

Making Molds for Resin Castings

Edited by the NRG staff

By David Collier (North West Model Shipwrights), Illustrated by Rich Brayshaw

Introduction

How many times have you been put off building or modifying a model because of the logistics of the task ahead? It's so easy not to try to adapt a model, or to become restrained by what you think are your own limitations. That project you have wanted to build could become a step closer with the knowledge, which will enable you to mass-produce specific items. Quite a lot of items on ship models are required in significant numbers, for example, bollards, cannon, belaying pins, hatches and doors etc. To guarantee uniformity between each item, a molding process can easily be employed to produce white metal, Britannia or resin fittings. For the purposes of this tutorial, we will show how to cast a bollard in resin. Similar methods can be used for white metal or Britannia but the molding material would need to be suitable for a higher temperature casting.

Creating a Master

The first step is to produce a master, or plug, of the item to be molded. The plug can be made from any suitable material such as wood, plastic, metal or a composite of different materials. The important thing is that the appearance is an exact copy of the desired product. For the bollard, the main parts such as the upright pieces forming the column can be cut from plastic tube or turned to the correct diameter from metal stock. The top 'lip' of the column could be formed from a circular disc of wood or plastic card. The base could be made from thicker plastic card or styrene sheet, or wood of the correct thickness.

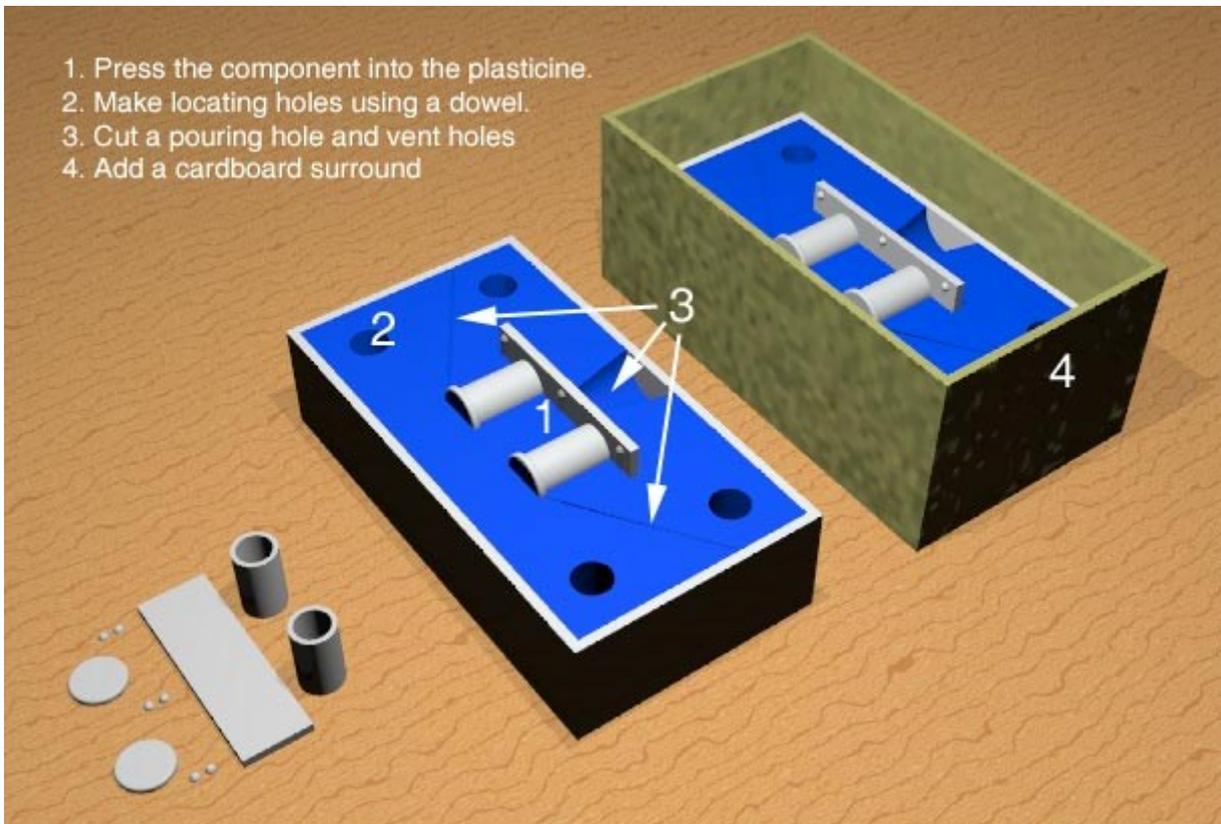
If you use wood in your plug, you may need to fill any grain with a sanding sealer to ensure a smooth finish, as what you are now creating, including any imperfections, will be replicated on every cast part you make. Take your time getting your plug right and it will pay dividends in the end. Brass manufactures, such as KS, have various brass structural shapes. Also, there are plastic structural shapes that are typically used for architectural models, from companies such as Plaststruct. Other details, such as the simulated bolt heads on these bollards, could be made from small rivet heads glued into place onto the plug.

These pieces should now all be glued together to produce the highest quality plug possible. If it doesn't look right, the chances are it is not. Throw it away and remake the part until you are satisfied with its appearance. Check it against the finished model in order to determine its scale and to satisfy yourself it is correct.

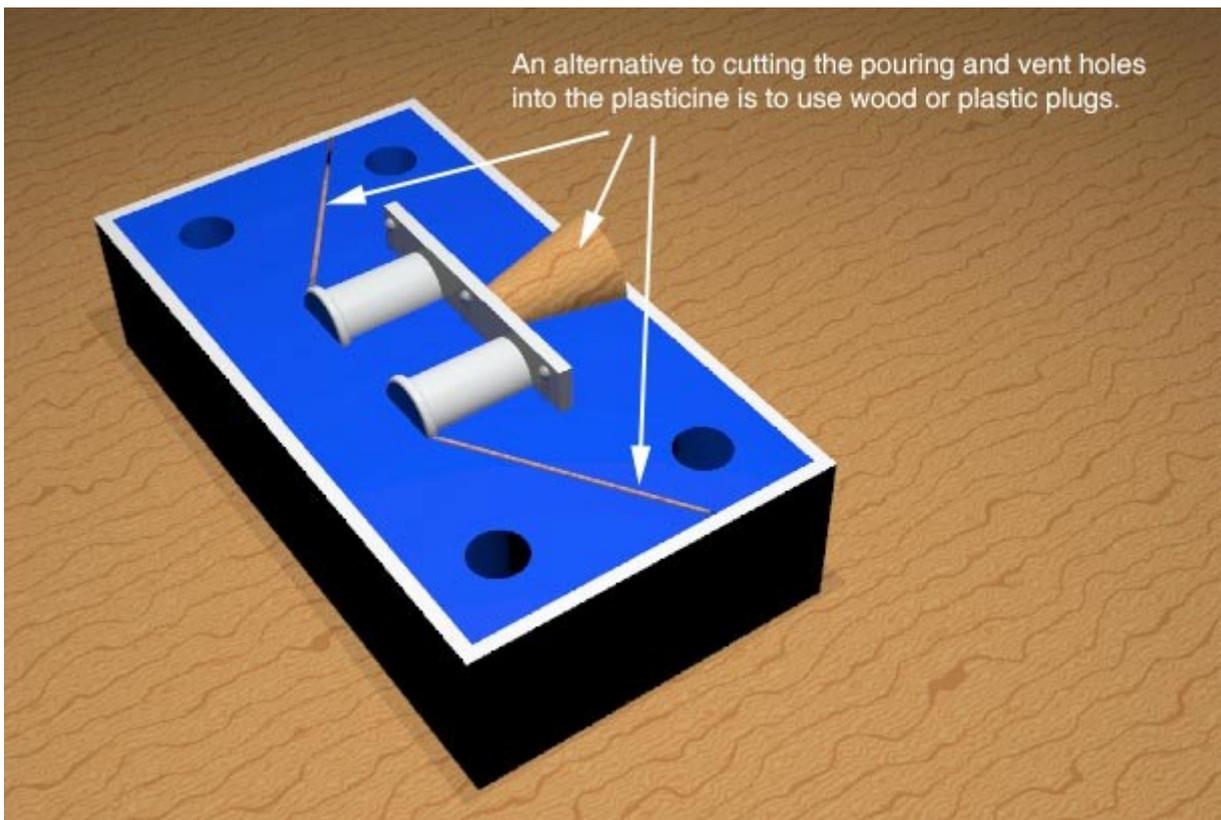
One of the attractive features of the molding process is that fine detail can be reproduced such as emblems, bolt heads and decor but remember that the process will also faithfully reproduce any errors!

Creating the Mold

Once the plug is complete, a mold must be prepared. The method which we will illustrate will show the creation of a split mold which is dowelled together when the molding material is poured. A box of suitable dimensions is required. Wood, metal or even building blocks such as Legos could be used. The box is filled with pliable non-setting modelling clay. There are several available such as Milliput, Sculpy Mold Maker or Plasticine (which is sold in the UK). Use this resin or clay to fill the box taking care that no air pockets are introduced. Level off the surface of the clay with a straight edge such as a steel rule or even a thin length of wire acting like a cheese cutter. Press the plug into the center of the clay with slow, even pressure until exactly half of it is submerged. This process is easier if the clay has been 'worked' by hand for a little while first.



'Dowelling' holes should now be drilled into the clay in four places towards the corners of the box, to roughly half the depth of the clay. The diameter of these holes is not critical but should not be less than 5mm (3/16"). Cut a funnel-shaped pouring channel into the clay with a knife. Air vent channels must be cut from those parts in the mold which will be at the bottom when pouring. Angle these vents upwards from the bottom of the mold so that molten material will simply not flow out of it when it is poured into the finished mold. An alternative way to produce both the air vents and pouring funnel, as advocated by Bernard Frolich in the book "The Art of Shipmodeling" published by Ancre, is to use appropriately shaped plastic or wooden plugs pushed halfway into the clay.



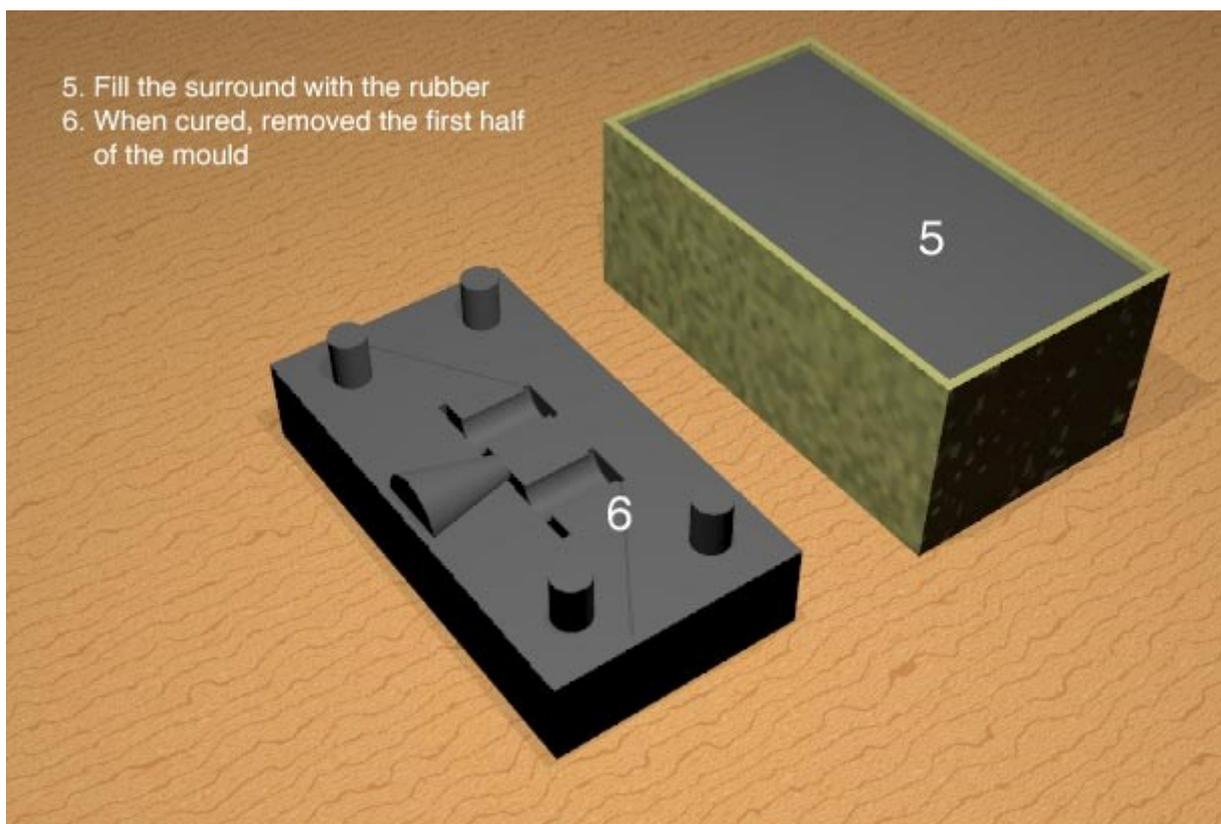
At this point, the box now must be extended upwards to twice the original height. If Lego blocks were used, add more rows of blocks to deepen the mold. If you used another material for the box, pieces of rigid cardboard, sheet styrene, wood or sheet metal can be wrapped around the original box and secured with tape, clamps and/or rubber bands. Make sure all the corners of this extension and the area where the extension meets the original box are well sealed with the tape to stop leakages. Our bollard, modelling clay and inside surfaces of the extended box must now be sprayed with a mold release agent and allowed to dry per the manufacturer's recommendations.

Pouring the Silicone Mold

The first half-mold is formed by pouring the molding solution on top of the bollard and clay. The silicone rubber solution used must be suitable for the resin or metal chosen for the molded item. For RESIN casts, rubber RTV 3325 should be used, and for METAL casts, rubber RTV 3255 is suitable. These products are available in many hobby shops, Hobby Lobby and online from Micro-Mark, Amazon, etc.

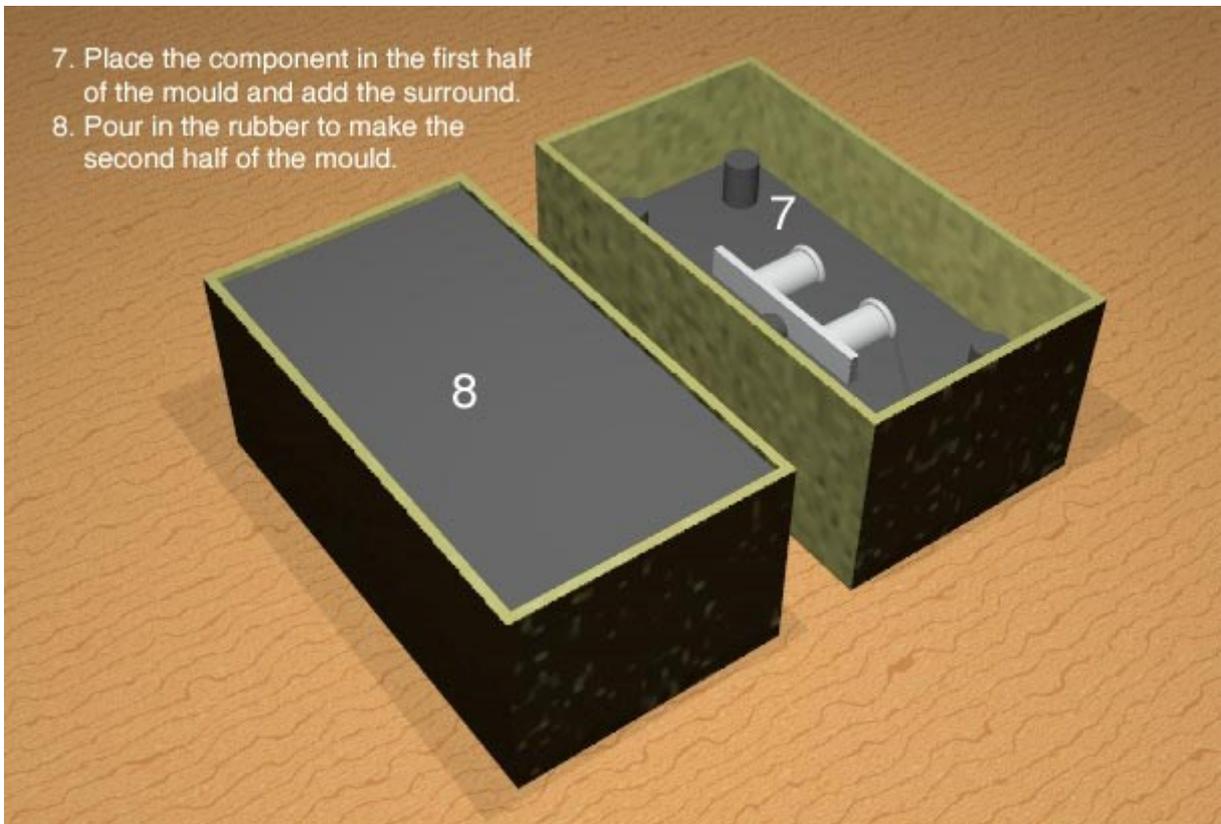
The manufacturer's instructions must be followed EXACTLY for mixing the rubber and catalyst. Care must be taken when mixing as NOT to cause air bubbles, as these will produce defective molds. When mixed, pour the rubber into the extended box SLOWLY from one corner, at the same time making sure that the mold fills without trapping any air around the master. The mold should be filled to the same depth as the clay in the bottom of the box. Now the rubber cure for 24 hours. Do not compromise on this. Please be patient.

After the rubber has cured, remove the extended walls of the box and flip it upside down so that the clay is on top. Lift the clay section off the silicone half mold. Clean any remaining particles of clay off the half mold and rebuild the extended box wall to the same depth as the mold you have just created.



Place the bollard master into the mold along with the wooden pouring funnel and vents, if used. Spray well with the release agent and allow to dry. The two halves of the mold will stick together if the release coat is not complete, so this operation is vital.

7. Place the component in the first half of the mould and add the surround.
8. Pour in the rubber to make the second half of the mould.



Mix and pour more silicone rubber solution to form the second half of the mold and allow it to cure for another 24 hours. The mold can then be split and the master removed. Make sure the vent holes are free of excess rubber. The mold is now ready for use, with the dowels ensuring perfect registration of the two mold halves every time.

9. The unwanted rubber can now be trimmed to complete the pouring and vent holes.

