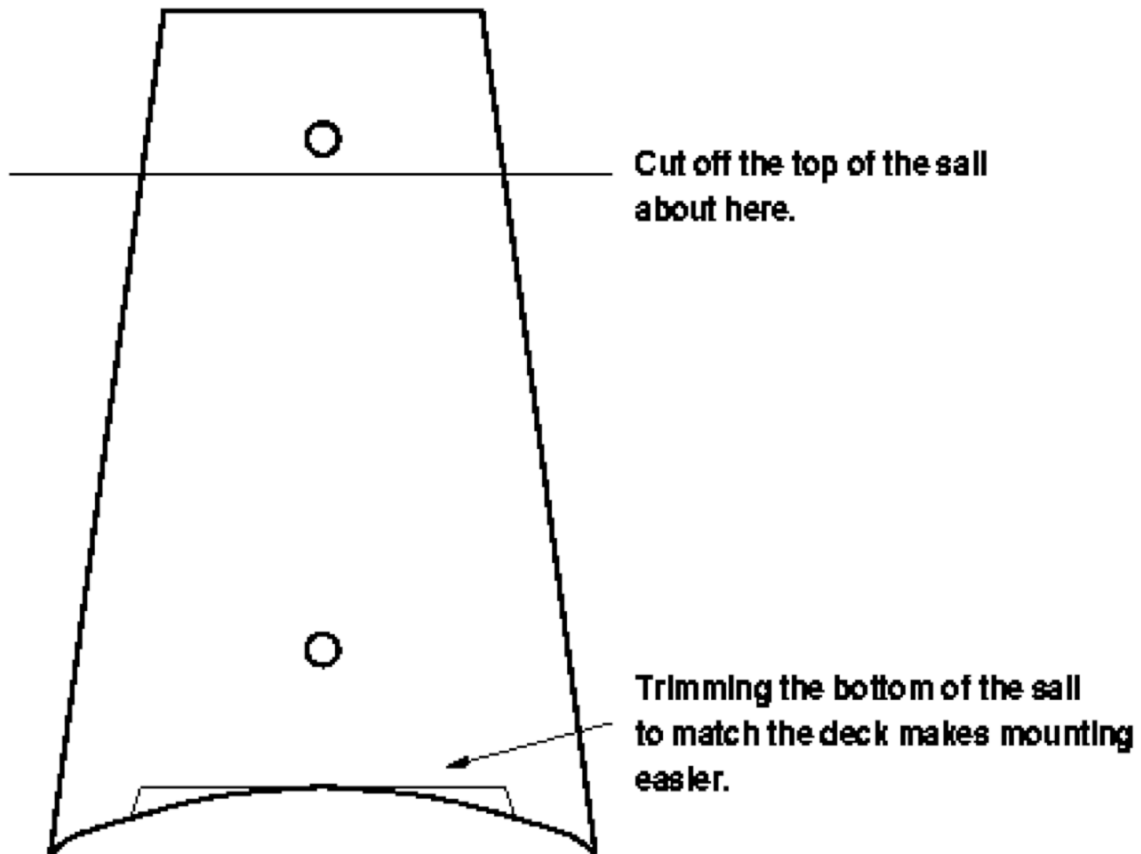
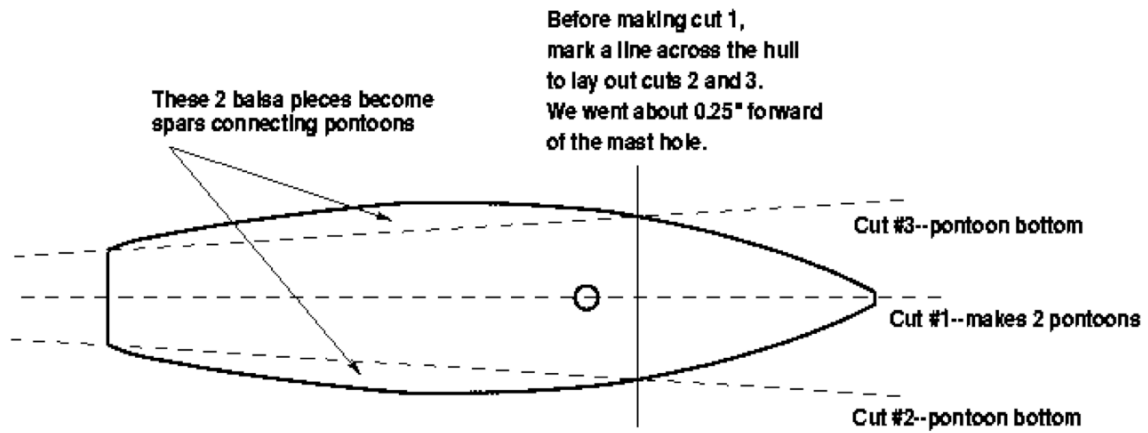


Catamaran Boat Design



Hull

1. Make the pontoons. Before making any cuts, lay all of them out and mark the hull. The first cut is made down the center of the hull, and makes the two pontoons. Use a small handsaw (hacksaw, coping saw, hand miter saw, etc.) for these, and be careful to hold the block securely. The rounded "sides" of the original block become the bottom of the pontoons (facing down into the water) and the centerline cut (that you're now making) forms the top of the pontoons. My Wolf scout was able to do this himself with a saw with some supervision; my Webelos did it with minimal supervision. Here's a sketch of the three hull cuts: sketch of raingutter regatta hull cut layout

2. Make the spars. Use the saw to trim off the rounded "sides" of the original hull (bottom of the pontoons, cuts #2 and #3 above) so that they become flat. The pieces removed should have a maximum thickness of about 0.1-0.15", making them suitable for "spars" to tie the two pontoons together. Do this carefully to make the two pontoons nearly equal in size/shape. Scouts can do the cutting, but will probably need help in laying out the cut lines and starting the cut. Any inconsistencies between the pontoons can be cleaned up by sanding later. If you want to use material other than the hull block for spars, this step can be skipped, but the flat-bottomed pontoons made by these cuts run faster.

3. Sand the pontoons. Have the scout sand the two pontoons to make them equal height and straight and smooth on the "top" (centerline cut) surfaces. Holding the pontoons together while sanding with a foam sanding block works well. Wetted edges of the pontoons can be rounded slightly, but the bottoms should remain flat. (I firmly believe that sanding is a character-building task which all scouts should master. ;-)

4. Assemble the hull. The "slivers" cut off the pontoon bottoms, pieces of mast, or other material are used as spars to tie the pontoons together. Lay this out and glue the pontoons and spars together, being careful to keep everything square. We use hotmelt glue, but any waterproof wood glue should work as well. If your pack or district restricts the boat's width (beam), be careful to satisfy this requirement. (Sand the sides of the pontoons, if necessary, and make an allowance for paint thickness.) If beam is not restricted, I recommend making the outside edges of the pontoons about 2-1/8" apart. This is wide enough for very good stability, but not so wide that the boat will bump the sides of the gutter excessively. Note that the mastless sail design described below won't work if the pontoons are too far apart! I also recommend using the hull "slivers" as the spars, with the forward edge of one spar at the mast hole cutout, and the aft edge of the other spar at the stern of the boat. These two locations provide good mounting points for the sail and rudder, respectively.

5. Sand the assembled hull. Trim overhanging ends of the spars even with the edges of the hull, and sand the assembled hull for painting (being careful to keep the pontoon bottoms flat). For the wetted parts of the hull, smoother is faster.

6. Add mast(s), if desired or required. The mast isn't necessary, though, and a mastless design with the sail described below will perform better.

7. Decorate before painting. Add decking, decals, or other decorations as desired and allowed by local rules.

8. Seal and paint the hull. We used sanding sealer/model paint. Good waterproofing is important to keep the boat from getting heavier during the races from water absorption.

Sail

1. Trim the sail. Cut off the top of the sail with a cut just below the upper mast hole (include the upper mast hole in the part you cut off). The top part of the sail doesn't help much in propelling the boat, but its weight contributes a lot to "top heaviness". Regular scissors will do the job. (I think that cutting even lower might improve performance further if the scout has good blowing technique, but we didn't try it.) regatta catamaran sail trimming sketch

2. Add a spar to the sail, if desired. A small shaving from the mast or a piece of balsa scrap can be glued to the rear top edge of the sail as a spar or stiffener to hold the top of the sail open (see photos of "Packers" boats above from the rear). If using hotmelt, apply it to the wood first, since the hot glue can melt the sail. Applying an ice cube or wet rag to the sail immediately after placing it on hot glue will minimize any softening or melting.

3. Paint or color the sail as desired. The bottom mast hole isn't needed, and can either be left open or covered with tape or a decal.

4. Mount the bottom center of the sail to the hull. For the sail design shown on the boats here, start by carefully gluing the center part of the bottom of the sail to the forward edge of the front hull spar. If you use hotmelt glue, apply it to the spar first, then stick the sail to it. (I suppose that small staples would work for attaching the sail, too.) Be careful to keep the centerline of the sail true to vertical and centered. Carefully trimming the center bottom of the sail to be a straight line before gluing will help this. With hot glue, use the ice cube/wet rag trick mentioned above to help it set up faster and minimize any softening or melting of the plastic.

5. Attach the sail corners to the hull. Once the bottom center of the sail is attached, bend the bottom corners around the sides of the hull to form the "cupped" shape shown in the pictures. Leaning the sail backward somewhat (as shown in the pictures) helps performance. Adjust the sides to a position you like, and mark the sail and boat so that you can reposition each side properly while gluing. Glue the bottom corners of the sail to the sides of the hull in the positions marked. Apply glue to the hull first, then stick the sail to it.