Centerboards 101

- The foam blanks and saddles provided by Greg Ryan are a brilliant way to make really light centerboards and rudders fairly quickly compared to the wood cored option. The downside is the amount of carbon and hybrid required is triple the amount required on a standard board. The question of longevity is another issue with anything using foam core, however, unlike the hull, stiffness reduction does not seem to be an issue with blades (some designers are working on R&D of flexible blade designs). I have little doubt that the blades will hold up very well other than the long term loss of some stiffness.

  These foam cored blades weigh 50% of the standard blades. This is a tremendous advantage—especially with the rudder. Reducing the centerboard weight also helps—particularly at the tip (if you are sailing your skiff in a manner that a weighted centerboard will help with righting moment—don't. It only helps if the boat is heeled). The buoyancy does create an issue with keeping the blades down.

Getting ready

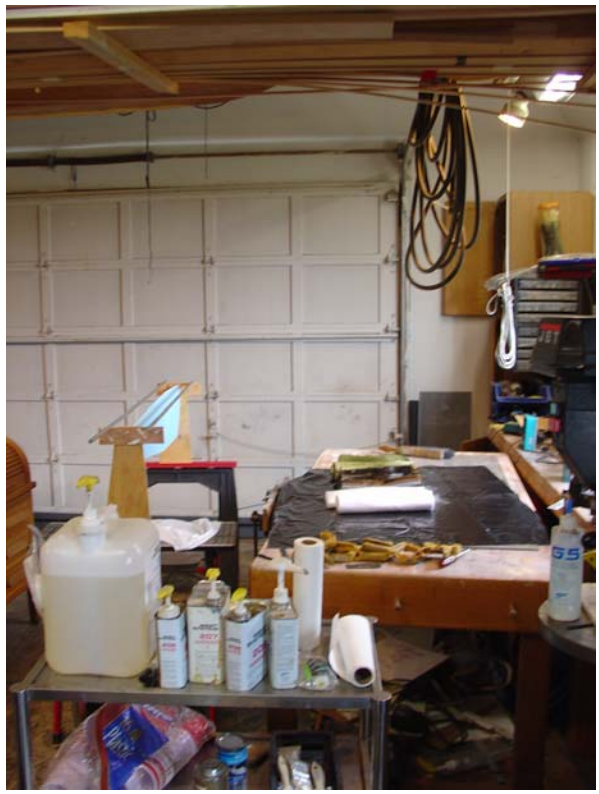
Here the two pieces of the foam blank have been bonded together and to the plywood stand with 5 minute epoxy. An 8” x 10” piece of plywood has been drilled with holes 6 inches apart and cut in half. They were then bonded to each end with 5 minute epoxy and some rods are placed in the half holes. These rods provide a platform to roll out each layer, unfold it, and drape it over the blank without getting it stuck to the wet epoxy. The optical marker on the clothe is then straightened over the leading edge. The material is then pushed down into the wet epoxy about 3 inches on each side. Finally, the remainder of the cloth is pushed through the gap and the rods removed until you are ready for the next layer.

Getting ready

The two pieces of 3/8” plywood are the same size and shape as the saddles. The will be bonded with fours spot of 5 minute epoxy to the outside of each saddle. You can remove the foam saddles and use these for other centerboards later. You should use a very straight 1x4 on the leading and trailing edge of these pieces of plywood to keep them dead straight. Otherwise you may end up with a slight bow in your blade (not good)

Getting ready and laying it up

Below you see the materials lined up in the order of use. Every piece was cut full width (25 inches) and one strand was removed from the very center as a optical marker. The material was folded along the missing strand marker and rolled up. Roll 1 hybrid is cut 16 inches short. Roll 2 and 3 hybrid is 1 inch short of the blank. Roll 4 carbon is 10 inches short while roll 5 and 6 carbon is 1 inch short. Roll seven is peel ply cut 4 inches wide (29 inches) and full length. Roll eight is cotton cloth that is applied last to absorb the excess epoxy.



Before starting the lay-up, cut the saddles 1” short of the blank so that you’ll not have a problem fitting it between the stands when you’re done.

Sorry for the poor quality. This picture shows the garage with everything ready to go.

Start the lay-up by wetting out the blank with epoxy with enough silica in it to make it like thin cream. Roll the first layer of hybrid on the rods, unfold it and drape it over the rods. The optical marker on the clothe is then straightened over the leading edge. The material is then pushed down into the wet epoxy about 3 inches on each side. Finally, the remainder of the cloth is pushed through the gap and the rods removed until you are ready for the next layer.

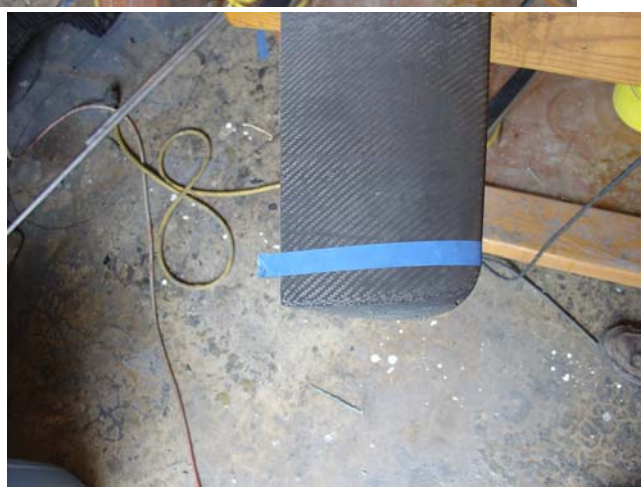
finishing

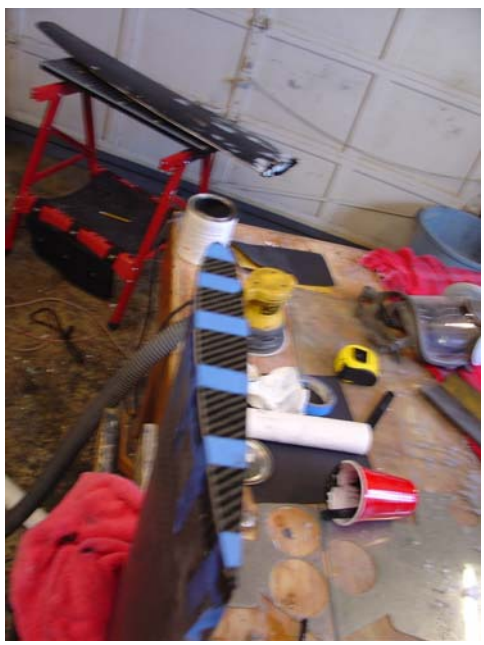
Apply the epoxy on each layer with a brush over the leading edge and down about 4 inches. Squeegee it down to the trailing edge. After installing the last layer of carbon, install the peel ply and then the absorbent cloth. Place the saddles with the plywood attached on each side a little high until you get a clamp in place. Then slide the saddles down the last ¼" and clamp the entire assemble. Let cure overnight and remove the plywood from the saddles and the saddle from the assembly. Peel the peel ply off and trim the edges. More later on finishing the blades

After you trim the trailing edge, cut the tip off square and the head at the angle of your deck (slide it in your trunk and mark it). Keep the blade as long as possible unless you are quite light or normally sail in heavy air. Even then, never cut it down more than 5 inches from the original blank length because you can raise it about 8 inches before it interferes with your vang and sail cheeks.

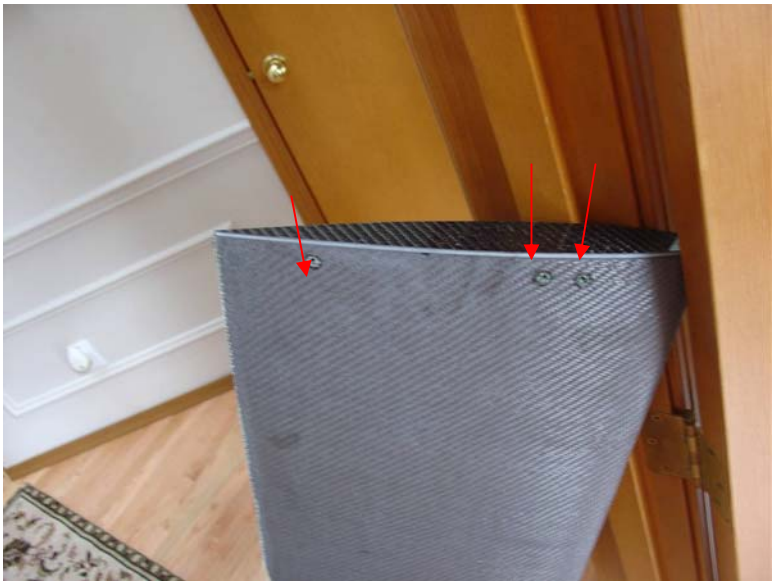
Once you've completed the trimming, use a small drill bit to dig out the foam on both ends. At the tip you'll want to dig out about 1 ½" while 1" is enough at the top. Clean up the sidewalls with sandpaper and fill both ends with silica/carbon powder/ and about 15% 410.

Left you see the top filled. It is then sanded flat and a piece of flats stock can be put on top for cosmetics. Below the flat stock was about 1/8" and beveled at the top to get rid of the sharp corner.





This tip design is scientifically designed to generate lift (when it hits the sandy bottom it lifts the board). As for which tip design is best—who knows?



Left, you see (if you look real hard) the three holes for the rope handle. This rope not only serves as a handle, it also acts to stop the blade from going down too far

Normally, I use fairing filler/silica/graphite powder on centerboards to finish them up. You'll want your rudder to be white (two part linear polyurethane) so you can see weeds on it (you can't see you CB so it doesn't matter that it is black)

This nice job (above) was done by Anita at VMG. I think it is far too much work since the rope acts as a soft stopper when you push the blade down.

Left, you see the blade being finished. The trailing edge has a piece of Mylar installed with double stick tape in order to extend the trailing edge enough to bring it to a finer point and cover the end fibers of the Kevlar.

The finished product coming soon