How to Make a Great Mold, Part 1

By David E. Parvin, A.L.I.

Have ten different mold makers each make a mold of the same object and you will get ten molds which vary in design, materials, and function. All might be satisfactory though you likely would be able to rate them from best to worst. This is the first of two articles in which, while I don't claim to have all the answers, I will explain how to make a really great mold.

The absolutely most important requirement for a mold is that it produces perfect reproductions capturing all detail without flaws or noticeable parting lines. There are other considerations such as durability and ease of opening and closing. In addition to filling these requirements, the mold that I will describe will allow one easily to make a new mold if the edition is so large that the first mold wears out.

Just so that we are all on the same page, let me define a few things even though most readers may already know them. First, the object of which the mold is made is not called the original, it is the *model*. Next, the names commonly used for the different types of molds may vary, overlap, or be ambiguous. The two most common types of molds used by sculptors are *block* and *skin*. The simplest of these to construct is the block mold; just surround the model with a box, cup, etc., which is called the *mother mold*, and pour in rubber. After the rubber has set up, remove the mother mold, cut open the rubber, take out the model, and the block mold is finished. Block molds are quick and simple to construct. But while they save time, they usually require more rubber and to some the cost of the rubber may be more important than the cost of labor. Also, the relatively thick rubber may make it difficult to remove delicate castings.

With a skin mold, the rubber is generally much thinner, more like "skin." This is achieved by painting the rubber on the model and constructing a tightly fitting mother mold over the rubber. Or another way is to construct the mother mold over the model leaving a narrow gap into which the rubber is poured. Here is where it can get confusing, a block mold is a pour mold while a skin mold may or may not be. Remember Logic 101:

If A = B and B may or may not = C, then

1. A = C.
2. A may or may not = C.
3. It's Tuesday.
4. All of the above.

(For more information on skin and block molds, see "How to Make a Secondary Mold," *SJ,* July 2004, "Secondary Molds in Life Casting, Part II", *SJ,* November and December, 2004, all by D.P. If you can not locate your leather bound archival copies of *Sculpture Journal,* contact Jon, the editor, who will happily e-mail the articles to you. Or, I will gladly do the same.)

In this article, I will describe how to make a really slick skin mold using the pour, not to be confused with "poor" or "pore," method. Since I generally write on life casting, I will mold a mother's hand holding her infant's foot. But, the model could have been anything. And while the hand and foot is relatively small, about 6" tall, I have used this type of mold for models up to several feet in height. For even larger models, life castings or not, I would probably paint on the rubber. It's going to seem that this process is pretty complicated with many little steps, and this is true. However, there are only six major steps:

1. Attaching the model to the base.
2. Covering the model with clay.
3. Building the mother mold.
4. Pouring in the rubber.
5. Finishing the mold.
6. Using the mold.

If as you read along something doesn't make any sense, I would suggest that you keep reading and a few steps later it may become clear.

#1. The model, a mother's hand holding her baby's foot.

#2. The base with holes to fasten the model and the inserts.

#3. A metal insert.

#4. The metal inserts attached to the base.

Attaching the Mold to the Base

Photograph #1 shows the plaster model. Note the line drawn on the model which will serve as a guide to

insure that when I cut open the mold, the seam will be where I have determined that it will be the least obvious.

Photograph #2 shows the base to which the model will be attached while the mold is constructed. I have drilled two 5/16" holes into the model and inserted dowels that are long enough to attach the model about 1/2" above the base. This spacing will allow for a small reservoir to be part of the mold to hold excess casting material. (If this doesn't make any sense, it will later.) The other four holes, which are 1/4" are for attaching what I am holding in photograph #3, a 1/4" threaded metal insert. While made for wood working, these inserts are really useful in mold making. In photograph #4, four inserts have been attached to the base by 1X1/2" bolts through the wood. Make sure that the bolts are long enough to reach the top of the inserts covering all the threads. To determine where the holes for the inserts should be, trace around the model and drill the holes at least 1/2" out from the edge of the model. Drill enough holes for at least two inserts for each section of the mother mold. Generally, two sections will suffice, however, very complicated shapes may require more.

In photograph #5, I have added clay "donuts" which are simply taking up the space that will be the reservoirs. While the reservoirs could be cut out of the rubber later, using the donuts is easier and they also prevent wobble when the model is attached as in photo #6. A little glue on the dowels is also helpful.

#5. The clay "donuts."

#6. The clay "donuts" in place between the base and the model.

#7. Rolling out the clay.

#8. The model protected with plastic wrap and partially covered in clay.

Covering the Model With Clay

In order to have uniformly thick rubber in the mold, the clay, obviously, should be a constant thickness. The easiest way to get uniformly thick clay is to use what I call "The Funky Method" named after a very fine ceramic and raku artist named Beth Funk who taught this to me. Attach a piece of 3/16" molding to each side of a board and use something round such as a piece of PVC pipe or a rolling pin as I am doing in photograph #7 to flatten the clay. There is no set rule as to how thick the clay (and therefore the rubber) has to be, anywhere from 1/8" to 1/2" will suffice. But I have found that it can be difficult to apply the clay without getting some thin places. Also, the model may shift slightly inside the mother mold when it's reattached after removing the clay. Therefore, I would suggest that one use clay at least 3/16" until she/he has made a few molds. For smaller models such as this one, I cut the clay into strips about two inches wide. Warming the clay will make the rolling, cutting, and applying easier. It is important that the clay doesn't stick to the model. So before applying the clay, cover the model with plastic wrap. See photograph #8. In this case, the model is plaster and shaping the clay around it isn't going to damage it. However, if the model is fragile, applying the clay must be done very carefully or, perhaps, a paint-on mold might be more appropriate. In photograph #9, the model has been completely covered.

Now it is time to give the clay covered model a "Mohawk." Because the rubber mold will have to be cut open somewhere to remove the model and the subsequent castings, every effort must be made to have the sides of the cut fit back together as perfectly as possible to minimize any seam on the castings. The clay must be made thick enough along where the intended cut is to go so that the rubber that replaces the clay will have enough depth so that when cut apart, the two cut surfaces will fit or key together exactly. Rubber 3/8" thick isn't enough. Also, the seam will have to be long enough to allow the mold to open sufficiently for the removal of the contents. And the Mohawk must also be wide enough to allow for making a zigzag cut without penetrating the sides. In photograph #10, I am fitting a strip of clay up one side and across the top of the clay covered model. This clay strip is about 1&1/2" thick and at least 1/2' wide. In photograph #11, eight things have been done since photograph #10. I will describe them in the chronological order.

The first was the attachment of the Mohawk by just filling the gap with clay and smoothing. Notice step

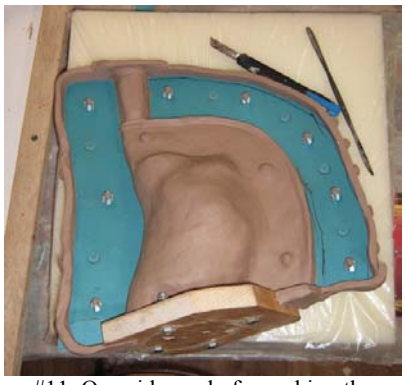
#2, the three clay bumps about four inches apart half way out on the Mohawk. These were made by adding pieces of clay and shaping as was step #3, the ridge on the outer edge of the Mohawk that goes the full length. The purpose of the bumps and the ridge was to insure that the Mohawk in which the seam will be cut fits exactly into the mother mold. Similar bumps and ridge were added to the other side of the Mohawk.

Since the mother mold must separate into two halves along the clay strip, the next step,#4, was to provide a barrier or shim so that first one side and then the other could be constructed without the two sticking together. Photograph #12 shows an ideal material to accomplish this, a printer's plate which is made of very thin metal, so thin that it can be cut easily with scissors. These plates are a by product of the printing process and usually can be gotten from any printing shop just for the asking. The shim as shown was made in two parts, the straight piece on the left side and the curved one on the right coming up over the top. Shaping the pieces of the shim is very simple. Just put the printer's plate behind the clay and trace it from the lower right corner up over the top to the end of the Mohawk. Cut along the line and fit the shaped printer's plate along the center of the Mohawk. Trim the shim until the fit is pretty close. Cut the shim from the plate so that it is about two inches wide. Press the shim about 1/4" into the center of the clay Mohawk as in photograph #11 which should anchor it securely. Be careful, you can easily cut yourself with the printer's plate material. Repeat for the vertical shim on the left side. Where the two pieces of metal meet and overlap slightly at the upper left corner, they can be joined with epoxy, super glue, etc. A paper clip is a simple way to hold them until the glue dries.

What I have done up to this point is made it possible for the two sides of the mother mold to be constructed separately so that they will come apart. I have also assured that the rubber part of the mold will fit precisely into the mother mold. What we now must do is assure that the two halves of the mother mold lock precisely in place. In step #5, some more threaded metal inserts were glued along the centerline of the shim. Notice that the ones along the Mohawk are closer together than the ones on the left side. This is because the rubber will only be cut apart at the Mohawk and the fit must be more precise there. Notice also that the holes in the metal inserts have been plugged with clay. This to prevent the mother mold material from getting inside and clogging the threads. The bumps, step #6, between the inserts are self sticking clear plastic dots made by 3M and can be purchased anywhere that picture framing materials are sold. Their purpose is to align the two parts of the mother mold so that the bolts can be inserted easily to fasten the two sided together.

#9. The model completely covered in clay.

#10. The clay that when attached will be the Mohawk or the place for the seam in the rubber.



#11. One side ready for making the mother mold.

#12. A printer's plate that makes excellent shims.

Once the mother mold is finished and the clay has been removed, we will need a way to pour in the rubber. Notice the clay extending from the top of the Mohawk to the outer edge of the shim; this will be a built in funnel for the rubber. Half will be in each side of the mother mold. This funnel needs be only about an inch in diameter.

The eighth and last thing shown in photograph #11 is the narrow piece of clay that goes all around the shim. This is just a wall about 1/2" tall which will contain the liquid material for the mother mold.

While I have only covered two of the six major steps in making a really great mold, we are over half way through, the rest is both easier and simpler. As I have mentioned earlier, if you are a little confused, patience, Grasshopper, it will all become clear in next months article.

David Parvin is a Denver sculptor. He may be reached at 303-321-1074 if you would like to discuss art, fly fishing, flying, or grandchildren.
