Three Approaches to Slip Casting Plates

by Dan Mehlman

In nearly 40 years of work as a freelance modelmaker, moldmaker, and designer in the ceramic arts and industry, I've had numerous inquires from potters regarding molds for slip casting plates. In this article, I'll describe two mold configurations. Then, I'll show how and why I developed a unique system for my own personal use.

First, I want to acknowledge that there are intrinsic difficulties in slip casting plates, which is why it's rarely done in industry. (In dinnerware factories, plates are typically made in jiggering or pressing operations.)

1 *Robins Plate*, 10 in. (25 cm) in diameter, slip-cast, wheel-finished stoneware, decorated with handmade roulette and stamps, fired to cone 6 in oxidation. **2** *Sun Platter*, 12 in. (30 cm) in diameter, mold-thrown ceramic, altered with roulette decoration, underglaze, fired to cone 6 in oxidation. **3** Models and solid-cast molds that Dan Mehlman made for two large platters with relief decoration. Note that these molds were used in a factory to solid cast a few first samples. Subsequently, the same models were used to make RAM press dies for production (Rookwood Pottery for Mottahedeh). **4** Examples of Mehlman's plate and bowl molds. All are concentric molds that can be mounted on the wheel with a Giffin Grip chuck.

So, despite the problematical nature of the process (as described below), why might a studio potter want to slip cast plates?

- The potter might already be using slip casting for other forms.
- Once the molds are made, the actual plate making is fairly straightforward and efficient. For the production potter, work can be produced in volume, perhaps by a worker with less experience and skills than in, say, throwing. On the other hand, for the artist potter, slip casting can be a good way to create blanks as a starting point for unique pieces.
- Slip casting can be the best way to produce non-round plates.
- Slip-cast pieces can be cast thin or thick, and are consistent in shape and size.
- The smooth greenware lends itself to carving, incising, and sgraffito.

Whatever the reason, there are two ways that one can slip cast plates: drain-cast molds and solid-cast molds.

Drain-Cast Plaster Mold

With the drain-cast mold design, a plate is made in a one-part, open mold, which forms the back of the plate (see 5). It's a typical drain-cast operation—the mold is filled with slip, allowed time to cast, and then tipped up and drained, leaving a cast piece behind. When leather hard, the reservoir (also called the spare) is trimmed and removed, and the cast is removed from the mold when ready by placing a board on top of the mold and flipping it over so the plate then drops out and rests on the board.

Here are some pros and cons of this type of plate-mold design and casting technique.

Pros:

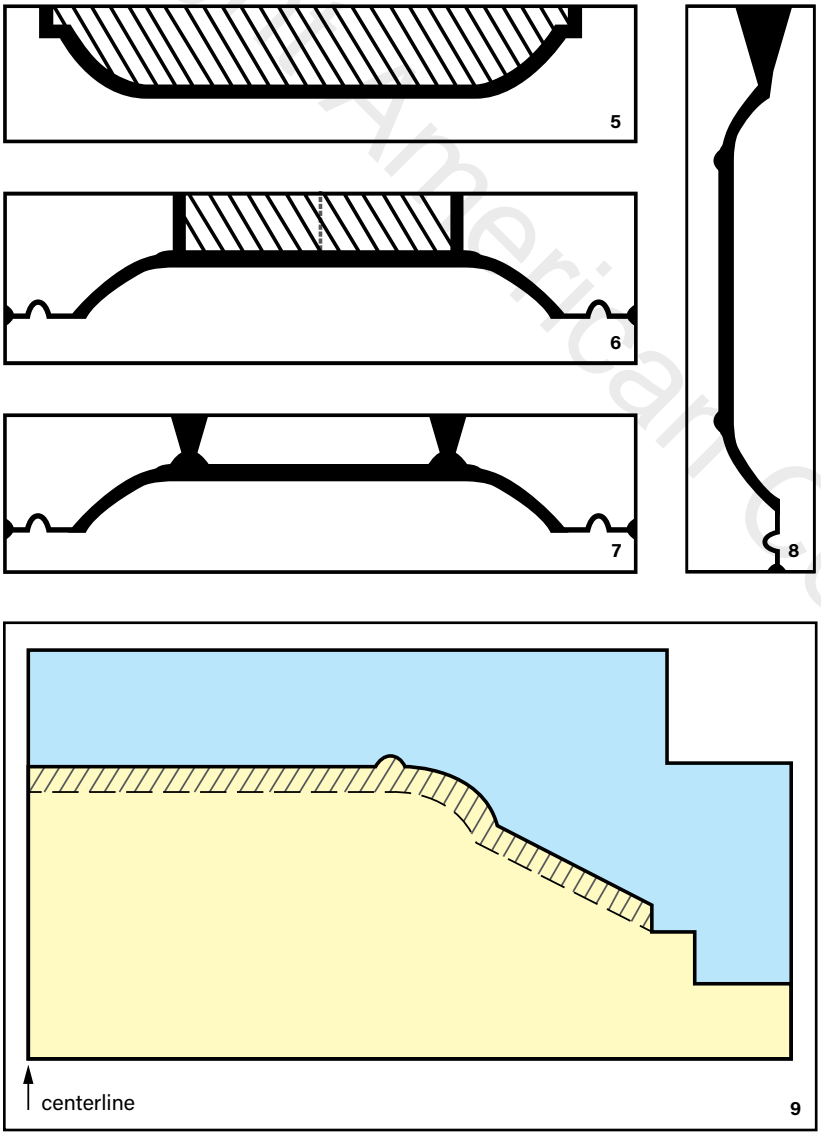
- The original model (the positive form from which the mold is made) is a simple, solid shape. In my commercial work, I turn plaster models on both a plaster wheel (vertical axis) and a lathe (horizontal axis), but any potter can turn or sculpt a

usable model in clay. The one-part mold is simple and seamless, so it is easy to make and easy to use.

- As the slip-cast piece is stiffening up, yet still in the mold, there is a nice opportunity to work on the face of the leather-hard plate with stamps, roulettes, carving tools, etc. Unlike a thrown plate, where the soft rim would have to be supported freehand (which could distort the plate), here the entire piece is supported and stabilized by the mold.
- As a bonus, the same mold can also be used as a slump mold with clay slabs.

Cons:

- The primary surface (the face of the plate) is formed by the draining of the slip. With careful technique and slip management, the drained surface can be very good, but poorly maintained slip or sloppy casting procedures will result in surface defects, requiring cleanup in the greenware stage.
- Since the mold only forms the back of the plate, there is not an opportunity to have sharp definition or molded-in decoration on the face.



5 Cross-section profile illustration of a one-part drain-cast mold. **6** Cross-section profile of an open-back, solid-cast two-part mold. **7** Cross-section profile of a tube-feed, solid-cast two-part mold. **8** Cross-section profile of an edge-feed, solid-cast two-part mold. **5–8** Slip is poured from above and fills the open, crosshatched areas depicted in the illustrations. The thicker black lines represent the clay building up on the casting face of the mold to form the plate, foot, and spare. **9** One-half cross section of a turned model (yellow) and the turned, one-part mold made from it (blue). The step-in that's on the bottom edge of the mold reduces weight and accommodates centering the mold on a Giffin Grip. The crosshatched area shows the cross section of a slip-cast plate after filling and draining the mold, then trimming off the spare.

- The wall thickness of the plate is controlled by casting time (as well as mold and slip conditions), so this type of mold doesn't automatically cast products of consistent weight.
- Since this is a drain-cast process, the face of the plate will simply reflect the back. For instance, if there is a raised foot ring on the underside of the plate, it will telegraph through and show as a trough on the face. (This is why open-cast plates are usually flat on the back—i.e. no foot ring.)

Solid-Cast Plaster Mold

Here the plate is cast by filling the space between two interlocking mold parts, one for the face and one for the back (see 6–8). The slip builds up from both sides, until they meet and form a solid wall.

Pros:

- In solid casting, the mold forms both sides of the plate, resulting in a molded face, with the potential for crisp details and, potentially, relief decoration.
- Unlike the drain-cast plate, the wall thickness of a solid-cast plate is consistently controlled by the mold.

Cons:

- The original model must be turned both front and back to create an accurate cross-section. (I form such models in plaster, though a potter might use a fired piece.)
- The working mold, in two keyed parts, is also more complex to make.
- When pouring the slip, we're filling a narrow space that is casting up fast, causing areas to become blocked, creating voids. It may take some practice to learn how to get a complete fill.
- A good fill is also dependent on proper mold design. The cross section of the piece should decrease as the slip flows from the point of entry to the most distant point. For instance, if you had a thin-walled plate with a very fat rim, the thin area would cast up solid before the rim, choking off supply and causing an incomplete cast.
- Then there's a problem that's familiar to any potter who has draped slabs over a hump mold. As the clay stiffens up, the piece begins to shrink and grab onto the hump mold. Similarly, the slip-cast plate may not want to release easily from the face side of the mold, especially with higher-shrinkage clay bodies and deeper forms.

In designing a solid-cast mold, an important consideration is how the slip will be introduced when filling the mold. There are two alternatives:

- In an open-back two-part mold, the slip is poured through a wide opening that

10 Daniel Levy's dinnerware, slip-cast porcelain, fired to cone 10 in oxidation, platinum details. **11** Steve Horn's plate, 11 in. (28 cm) in diameter, mold-thrown ceramic, fired to cone 6 in oxidation.

encompasses the entire space within the foot ring (see cross-hatched area in 6). Thus the rim of the plate is solid cast (between the two mold parts), while the open center area of the plate is actually a drain cast. The challenge, in both mold design and in use, is matching the thickness of the drain-cast area to the solid-cast area. There is also a tricky detail where the spare is trimmed off.

- The alternative is a tube-feed two-part mold. The entire piece is solid cast, front and back, formed between two mold parts. The slip is fed into the back of the plate via two or more small tubes. Plastic funnels are placed in the feed tubes as slip reservoirs. Additional vents may be necessary to prevent voids caused by trapped air.

Finally, there's an edge-feed two-part mold. The mold stands up on end, and the slip is fed in through the edge of the plate. I don't like this system, but it works in certain cases.

Note: Although I refer to turnings or shapes made on the wheel, everything above applies to non-round shapes as well.

A Natural Journey

My own journey in plate making began in junior high school shop class, when I draped a slab over a form (to make a spoon rest that my mother used for the rest of her life). Throughout my undergraduate and graduate ceramics education, and in the ensuing years, I liked to make plate forms, both thrown and slab built, as a canvas for quirky, personal drawings, paintings, and relief sculpting. Over time, however, I came to feel that, for me, ceramics wasn't the best venue for working out such imagery, and turned to printmaking and drawing for that kind of expression. I gradually moved away from the fine-art side of ceramics and toward making more functional ware, as my personal work became informed by a career in the dinnerware industry.

Early on, when I was making heavy sculptural plates, I draped slabs in simple bisque molds. I turned big, hollow, fired-clay domes with fair curves inside and out, which could be used either to drape slabs into the hollow or over the dome. (I recommend this as a useful tool that can be made by any potter.) As I became more adept in plaster work and my studio became more devoted to modelmaking and moldmaking, I began to slip cast more of my own work. Eventually I developed a hybrid system for casting plates in a mold, while retaining some elements of throwing.

To make my open-cast plate molds, I first design the cross-section of the plate on paper (yes, I still draw "old-school" with a drafting table and a pencil). Based on the drawing, I make a styrene template, set it up on my plaster wheel, and turn a solid plaster model. Then, with the model still on the plaster wheel, I pour the one-piece mold and turn the outside of the mold so that it is perfectly concentric with the inside. On the back the mold, I form a short cylinder that fits in a Giffin Grip so that I can secure and center the mold on the wheel later to refine and decorate the plate surface (see 12–16).

I use the same molds with either draped slabs or casting slip. With slip, however, I believe the plates are less prone to warpage, and I like working on the smooth, leather-hard slip. I developed a procedure in which I drain-cast the piece, then place the mold on the Giffin Grip. Since the outside of the mold is concentric with the inside, the plate spins true, as in a jigger mold. I then throw the face of the plate by hand—compressing and ribbing the piece to eliminate any trace of the foot ring on the face, and refine the form. This is also a way to clean up any little defects from the draining of the slip (if, like me, your slip is not always perfect). In a sense, it's a bit like jiggering without the jigger arm. I also throw the interiors of slip-cast-molded deep bowl forms the same way, which would be impossible to do with slabs (see 13–19).

The same molds and procedure work with plastic clay. To minimize warpage from the clay's forming memory, I pound out a slab roughly by hand and then use a slab roller just to finish it off. Then I cut a disk about the size of the plate, lay it on the mold, and throw the plate inside the mold, the same as I do with the cast plates. (I'm amused to imagine a potter puzzled by the finished plate—the back is obviously molded, but has the canvas slab-roller

12 Plaster-turning wheel with a styrene profile template clamped to the pivoting jigger arm. **13** Plaster model, turned with a styrene template. **14** Setup with a template for turning the outside of the mold, which will be poured over the model. **15** Turning the outside of the mold, which allows it to be centered on a wheel when in use. **16** View of the finished mold. **17** Filling the finished mold with white stoneware slip. **18** Trimming any excess slip off of the mold. **19** With the mold placed on the wheel, turning the wheel and ribbing to refine the face of the plate. **20** Adding texture to the rim with a plaster roulette. **21** Using plaster stamps to create a flock of robins along the rim. **22** Creating a combing pattern on the rim of the fish plate. **23** Demolding the plates directly onto plaster bats that fit inside of the molds. **24** Finishing off the rim with a Surform rasp. **25** *Swimming Fish Plate*, 10 in. (25 cm) in diameter, mold-thrown stoneware, altered with combing, stamps, underglaze, fired to cone 6 in oxidation.

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texture, while the face of the plate clearly looks thrown.) By the way, I also have made and used similar concentric hump molds that mount on the wheel to make plates face down.

With either slip or slabs, after this wheel work comes the fun part—decorating the leather-hard piece (still in the mold) with various textures, combing, etc., and then impressing imagery with handmade plaster roulettes and stamps. For me, this way of making plates combines the efficiency of mold-forming with the opportunities of hand finishing (see 20–22).

I think that what you make and how you make it reflect every aspect of your life. This system works well for me because of my particular skill set and my unique studio, which is primarily a professional plaster model/mold shop. Pottery making is an artistic activity that I pursue out of a lifelong fascination with the materials, process, history, traditions, and design challenges of ceramics. My personal goal is not to manufacture product, but to develop ideas and pursue a practice that, I hope, occasionally approaches perfection.

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