DIRECT CASTING
PEWTER

NEFWT...May 10, 2010 Scott Layman

Adapted: Arrowmont School of Arts and Crafts class taught by Elizabeth Hake, October, 2009

Materials:

Pewter metal	5lbs. ingot item #750-042 @ $99.00 from Rio Grande
	Old pewter...as you find it at flea markets etc.
Cuttlefish bones	"Pet Creations" 11819 N. Main St., Jacksonvile, Fl.
	Apx. $1.00 each for largest...call ahead 757-4685
Pewter Oxidizer	Rio Grande cat # 331-037 $20 / quart
Stainless steel shot	Rio Grande ...$16.65 / lb.
Ceiling tile, ceramic floor tile	Scrap pieces readily available

Equipment:

Hack saw, jeweler's saw with fine blade, Propane torch, stainless ladle, pliers etc.

Preparing the mold: Cuttlefish Bone

1. Flatten the soft side of the cuttlefish on sandpaper, or back side of a ceramic floor tile. Be careful not to rock the cuttlefish which would create curvature. Rotate the cuttlefish on the rough surface so as not to develop grooves. The face of the mold must be flat so that the tile backing seals and molten metal does not run out.
2. Square off one end of the cuttlefish....preferably the larger end. Hack saw, coping saw, or band saw all work well. This will be the top of the mold.
3. Cut ceiling tile to fit contour of cuttlefish blank. Place back side of tile against flat side of cuttlefish to get contour. Hand cut, or band saw.
4. Orient your design so that irregular and/or thin shapes point toward the bottom of the mold. Locate the pattern or mold cavity apx 3/4" – 1" below top edge of mold leaving room for the pouring basin and sprue (path for molten metal to flow into mold cavity) Keep all design features at least 3/8" inside the flattened area. If possible, the heaviest, and/or least detailed part of the design should be at the top of the mold. This is where the sprue will connect to the mold cavity
5. Press object into the cuttlefish to create a cavity or carve out with various shaped toolsIf a smooth surface is desired, do not brush or blow out after pressing pattern in. If a natural cuttlefish texture is desired, use tooth brush or similar, and gently blow out dust.
6. Cut conical shaped pouring basin ...half in cuttlefish, half in ceiling tile. Create sprue, or pathway for the metal to flow into the mold cavity. Make it large enough so metal will not freeze off too soon, but not larger than necessary....you'll be cutting it off and finishing it!
7. Place cuttlefish mold and ceiling tile backing together, tops even, ensure flat fit all around, and secure with masking tape. Any gap between mold and backing could allow molten metal to escape!!

Carving Design:

1. When doing an impression casting – pushing items into the cuttlefish never lay the mold on the table because it will break in half. Always hold the cuttlefish in your palm.
2. Letters and Numbers have to be carved in backwards – since you are working from the back side of the finished design. Trace design on paper and flip over to lay over mold and transfer
3. Knitting Needles since they have smooth edges and a point like a pencil are great to use for drawing the outline of your shape. Also use to rub back and forth on edges or small areas to smooth.
4. Clay tools with wire shapes on end of tool are great for scooping out large areas in the mold.
5. Tubing is great to make a round bail or circular designs.
6. Smooth areas to contrast with linear pattern can always be filed on edges or areas which stick up higher after casting.
7. If you want a strong linear pattern brush out design with a paintbrush
8. For smooth areas once pressed DO NOT remove material.

Prepare to Cast:

1. All parts of design need to touch one another for the entire design to cast. Look back over design and ensure small areas large enough to admit the metal.
2. Cut Sprue Gate at top of mold ½ - 1 inch wide on 45 degree angle. Try to "scoop" the area out with smooth edges.
3. Cut the Sprue holding the mold at 90 degree angle the top and bottom on the sprue channel should be the same width and depth. Avoid cutting a sprue which is narrower at the point where it touches the design – this is called a "pinched" sprue.
4. Brush out debris if any with a paintbrush.
5. Trace around cuttlefish with a pencil soft side touching ceiling tile.
6. Cut out ceiling tile with hacksaw blade or coping saw
7. Cut sprue gate out of ceiling tile
8. Tear off long piece of 1" masking tape. Hold tape with thumb and pull with other hand – tape actually stretches a little. Tape around central area at least 3 times.
9. Check to see if mold slides back and forth – if it does the tape need to be cut and tape again. If tape is not tight metal will just go through the bottom and not fill the mold.

Casting:

1. Pewter grain does not need flux added to metal. Melt pewter in stainless steel or Iron ladle.
2. Silver, Gold, Bronze etc.. needs to have casting flux added to the metal. These metals need to be melted in a ceramic dish. The dishes with handles are easiest to use. You will also need a carbon stirring rod to clean off the surface of metal.

3. Metal needed is a guessing game – no worries you can always use the leftover again. If using previously cast metal with new metal the ratio to use is 50 old – 50 new.
4. Melt Pewter metal then turn off tank and pour. Let metal solidify at least 5 minutes or until the sprue button on top is cooled to the touch. Do not LEAVE in mold overnight – ideally just till it cools – I have found students who left overnight it is harder to get casting out of mold.
5. Casting Silver – the surface will turn black with oxidation – it is best to pickle entire casting before cutting of sprue.
6. Lay the crucible on edge of mold before starting to pour, once pouring continue to pour until sprue gate is full of metal.
7. To pour silver the flame must be kept on the metal the entire time you are Pouring – keep the flame on the metal at the lip of crucible while pouring

Removing Sprue:

1. Number 2 sawblades are great for cutting sprues of silver – anything will cut pewter !
2. Remember to cut on the outside of where you want to cut sprue off – Sometimes your sawblade gets caught and pulls in towards your design Before you know it you have inadvertently cut off a part of your design!
3. File and sand area where sprue was cut off.

DIRECT CASTING has been around for centuries. Cuttlefish Bone Molds have been used at least since the 6th century with some of the oldest known examples being cuttlebone cast buckles found in Germany, that's 1,400 years ago! During the Renaissance Period 1300-1600 cuttlefish bone was regularly purchased by goldsmiths in Italy. Cuttlefish Bone Casting is still popular being widely used by jewelers around the world and taught in many beginning jewelry classes. Tufa stone, a porous volcanic rock, has been utilized in the same direct casting method for many years by Navajo Indian metalsmiths and other Native American Artisans for casting. Steatite has an even longer history of being used for direct casting with the earliest known examples from the Late Bronze Age and the earliest Roman Republic period. That's around 2,500 years ago.

In our one day casting class we pressed and carved into our molds to create a depression or design down into the mold and then put a back plate on to make a two piece mold. Then we poured molten pewter into the cavity to create the resulting casting. Other metals can be used with this technique such as Silver which melts at 1640 degrees F, and Gold which melts at 1945 degrees F. For our short class it was easier to use pewter since it melts around 500 degrees the mold does not get burnt out and just in case your casting was not complete you could tape it back together and try again. Also, since you can melt pewter with a propane torch it melts much easier and faster than other metals. Pewter is a very affordable metal which makes this method a great way to make jewelry without spending a fortune!