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Molding Parts in a Two Part Rubber Mold

Many of the parts that we need have important details on both the front and back that must be duplicated accurately. A two part mold is essential in molding these more complex parts. A rubber molding compound lets you produce 3-dimensional parts with intricate details on all sides.

In this example we are molding a relatively simple bracket/faceplate that attaches a servo to a bulkhead and allows only the output shaft and arm of the servo to extend beyond the bulkhead while mounting lugs on the back of the bracket support the servo.

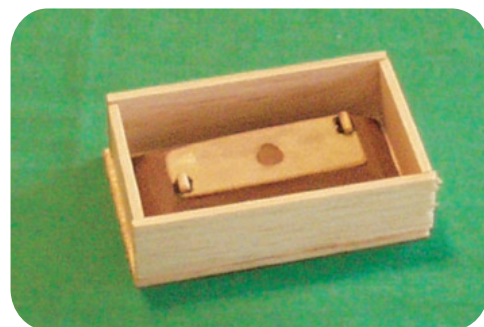
Step 1

The pattern was built by laying up the layers of glass on the bulkhead while protecting the surface with a mold release film. A layer of filler was then added to the front surface and face plate was trimmed to final shape. The front surface details and servo mounting lugs were fabricated from small pieces of wood. Finally the part was sealed with several coats of clear paint. Clay is used to support the pattern on the bottom of the box. The mold parting line is defined by line that where the upper edge of the clay meets the pattern. On this part placement of the parting line was easy but on more complex parts the line must be positioned so the parting line flashing can be easily trimmed away without damaging any details of the finished part.



Step 2

Build a box around the pattern to retain the liquid rubber while it cures. The box should be large enough to provide 1/2" of rubber around the pattern and the sides should extend 1/4" above the pattern. I have used sheets of balsa and cyanoacrylate glue to build a sealed box. Then mix up a batch of the mold making rubber and fill the box. Due to the low viscosity of the rubber mixture and the long pot life it is not necessary to degas the liquid in a vacuum chamber. However you should take care that no air is trapped next to the pattern when the mixture is poured into the box. So pour a small amount of rubber on the pattern and use a small brush to spread a thin layer of the liquid over the pattern and into all of the corners. Then slowly pour the rubber into the box and fill the remainder of the box and allow it to cure over night.

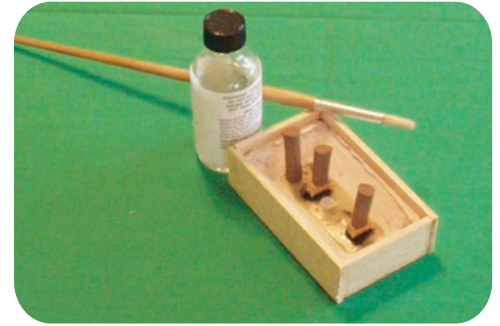


Continue to Step 3...

Molding Parts in a Two Part Rubber Mold Cont.

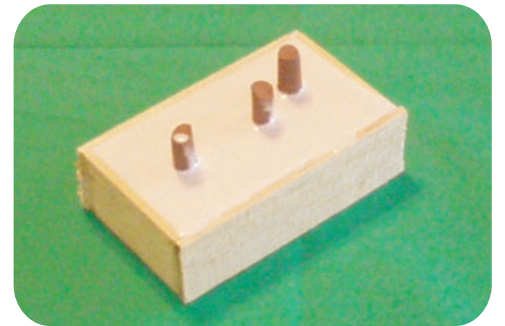
Step 3

After the first half of the mold has cured invert the box and remove the balsa box and clay that supported the pattern. Then build a new box around the cured mold with the back surface of the pattern facing upward, the sides must extend at least a 1/4" above the cured rubber and pattern. Roll some pieces of clay to 1/4" diameter and cut lengths of the clay that will extend from the pattern above the top of the box. The clay will form a "sprue" and "gate". A sprue is the opening in which you pour liquid resin and the gate is the channel in which the resin travels into the mold cavity. More than one gate will be needed and they must be located so the excess resin that will fill the gates can be trimmed away and any damage will be hidden on the finished part. These gates also provide a path that allows air to exit the mold cavity as it is filled with resin, so position the gates carefully.



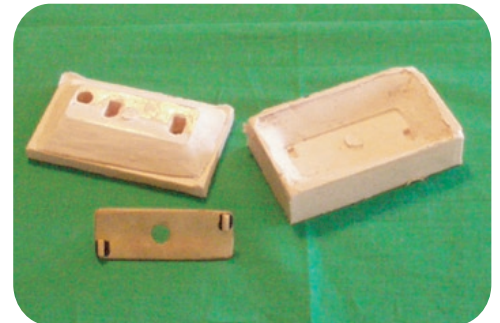
Step 4

Use a small brush and apply a coat of the rubber mold release to the lower mold half, do not apply this release to the pattern. Mix up another batch of mold making rubber and fill the box as you did the first half of the mold, and allow the rubber to cure overnight



Step 5

After the rubber has cured remove the balsa box, carefully separate the two parts of the mold and remove the pattern.

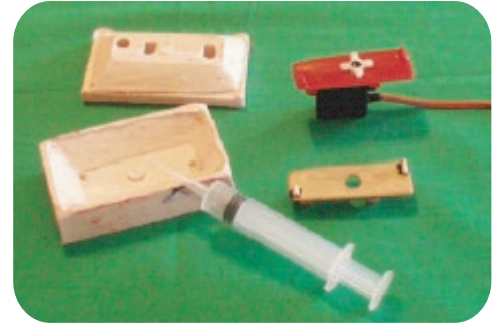


Continue to Step 6...

Molding Parts in a Two Part Rubber Mold Cont.

Step 6

Now we are ready to mold a epoxy fiberglass part. Mix up a batch of low viscosity epoxy. Pro-Set 125/229 or the MGS L285/H285 both work well for molding small parts. Color pigment can be added to the resin to produce a more attractive part, in this case I used a red pigment. A portion of the resin is placed in a second cup and a milled glass filler was added to create a paste that has increased strength. The paste was used to fill small details where increased strength was needed like the servo mounting lugs. After the small details in the lower part of the mold are filled with paste some liquid epoxy was poured into the mold and a few layers of glass cloth are placed into the mold. Be careful that the cloth is wet out well and that no air is trapped in the lower mold. Next fill details in the upper mold with the filled epoxy paste and put the two halves of the mold together. Use a disposable syringe to inject epoxy into the sprue openings in the top of the mold. Fill each opening and place a layer of plastic film over the opening to close them. Tilt the mold to each side to help any trapped air to escape. As air escapes from the mold refill the sprue openings with epoxy. Set the mold aside and allow the epoxy to cure overnight. The next day the mold should be opened carefully and excess epoxy can be cut away at each gate and along the flashing.



Supplies to complete this project:

Molding Supplies:	HSIII RTV Mold Making Rubber M410 Release Agent for 2-part rubber molds M411 Chavant #307 Professional Modeling Clay M307
Epoxy:	Pro-Set Resin A125-00 Pro-Set Hardener A229-00 Metering Pumps A303-00
Epoxy App. Tools:	Reusable Mixing Sticks A804-8 Reusable Mixing Pot A5001 Disposable Brushes A803-12 Disposable Gloves A832-4 Syringes A807-2
Filler:	CST Milled Glass A4010 (optional)
Pigment:	Epoxy Pigment (optional)
Fiberglass:	Fiberglass Cloth 5.8 oz. G37330

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