

Fiberglass Wheel Pants

Follow along as we fabricate an epoxy/fiberglass mold.

Let me begin by saying that there are almost always less expensive ways to do things. I will tell you up front that I'm not one to search for the absolute cheapest way to do things. I prefer to spend my time learning to do things in as professional manner as possible. When it comes to my homebuilt I don't go out of my way to spend money unnecessarily but I don't cut corners either. When it comes to composite construction, I purchase most of my materials from Fiberglast Developments. I purchase all of my glass, kevlar and carbon (cloth, tapes, etc.) from Wicks Aircraft Supply. You can no doubt find substitutes from multiple alternative sources.



Here is a shot of the wheel pant I want to duplicate. The first order of business in molded composite construction of course is to make a "plug". That is, make an exact model of what you want to duplicate. This model will serve as the "plug" from which I will make the mold. This model needs to be strong enough to survive the fabrication of the mold but many inexpensive household products can be used for this purpose including plaster, wood, balsa or foam.

I am fortunate in that I will use an existing part from which to make the mold. I am using automotive spot putty to fill a few defects in the part but it otherwise only required a lot of wet sanding with 400 grit sandpaper. Keep in mind that any imperfections will be duplicated in every part so it pays to make the plug as perfect as

possible. There is a limit of course and you need to keep in mind what the part's application will be so you don't get carried away with plug preparation. I feel like I have a good "plug" for our homebuilt wheel pant.



I have intentionally left the dimples in each side of the original wheel pant. This dimple marks the appropriate location of the axle and will come in handy when mounting the wheel pants. Also, to aid installation the epoxy parts will be left bare which will leave them semi-translucent further aiding accurate mounting.



I made a simple rectangular box. The box must be deeper than 1/2 the width of the plug.



The box gets covered with masonite on one side. I had a scrap piece large enough to cover the area needed for this project.



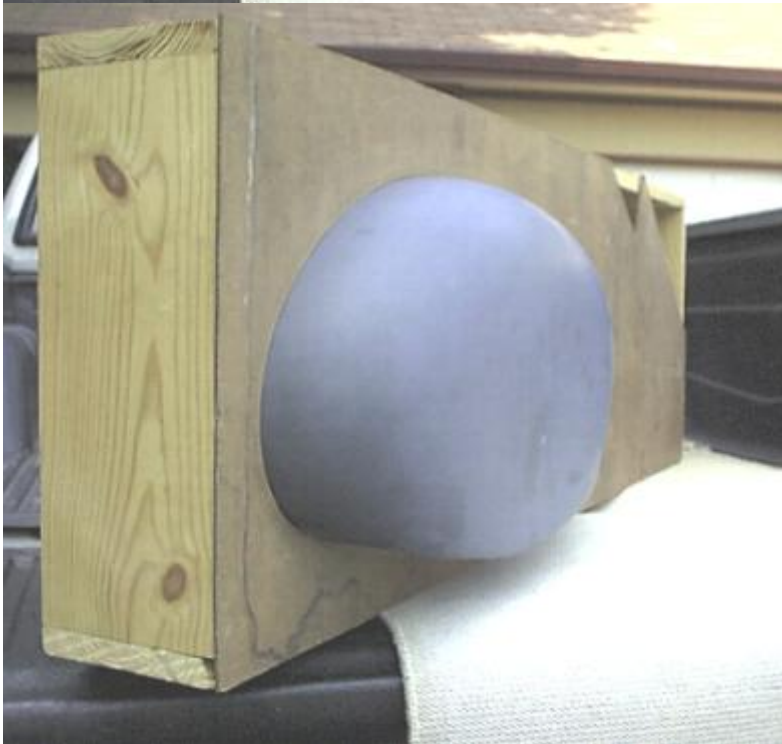
The plug is positioned on the masonite covered box and it's outline traced. We'll be using a sabre saw to cut inside the traced line. This is a matter of cut and try until we get a good fit to just clear the plug so we can set it 1/2 of the way into the box. Whatever is left sticking above the level of the masonite will be part of the first half of the mold. If this doesn't make sense right away, it will shortly.



Bobby is holding the light directly over the edge of the part so Tressea can trace the shadow with a pencil on the masonite. This won't be exact but it's as close as any way I've done it in the past.



The hole is cut with a jigsaw. We cut inside the line and will cut/fit the hole to just clear the part. After fitting the part to the hole, cross supports will be added underneath to position the part so exactly 1/2 of it protrudes up from the surface.



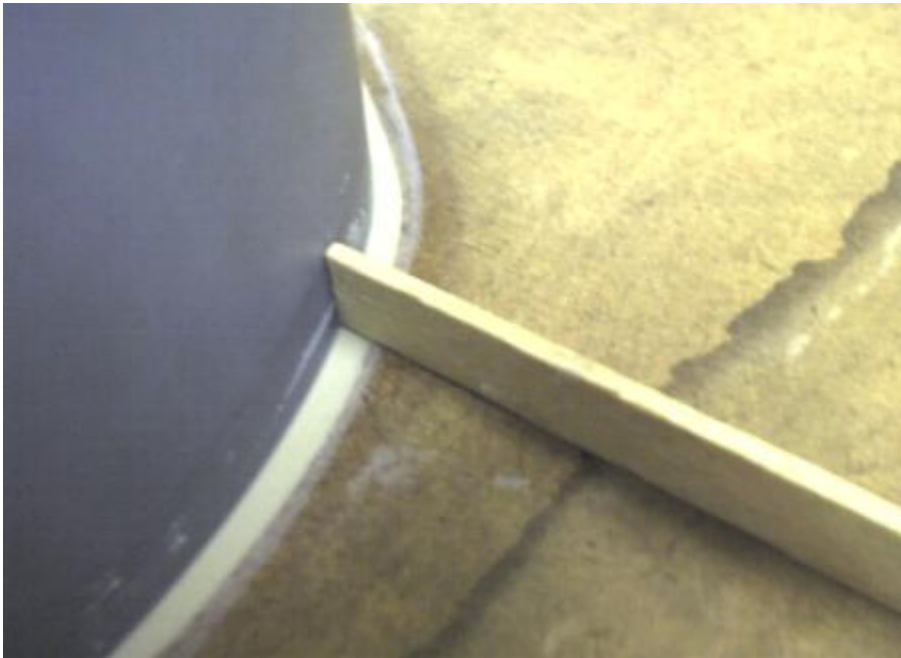
Here's a couple of shots of the "plug" fitted to the box.



The final round of wet sanding. Hurray! I'm using 600 grit just to make sure I didn't nick the part when doing the initial fitting to the box. I'll hose it off, let it dry and mark the centerline on the pant then fit it to the box "for real".



An oil based modeling clay is used to fill in the gap between the "plug" and the box. The more precise the initial fit, the less clay you'll need and the quicker this work will go. The clay can fill up to about 1/4". Anything over that and scrap wood or similar will need to be glued in from underneath to help close the gap and prevent the clay from simply pushing through the hole.



After laying out a thin line of clay, I use a craft stick to push the clay down into the gap. Then with a fresh straight edge cut on the stick, the excess clay is removed. Pictured here is the largest gap I had-about 3/16th of an inch. The rest of the gap was considerably less.



Once the clay is in place. Several coats of a non-silicone wax are applied. I use Fibre Glast's #1016 green mold release wax specifically designed for this purpose. It goes on similar to an automotive paste wax. Allow to haze and gently buff it off. The clay and the face of the board around the "plug" also get waxed. Be gentle here! Allow one hour between coats. According to Fibre Glast, the wait is to give solvents extra time to evaporate so a tougher wax barrier develops. I applied three coats.



Next I apply the PVA release agent. PVA (Poly Vinyl Acetate) is a liquid acetate in an alcohol base. Use a Preval spray unit or similar to lay down three or 4 mist coats. Don't forget to spray the clay and the first couple inches of the parting board. This will be the flange of the mold and needs to release cleanly. Allow at least 10 minutes between coats and an hour or two after the last coat before proceeding. The PVA must be completely dry before continuing. Warming the PVA will help make the mist finer. I sit the Preval unit filled with PVA in a sink of warm water. NOTE: You DO NOT spray this stuff like paint. Please notice how far away from the part I am. The idea is to create a soft gentle

mist. The idea of a release agent over the wax is to provide a measure of assurance that the part will pull cleanly from the plug with minimal difficulty. Trust me, it's hard enough getting the mold off the part using this two step mold release process. Don't skip either step.



If you will be unable to complete the application of two coats of epoxy surface coat and the complete lay-up schedule, stop after the application of the PVA. Once you start applying the epoxy surface coat, it is best to complete the layup so it all cures as a unit. Here I am applying the first of two brush coats of epoxy surface coat. It comes white but if you prefer pigment can be added. Some people prefer black to aid in finding imperfections. From this point until at least 8 hours after the last layer of cloth is layed up the temperature should be maintained above 80 degrees F for proper cure. Allow the first coat to cure to the point that when a dry brush is swept across it mild bristle impressions are left but no surface coat is actually disturbed nor sticks to the brush. Be

gentle with that first brush coat. You don't want to accidentally pull up the PVA which at this stage will come off like a sheet of plastic sandwich wrap.



When the second round of epoxy surface coat passes the brush test, mix a paste of epoxy resin and micro balloons to make a filler about the consistency of toothpaste. Use this to fillet the area between the plug and the parting board. While a microballoon paste does not have great structural properties, it is better than having the fabric pull away from such a sharp corner and leave a void which it will do.



And here it is. The first 1/2 of the wheel pant mold. The layup consists of 14 layers in three weights of E-glass cloth. The green cast comes from the epoxy resin. It doesn't look green in the cup but after piling 14 layers on top of itself, the green really comes out. This will be allowed to cure at 80+ degrees for the next day or so (I'm using a 1500 watt bathroom heater) then we'll try to separate it from the box.

After separating the first half of the mold from the box, we turn it over and layup the other mold half just like the first. Wax, PVA, epoxy surface coat and then the 14 layers of glass cloth. Once cured I used a bandsaw to cut off the excess around the mold but leaving a nice flange. The flange was drilled every 8" or so with a 3/16" drill bit through which bolts were inserted. This is done before taking the mold apart to assure that the mold halves will be aligned perfectly.

Houston,.....we have a mold!



Here I am just as I released the 1st half of the mold from the plug.



Both mold halves separated cleanly. They are rinsed in warm water to remove the PVA and then wet sanded with 400 grit wet/dry paper. In the past I polished the mold surfaces with a fiberglass boat polish and 600 grit wet/dry sandpaper but I was so pleased with the mold surface that I went straight to the wax. Several rounds of wax are needed followed by PVA (just like we did when building the mold) before the first part can be laid up.



Here's a good week's work. I'm pictured here with the first wheel pant to come from the mold we made on this page. Also in the photo are 4 halves to make up one pair of Maule style wheel spats. These parts were laid up in a mold I made some years ago.

Wheel Pant Materials, Components, Sources & Costs

Components	Source	Cost
1 gallon #88-B Epoxy resin	Fibre Glast Developments	\$51.95
1 quart #87-B catalyst for #88 epoxy resin	Fibre Glast Developments	\$17.95
1 quart kit #1099-A Epoxy surface coat	Fibre Glast Developments	\$24.95
#1016-A Green Mold release Wax	Fibre Glast Developments	\$8.95
1 quart #13-A PVA release agent	Fibre Glast Developments	\$8.95
1 pound #104-A Kleen Klay	Fibre Glast Developments	\$2.95
? yds. 7500 E-glass cloth	Wicks Aircraft	\$
?	?	\$
?	?	\$