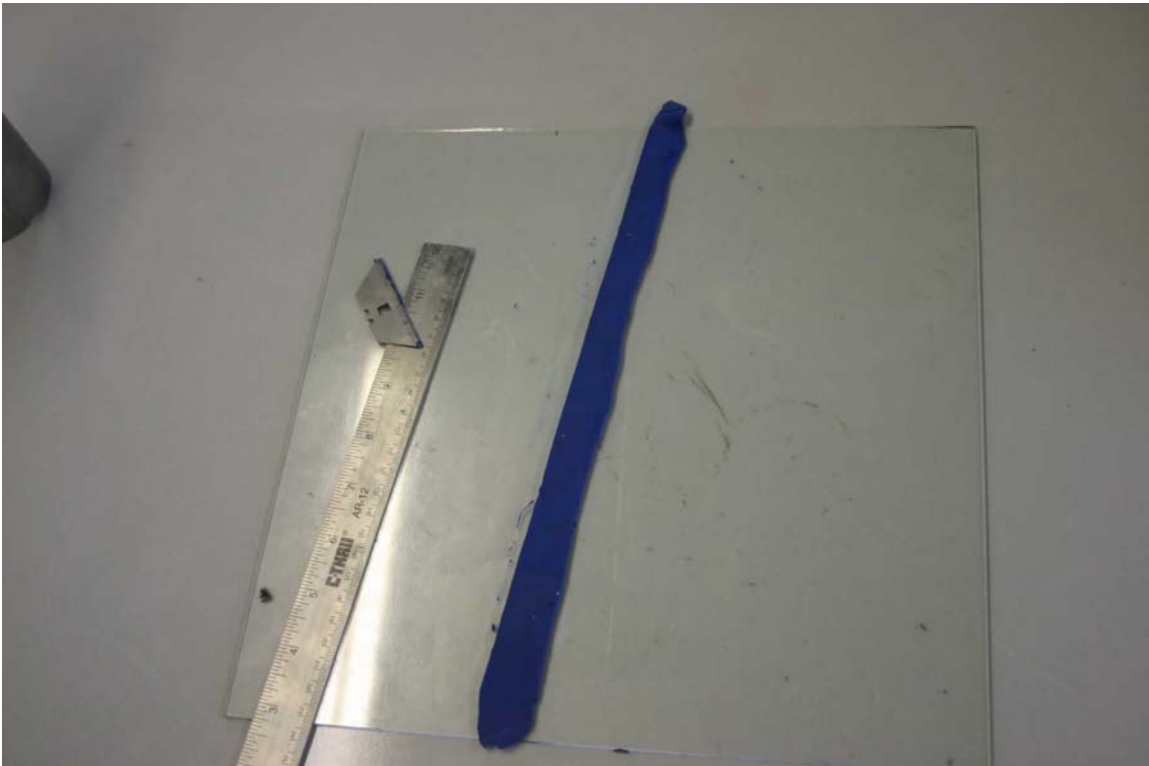


## Carbon Fiber Tutorial II - Making molds and tubes

This second part covers a lot of ground but the techniques can be used for complex projects. To demonstrate how to make a two part mold I've decided to mold a tube which could be use to make charge pipes, etc.

All the usual disclaimers\_the chemicals are hazardous so use adequate protection. This tutorial is how I do it. There are other methods which may be superior. If you choose to try these procedures its at your own risk.

First I wax the part thoroughly with mold release wax. I put on at least six coats. Wait till each coat dries and buff. I use clay to form my parting lines along with foam board.



I cut the clay into long strips which will be applied to the part.



This is followed by the foam board which is pressed firmly against the clay and the back size is hot glued to the part. Important is the parting line is placed on each center line of the

tube.



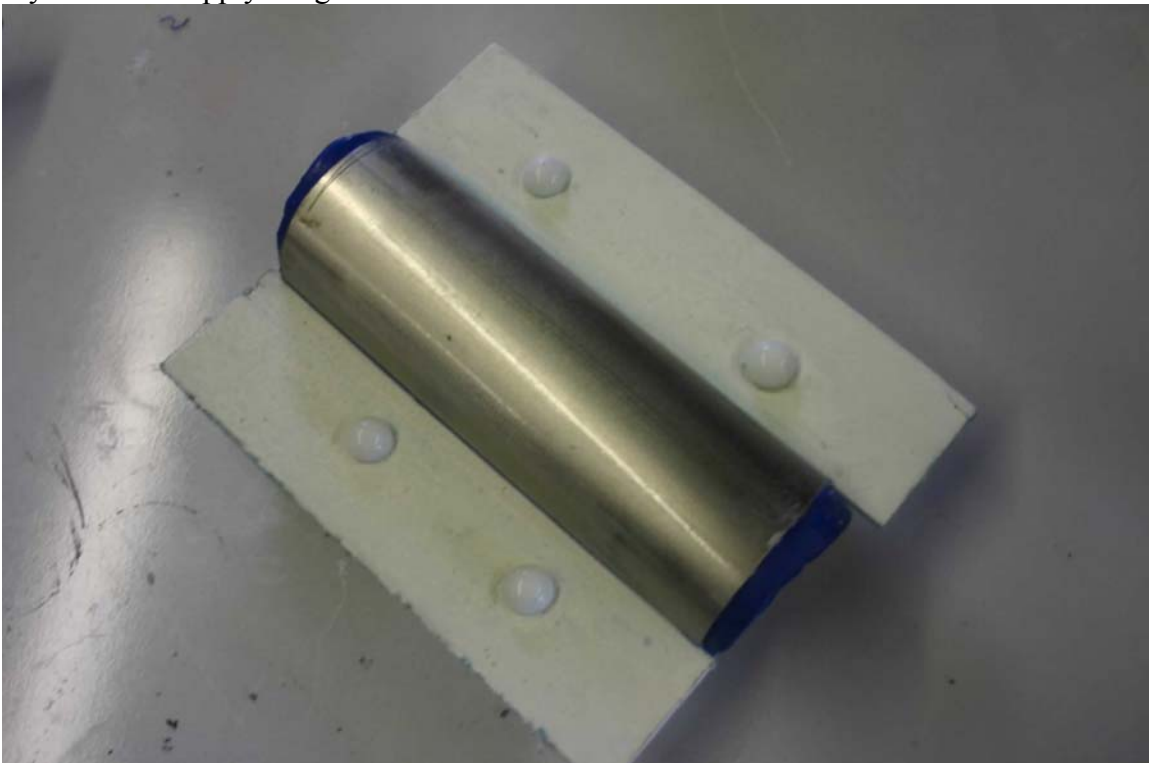
This is repeated on both sides. I also use plastic half rounds as registration aids. I bought these from a sewing fabric store.



I also add extra pieces of foam board to the glue side and glue these on to further support the flanges.



The flanges are waxed on the side to be molded and also sprayed with PVA. Once its all dry its time to apply the gel coat.



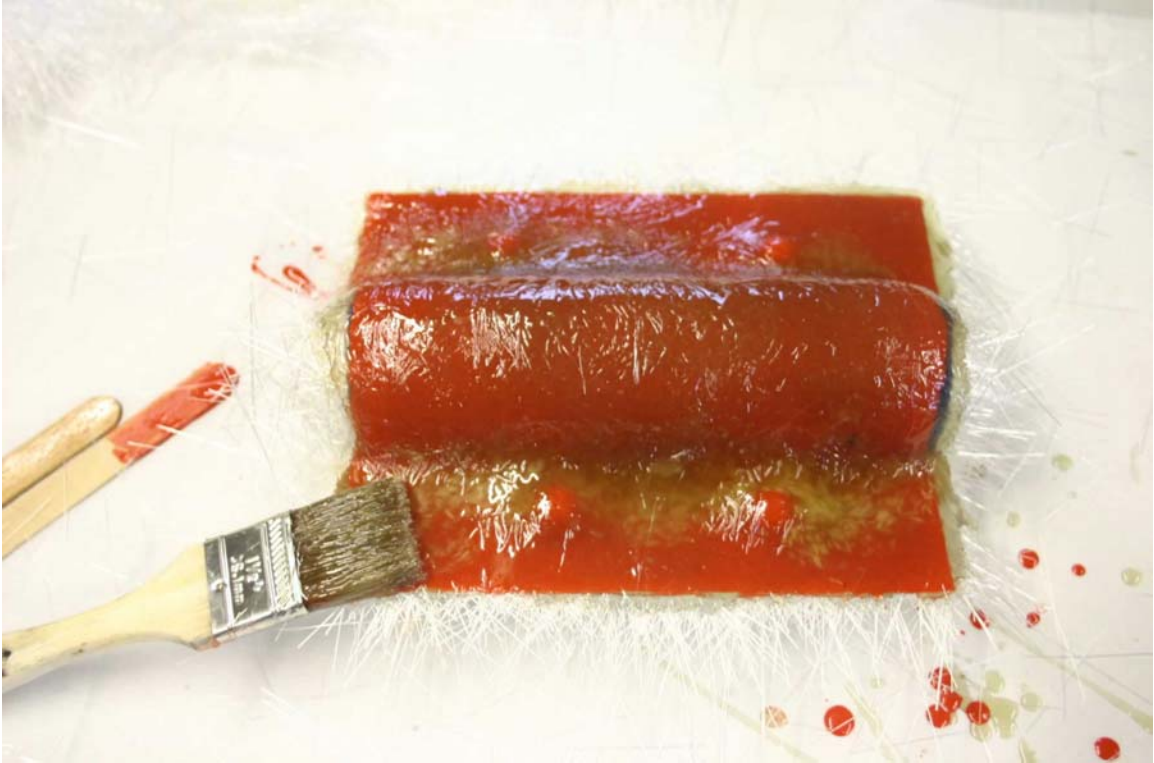
I use an orange tooling gel coat for my molds.



I apply this in two coats to about  $1/16^{\text{th}}$  inch thick and allow to dry to fingerprint dry state. Its then time to start laying on the fiberglass. I use chopped fiber for the tight places and around the plastic

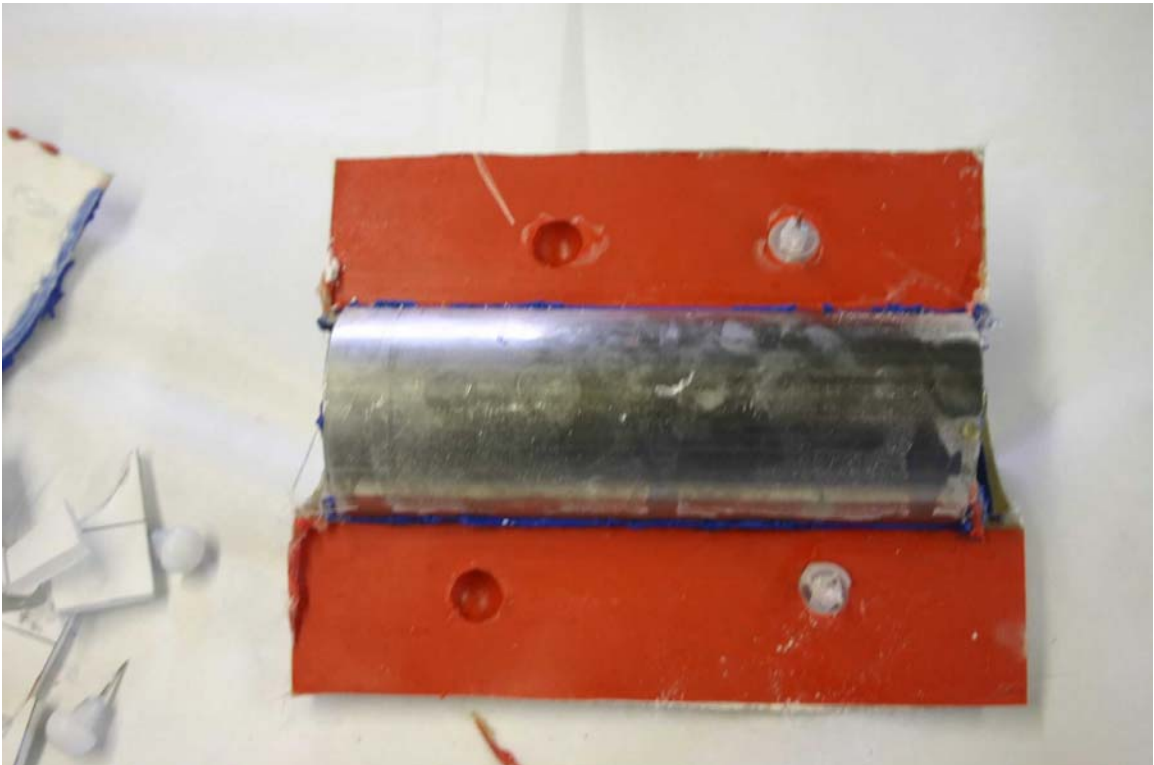
buttons.







The part after six layers of 6oz. Cloth and allowed to dry. The next step is to flip it over and remove the foam board support and flanges and clay. Pop out the plastic buttons.



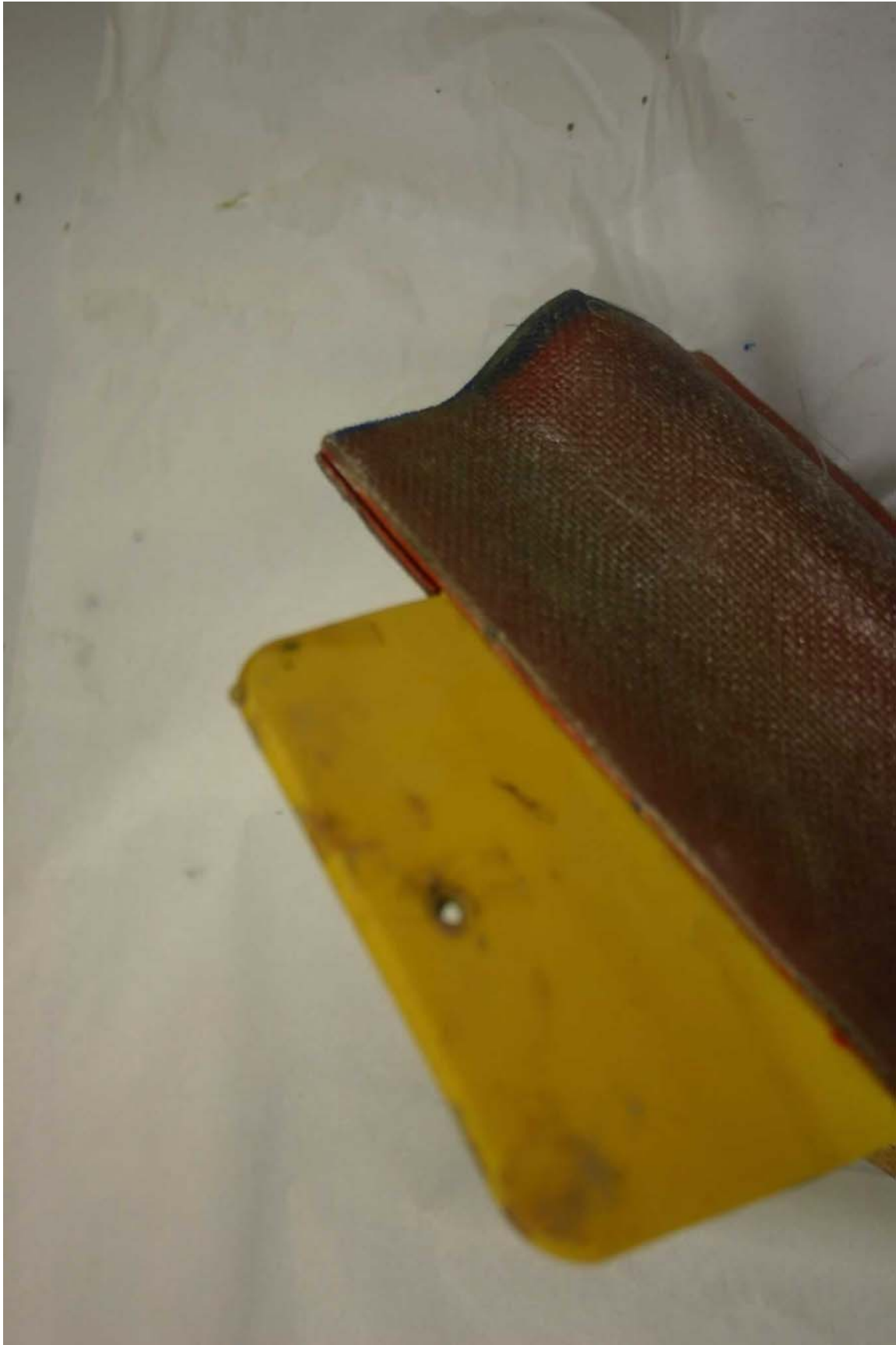
Don't loosen the metal tube. Now wax the tube and flanges with six coats of wax and PVA. Repeat laying on two coats of gel coat followed by the



fiberglass.



Let everything harden overnight and use wedges(Bondo spreaders work great) to separate.





Remove the tube, wash off the PVA with water and then wax the mold. Note how the plastic rounds allow perfect alignment. This step is only necessary for tube. You need to form an inner flange to allow the final tube halves to be bonded. Take one half and replace the tube and wax everything again. Lay fiberglass over the flange and about 1" over the tube. You only need two layers of cloth here. Note -I've

drilled  $\frac{1}{4}$ " holes through the flange.



Once dry, remove the tube and trim the raw edges to about  $\frac{3}{4}$ " wide.



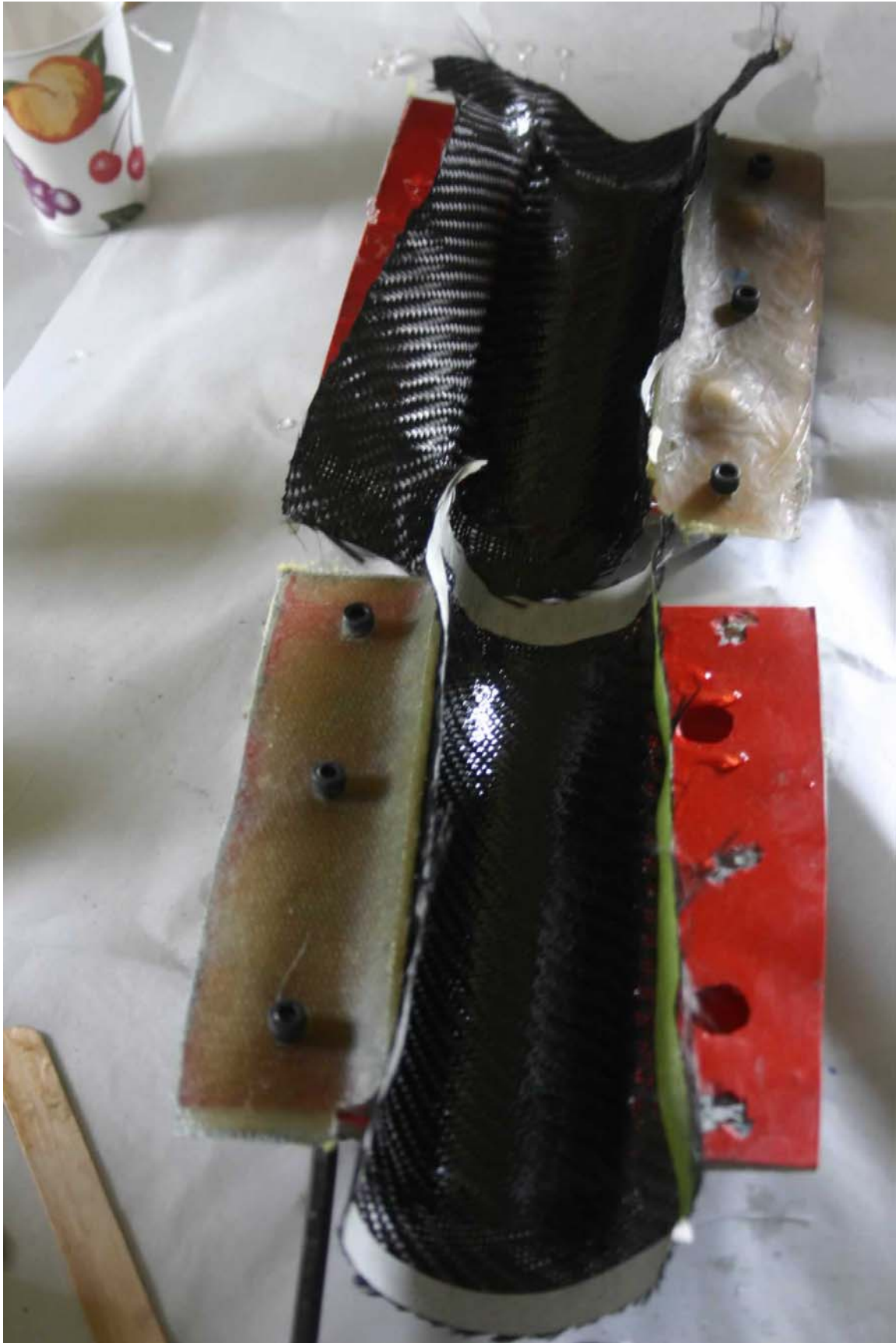
This is the tricky part. You need to decide how many layers of CF you will be using to lay up the tube. I usually use three. Cut three strips just as wide as the lip  $\sim \frac{3}{4}$ " and use resin to bond these to the lip.



Now use the same process to make another lip for the other side of the mold.



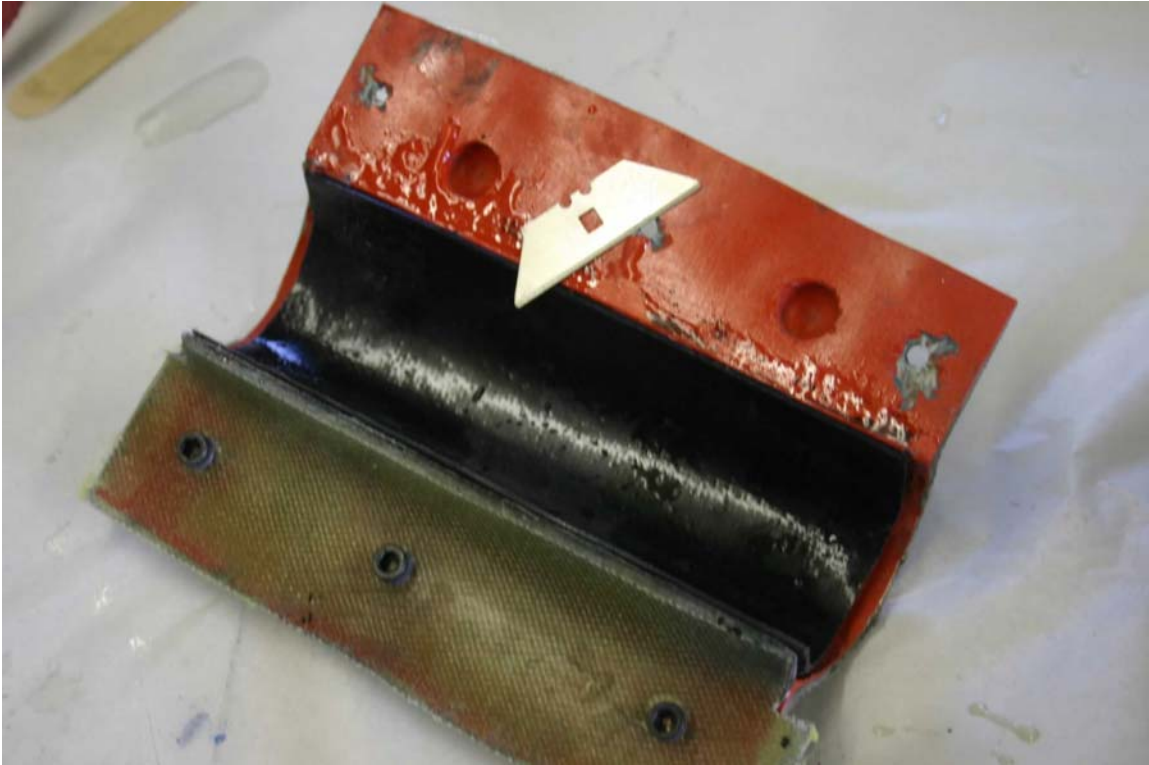
Bolt the lip to the mold half. Again wax and buff. Begin laying down a layer of resin followed by a layer of CF. I used fiberglass to backup the CF just to save materials for this demo.





Be sure the resin and material fits well where the mold and lip come together. Once dry trim. If you time it before everything completely dries you can trim with a razor blade.





You can now sand the lips on each finished piece and bond together with resin or use an epoxy glue for strength. A better way which everything in perfect alignment is to unscrew the lips from the flanges. Wax the mold and replace the CF half tubes. Run a small amount of resin along the lips and then clamp the two mold halves together. I then saturate fiberglass tape and place the tape over the inside lips to

strengthen.





This is what it looks like after drying. A few coats of urethane and you have a perfectly round, extremely strong tube. Actually we tested this tube with an 180 lb. onlooker standing on it and it didn't deform or separate. I used this same technique to make a charge pipe for a Honda we were turboing.



I'm also using a bit different technique to make seamless tubes using CF sleeves and an inflatable blader.

I hope this helps with your future project.

Morgan