

PREPARATION OF THE MODEL

MODEL MATERIAL

PLASTER

RECOMMENDED TREATMENT

After cleaning, a sealer should be applied, selecting one of the four following methods:

1. Dissolve liquid soap in water and rub it over the entire surface.
2. Wax deposit; use a very fluid liquid wax.
3. Varnish; use shellac or a cellulose or acrylic varnish.
4. Use a clear spray acrylic or PVA spray release.

POROUS MATERIALS (stone, concrete, unglazed porcelain, baked clay, etc.)

Use a spray acrylic or shellac.

METAL

1. Degrease with a solvent.
2. Clean with a liquid detergent in water, then dry.
To test for the necessity of a sealant, press a thumbprint of latex against the metal. After a moment, when the latex has set, remove the spot of latex. If a black mark on the metal is left, a reaction has occurred and a sealant is necessary.

If necessary, use a spray acrylic or shellac.

GLASS, PORCELAIN, CERAMICS

Coat with a spray acrylic or shellac.

WOOD

1. Use a thin application of wax, cellulose sealer or varnish.
2. If the original surface of the wood is important to preserve, spray with a PVA sealant (water soluble).

WAX

No surface treatment is necessary.



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MAKING A FIBERGLASS MOTHER MOLD

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MATERIALS NEEDED

- ◆ fiberglass matting, fiberglass strands, CECO powder, polyester resin, catalyst, acetone, denatured alcohol, and clay

- ◆ talcum powder to sprinkle into the latex when removed

- ◆ mixing pans, spatula, brush, and paint roller pan for resin

- ◆ Sawzall, drill, and bolts



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The purpose of the mother mold is to hold and protect the latex mold. It holds the shape and supports the latex while a mold is being made or stored. The seams in the mother mold should be precise. Otherwise, over time, the latex mold will eventually sag into the seams of the mother mold. Always store the latex mold in the mother mold. (See 2)

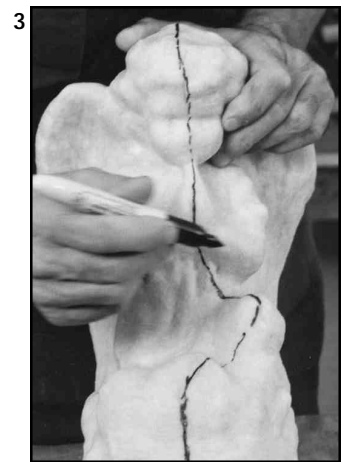


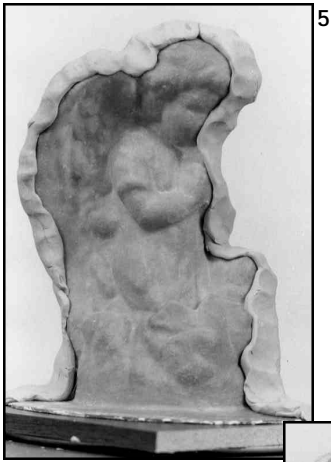
1 PREPARING THE MOLD

When the latex mold was prepared, as many corners and extensions were rounded off as possible. This will ease the release of the latex mold from the mother mold parts. The mother mold is rigid. Consequently, it must be built in parts that can be pulled straight off without binding.

In this mold there are still areas that extend out, so it is necessary to divide the mother mold. Since the pieces must be pulled straight off, the areas that stick out, or may cause binding, should be divided. Any bulge or overhang must be divided. At this point, draw a parting line that will later be used as a guide in determining the clay seam. Draw over the center of the knee which sticks out. The same applies to the wings. The intention is to create a mother mold that will be easy to remove and keep the number of parts to a minimum. (See 3, 4)

This model will require three parts. The wings will be divided between the front and the back, and the knee will be divided with that line running up under the chin.





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2 PART DIVISIONS AND CLAY DAMS

The clay seam is going to be mounted on the back area of the wings. Clean the rubber with denatured alcohol. The cleaner the rubber the better the clay sticks to it. Clean all the rubber where the clay will go.

Attaching the clay is a two-step process.

[Keep the clay warmed to about 90° F. It stays softer.]

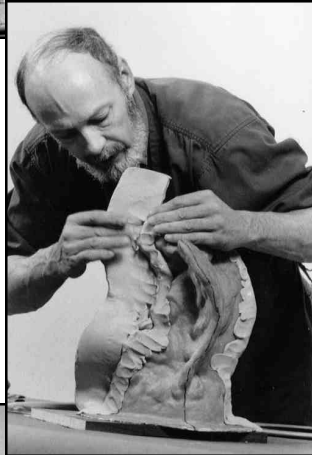
Make a one-inch diameter snake; flatten it. Press the clay onto the back side of the line. Push it flat against the rubber all along the parting lines. Be sure that it is tight against the rubber all along its length. This is the first stage of making the clay dam.

Make sure the clay is just over the line so that it can be trimmed back to the line. Trim to the line precisely. (See 5)

[Do not trim with a sharp knife that could cut the rubber.]

The clay, if warm, trims easily.

Now, a dam of soft clay is attached to the clay seam. This dam should extend several inches from the mold surface. It will be the flange in the finished mother mold. Be sure that the clay is attached firmly to avoid problems while applying the matting. Press the clay together firmly, seam to dam, and back it up behind with more clay pieces. (See 5a, 6) Smooth it off on the casting surface. Only one side will actually be used to cast against. The adjoining mold part will cast directly against the part now being prepared.



5a



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3 INSTALL LOCKS

The locks are simple indentations that will hold the parts in place and prevent slippage. It also keeps the seam line even and accurate. Put two or three locks on each side. They guide the assembly of the parts. Everything will line up. The locks can be pressed in with the thumb. The locks should slope inward gradually and smoothly or they may cause the parts to bind together.

A flat top needs to be installed so that the piece will be stable, flat, and self-standing when it is being poured. A piece of clay is measured and pressed into each side of the top of the clay dam to provide the flat top. (See 7)



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Smooth out the attached clay, and cut it flat with a knife. As a separator, apply wax or FLEXOGLUE to the clay, the rubber, and the basic board. Use several coats of a separator. Cover the whole area with the FLEXOGLUE and all the board surface around the model. Carry the separator out further than you think is necessary, just in case. Apply several coats, leaving time for drying between coats.



4 PREPARING FIBERGLASS MATTING; RIPPING PATCHES

Use two - ounce matting. The fiberglass matting is sold in five-foot rolls. (This size roll is the most economical when buying.)

To begin, cut the fiberglass off the roll in two-foot sections. Lay these sections on a flat table with straight edges. The matting is creased and torn against the edge of the table. (See 8) The pieces with the straight hard edge, from the outside edge of the roll, are called straights; the pieces with the torn edges are called the roughs. Stack them separately.

Crease, then rip against the edge of the table (or with a yardstick). The soft, or rough, edges that are created by ripping are important. Cutting with a knife or scissors creates a hard edge.

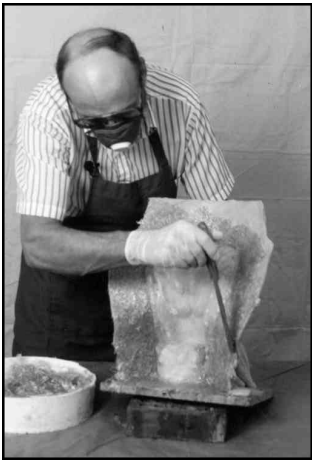
The ripped pieces should be sized so that they fit easily into the pan that will be used. (See 9) The resin will be in a pan and spread over the pieces. The pieces should be small enough to fit easily.

Also, patches should be of a size that is easily handled. If the patches are too big, they can't be easily shaped to the model.

The rough edges are easier to blend into each other. Straights are used to get a crisp outside edge that is easier to trim.

Rip enough patches to complete the mold section. It is awkward to try ripping patches during the actual application process.





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5 PREPARING, APPLYING, AND MIXING THICK RESIN; APPLYING MIXTURE TO MOLD; CLEANING TOOLS WITH ACETONE

Wear a mask that can filter toxic odors. Inexpensive organic throwaway masks are available.

Resin and CECO powder and quarter strands will be mixed. First mix the resin and the catalyst: 1/2 pint of resin; 1 cc of catalyst. **(See 10)**

[You will have about 15 minutes of working time.]

A. Mix and stir for at least one minute.

B. Next, mix in the quarter strands -- enough fiberglass strands so that, when stirring, there's a trail behind the stirring stick. Make sure it is mixed thoroughly and uniformly.

C. Now add the CECO powder. Use enough CECO powder, as thickener, so that it will stay on the sides of the mixing bowl without sagging.

(Wet resin without strands tends to stick to the rubber regardless of the separator. As a secondary benefit, the strands help to keep the fiberglass from sticking to the rubber.)

Make the mixture thick enough so it is a paste that will stand by itself like a thick frosting. **(See 11)** This thickness of paste will assist in applying an even coat to the rubber surface.

Apply a little at a time, and be sure that the mix goes fully into all detail. Press out all air bubbles. Avoid gaps.

Begin at the bottom, and make sure that the locks and the cracks are all filled.

Cover the model and the clay wall completely with at least a 1/8 inch coating.

While applying the mixture, hold the spatula handle up. **(See 12)** This prevents the resin from dripping onto your hands.

Avoid leaving airholes; airholes and bubbles will be open pockets in the mold's surface when it dries.

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The fiberglass and resin paste is easy to work. Avoid pushing hard with the spatula; ease the mixture across the surface of the clay dam and the mold. **(See 13)**

Begin by covering the clay dam (only the one surface), then work into the model. Proceed from the edges in toward the center.

While covering the surface, use the paste to further round the shape of the mold. A rounded surface will be easier to work on when applying the matting. **(See 14, 15)** The mix does not need to be dry before the matting is applied; as soon as this process is completed begin the next stage of mixing resin and applying the soaked matting.

Keep everything smooth and rounded or it will be difficult to place the matting.

Clean up with acetone. Add acetone to the bowl and progressively work the excess mixture into a mound that can be wiped from the bowl. **(See 16)** Keep the knife and brush in acetone after cleaning throughout the process. Long-term storage in acetone will deteriorate the bristles, but if the tools are used continuously, it is simpler to keep them soaking. (Acetone evaporates quickly; keep in a covered jar.)

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ACTIVATING AND APPLYING; PATTING RESIN SOAKED FIBER- GLASS PATCHES TO THE MODEL

Pour resin in a pan (a paint roller pan is ideal). One pint of resin is the estimated need for this model section. Add 1 1/2 cc of catalyst into the pint (*this slightly lower percent - age of catalyst will extend the working time*).

Mix the resin and catalyst thoroughly in the pan for one minute.

Arrange the straight-edged patches and the rough-edged patches in two easily accessible piles.

Keep the straight edges aligned. The straight-edged pieces will be used in forming the outer edges of the mother mold section. These hard or straight edges are easier to trim, and they also help keep the outside edges of the mother mold thick as they overlap, rather than tapering out.



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Hold three layers and saturate all three at once. Hold the patches in the corner gently with the right hand. **(See 17)** Pick them up by the corners with the fingertips. This will help to keep the glove clean and prevent problems that occur when the glove is sticky and saturated with resin while you are working.

The other hand holds the brush and is kept absolutely dry.

The roller pan should be filled enough so that an area large enough for the patches is left dry. **(See 18)**

Dip the matting into the resin, and lay it on the dry end of the pan. Using the brush, pull just enough resin over the top of the matting to wet the surface without drenching it. The patches should be completely wetted without dripping.

Do not oversaturate the matting.

If there is not enough resin it won't press down easily, or set up correctly. If it drips, it will tend to sag, pull apart and droop. Held up by the fingers, the patches should be completely moistened but not dripping.

With the bristles of the brush, pat into the middle of the matting and work out to the edges. Pat out the air until all the air is worked out and the matting adheres snugly and evenly. **(See 19)** Overlap the next set of pieces. Using three pieces each time, overlapped, makes six layers at most points. Overlap about a third of each patch. Pat gently rather than brushing. **(See 20, 21)** Attempting to brush the saturated patches will simply pull them apart into clumps. Do not try to move the patches across the wet surface; if necessary, pick them up and place them back down if they need to be relocated.

The hard straight line goes to the outside edges.

Use only the bristles of the brush. Do not pound the matting with the brush. Pushing too hard on the matting will squeeze the resin out of the patches and prevent the mold from building up depth and strength.

Strengthen the top corners with a little extra resin. The pouring stand -- the flat top -- needs to be stronger to maintain the mold upright while it is in use.

The roughs, the frayed edges, lock into the pieces that are already patted in. **(See 22)** The frayed edges are easier to blend into the already placed patches. They allow a smoother surface when the mold has dried.

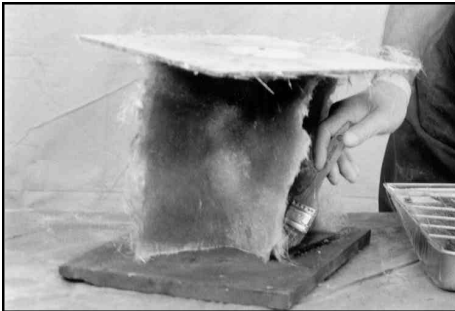
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Apply fiberglass matting to the base. Also, add dry matting to soak up the drips at the bottom. (See 23)

When the section has dried and is hard, remove the clay dam and put several coats of FLEXOGLUE on the fiberglass flange and the next section to be completed. Be absolutely certain that the FLEXOGLUE dries completely between each coat. Repeat the process until all the sections are completed.

Be absolutely certain that the fiberglass flange, that area which will be built against the adjoining part, is completely coated with the separator.



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7 TRIMMING AND COMPLETING; TRIMMING ROUGH EDGES; INSTALLING FASTENER BOLTS

After all the sections are completed, grind the tops of the pieces flat and level as preparation to install a base. (The top is the bottom when it is being poured.)

Check the top with a level. (See 25, 26)

Cover a board with the separator and place the model on the board with the top down. Using the board as the form, build up the base. This will make the mold self-standing.

Make sure there is about a two-inch overlap of matting onto the mold sections so that the base is integrated into the sections and will not snap off. (See 24)

Be sure when building the base that each section is built separately or the sections will be held together by the fiberglass rather than being able to come apart.

Now drill the fastener holes in the flanges. Use a 5/16 bolt and wingnut. (See 27) The fasteners are drilled in now because the mold is exactly in alignment. Doing it later, after the mold has been opened, could result in the holes being drilled out of alignment. Once the mold has been opened, it could shift before the holes are drilled.

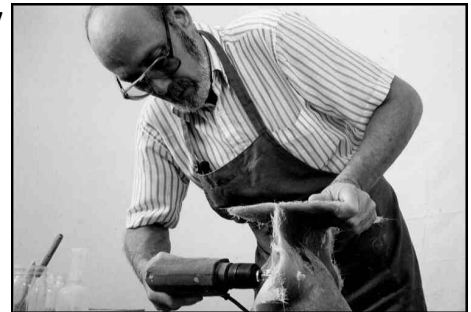
Drill fiberglass slowly. A high-speed carbide bit is most efficient because of the heat generated by the fiberglass as it is drilled.

Using the Sawzall, or a jigsaw, with a fine metal cutting blade, trim all the edges. (See 28) Grind the trimmed edges to leave them smooth.



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8 REMOVING THE MOTHER MOLD AND THE LATEX MOLD

The mold should break apart easily. If the mold does not break apart easily it may indicate a problem that will need to be corrected. Using a flat blade or a screwdriver, gently wedge the pieces apart at a seam away from the rubber mold inside. Avoid pushing the screwdriver in where it could damage the rubber. When all the sections have been removed, the next step is to take the rubber off the model. Carefully and gently pull it all the way around and remove it from the board. Don't pull hard on the rubber. While pulling, hold your hand close to the spot where the rubber is separating from the model. **(See 29)**



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Until it is completely cured, rubber can be stretched and distorted.

While removing the latex, sprinkle talc powder along the exposed edges as the piece is removed. **(See 30)** This will prevent the rubber from sticking to itself. Always pull with your hand close to the model. Care at this point will prevent distortion from occurring in the rubber. Work around the model, pulling a bit at a time, adding talc, and progressively work the rubber off the model. Pull from where the latex has not been released.



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[After this first application of talc, it will probably not be needed again.]

Gently clean the inside of the mold. Pieces of clay always get stuck in the details. Scrape gently. Wash the rubber mold with soap and warm water. **(See 31)**

Always store the mold in the mother mold to maintain its longevity.



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9 FINAL TRIMMING

Bolt the sections together with the latex inside. Trim the rubber lip with scissors to match the top flange of the mother mold. **(See 32)**



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