ceramic carving tool techniques

bringing the ceramic surface to life

Ceramic Carving Tool Techniques

Bringing the ceramic surface to life

One of the best ways to make a piece of clay work your own is to literally put your mark on it. In Ceramic Carving Tool Techniques: Bringing the Ceramic Surface to Life, you will learn to go further, bringing the form and surface of your work together into a signature style using a variety of carving tools in combination with carving techniques like sgraffito, etching, wire-cutting, relief carving and more.

Advice on the Best Tools for Carving, Cutting, Scratching, and Slashing Clay

by Robin Hopper

No matter how you want to approach the surface of your clay work, knowing what tool work best for each job—or even what tools are available—is a great way to get started.

Scratching the Surface: Carving Intricate Sgraffito Designs for Color and Depth

by Wayne Bates

Even the simplest clay carving techniques can yield complex results with a little planning and ingenuity. Adding and altering layers of information will help to build a surface that will expand your visual vocabulary.

Carving Low-Relief Surface Designs into Wet Clay

by Ann Ruel

Relief carving can truly blur the line between form and surface. Carving a surface to the point of removing parts of the form creates textural depth and striking visual effects. It can be time consuming and challenging, but careful planning makes the final product worth it!

Advice on the Best Tools for Carving, Cutting, Scratching, and Slashing Clay

by Robin Hopper

An infinite variety of graphic marks can be made in soft clay through the use of a wide assortment of knives, forks, scalpels, welding rods, wire-ended or wooden modeling tools, sticks, bones, awls, needles, saws, wires, kitchen utensils and just about anything that can be creatively employed to produce an image, mark or sign. The nature of working with tools is such that artists usually develop favorites that seem to become extensions of their hands. Most potters and ceramic artists I know seem to have boxes of tools selected or made for specific processes of surface enrichment. They invariably are seeking the one tool that will out-perform all others, feel better in the hand or just be more pleasurable in use. Tools either can be purchased or found objects. In sensitive hands, sometimes the most unlikely looking implements give the greatest results. Almost any tool takes time to give out its secrets for best use, so continued play or exploration of potential is a given if you want to use tools to their optimum level. Slight variations of pressure, twist or movement can produce or reveal the most amazing complexity of marks from even the simplest of tools.

Tools and Methods

The tools that seem to perform best with either soft or leather-hard clay—the states where most slashing, scratching, carving and cutting is done—are primarily tools with sharp points or edges. Clays generally are abrasive, finely granular materials that quickly will take the edge off of softer metal tools. Most cutting tools perform best when kept sharp. The types of material used for ceramic tool making varies from fairly soft alloy metals to knife-quality steel and beyond, into tungsten carbide, a fine, very hard crystalline material.

The price of the tool often will indicate the quality. The better the quality, the more efficiently it will do the jobs required of it. Inexperienced clay workers often blame themselves for problems caused by tools that are inadequate for the job. Potters' tools that are packaged as beginner sets often make an already difficult process more so with unsatisfactory tools that quickly become dull from abrasion, causing unwanted "chattering," or bouncing, of the tool on the clay because it is too dull to cut properly.

Cutting and scratching tools.

Wire cut harp.

Photos (unless otherwise noted): Judi Dyelle

The best tools are usually individually handmade by small companies that understand exactly what the potter needs from personal experience and discussion with the people who use them. Tools made from high-quality knife steel, such as those made by Dolan Tools, will outperform soft metal tools and keep an edge against the abrasive qualities of clay for a long time. Knife steel easily can be sharpened with a file to maintain a sharp cutting edge.

The best and most long-lasting edge on pottery cutting tools is provided by tungsten carbide, a material considerably harder than steel. Even though it is very hard, crystalline tungsten carbide is extremely brittle, and tools made from it should be used carefully. Avoid dropping these tools on hard surfaces, as they may break. Tungsten carbide tools are usually individually handmade by small companies, such as Bison Tools. Although more expensive than metal tools, the cutting quality of tungsten carbide tools is much better. They are even capable of trimming and cutting through bisque ware! Should they require sharpening, they can be returned to the company.

For the serious potter, tungsten carbide tools are probably the most satisfactory tools, turning what was often mundane work into sheer pleasure.

Buy the best tools you can afford, or make your own using the best materials you can afford.

Photo: Eva Heyd

Marc Leuthold's *Wheel, Anagama Series*, 20 in. (50 cm) in diameter, 2 in. thick, wood-fired stoneware, 2002.

Cutting

The way clay cuts depends on both the state of the material and the cutting tool. As a general rule when using knives and scalpels, the stiffer the clay, the more easily controlled the cut, and the softer the clay, the more resistance there will be to the cutting tool. Clay tends to cause the knife blade to drag by sticking to its surface.

Wire Cutting

The potter's wire is much more than a tool for separating a thrown pot from the wheelhead or throwing bat. It can be simply a flexible wire with a handle at each end, or it can be fitted into a handle similar to a small woodworker's bow saw and tightened to form a rigid cutting edge. Such a tool can have numerous interchangeable plain or twisted cutting wires to give a wide variation of possible cuts.

The twist wire shows multiple cuts that pick up on the features of the glaze, emphasizing the thick and thin qualities. Twisted wires with a much greater textural emphasis can be made from sprung wire curtain rod, which is often used for stringing kitchen curtains and is usually covered with a plastic coating. This can be found in old-fashioned hardware stores. After removing the plastic coating, the wire can be gripped with needle-nosed pliers and stretched to create a variety of wavelike patterns of grooves. Pulling this type of wire through soft clay and moving it from side to side will give a surface evocative of sandy beaches after the tide has receded. Using the process of slab making by throwing a block of clay on a hard surface, wire cutting it into slabs and pulling and stretching the sheets of soft textured clay on a hard surface allows for a great variety of expanded patterns.

Carving

Surface carving is usually done best with a variety of tools—from knives and gouges to wire-ended modeling tools—when the clay is leather-hard. The thickness of the objects to be carved should be considered carefully early in the process.

Surface Expansion

Creating linear images in soft slabs of clay or in soft thrown clay cylindrical forms and then pushing from beneath or inside the thrown form allows expansion of the image and textural development at the same time. Spraying or brushing the surface with a solution of sodium silicate and quick drying it with a blowtorch or heat gun while leaving the underside or inside of the form quite soft will produce remarkable surface textures when the clay expands from beneath or inside. Often resembling aged, tooled leather, these textured surfaces react well with thinly sprayed colorants or glazes or when fired in wood, salt or soda firing kilns.

Fluting tools.

Fluted pitchers, bisque fired.

Tearing

Ripping clay is best done when the clay is soft leather-hard. At this state it is easier to grip without sliding and to either gently tease apart or vigorously tear, depending on how you want it to look or feel. Clay often has a will of its own when being ripped, and sometimes a few guiding pinpricks along the tear line makes control somewhat easier.

Fluting

Fluting is the process of cutting decorative grooves into a clay surface. It is best done on leather-hard clay with wire-ended modeling tools of various shapes, bamboo tools with sharpened edges or metal tools with cutout sections and/or sharpened edges. If the clay is too soft, it may deform the object being fluted; if it is too hard, it may crack the surface or edges of the object. Fluting generally is done in a dragging motion, pulling down toward you in a clean, sweeping motion. The clay will cut cleanly and evenly at this stage if your tools are sharp. If the clay has started to change color or the surface is starting to dry, the tool is more likely to slide uncontrollably than cut easily. Unless you want loose grooving of the surface, fluting is a meticulous and time-consuming process.

On a round form, some people mark out exactly how many strokes are needed so the last and first strokes will be equally spaced. Others do it by eye, allowing the spacing to expand or contract as the last few cuts are made.

Fluting often leaves a burr at the edge of the cut mark. If this is undesirable, it can be removed in the leather-hard state with a damp sponge, or in the dry state with a soft, abrasive pad, such as a softened kitchen scouring pad.

Fluting doesn't necessarily have to be deep to be effective. The final quality of this type of mark usually lies with the glaze used over the top. If high-temperature fluted porcelain is covered with a transparent or translucent glaze such as a celadon, the fluting can be very shallow yet still visible because the glaze pools in the slight depressions, giving a variety of tones. Deep fluting is perhaps most effective with high contrast glazes, where there is a strong variation in color from thick to thin and the thinning glaze emphasizes edges dramatically. High iron content Tenmoku glazes that are dark brown to black when thick and almost orange when thin are a good example of high-contrast glazes.

Fluted surfaces often are enhanced greatly by wood, salt or soda firing. With suitable glazes, fluted surfaces can be further altered by sandblasting (see Chapter 19).

Pineapple or Crosscut Fluting

Another traditional form of fluting uses cuts in opposite directions, either diagonally, or vertically and horizontally. This generally is known as pineapple, or crosscut, fluting in reference to the diamond- or square- shaped protru-

Photo: Emu Goto

Rachelle Chinnery's *Flores Series*, 14 in. (35cm) in length, carved porcelain, cast bronze base, 2003.

sions left from the original surface. As described above, all fluted objects play beautifully with glazes across their surfaces, emphasizing edges and depths by various color or texture changes.

Faceting

Faceting is done by cutting the clay surface into a series of wide, flat planes. Cutting wires, large knives or carpenter's blades are often used for faceting, and the process is best done on clay between the soft and leather-hard states. Since faceting emphasizes flat planes and edges, it will be enhanced by glazes and the firing processes described for fluting.

Sgraffito

Sgraffito comes from the Italian word for scratch, and it describes the process of making marks by scratching designs into surfaces. The tools used for sgraffito are basically anything with a sharp point. A personal favorite of mine is a 9-inch length of welder's brazing rod ground to a point or chisel shape, then sanded smooth. The rod has a good heft in my hand, and it has a short length of rubber tubing to enhance the grip.

Sgraffito can be done directly into the clay, through a layer of slip or pigment or even through glazes. For artists who enjoy the drawing process, sgraffito is similar to drawing on paper with pen and ink or hard pencil. Sgraffito drawings made directly into the clay can be further enhanced by filling the lines with ceramic colorants. The colorants can be applied as a solution with water, then cleaned of the excess with a fine scouring pad. Or they can be applied with a ball of cotton wool and powdered color.

Since sgraffito processes often cause considerable dust, it is recommended that you wear a dust mask. Sgraffito through slips, engobes or underglazes into the body is best done at leather-hard through dry states. Sgraffito through the glaze and down to the bisque usually produces the best results when the glaze is still damp. A colored slip coating on the object before bisque firing often gives greater emphasis to the drawn design, particularly when it contrasts with the glaze color. Glazes for use with sgraffito processes should have at least 10 percent clay content to prevent possible crawling problems caused by glaze loosening from the bisque surface in the scratching process.

Saw Blades, Cut Kidneys and Texture Tools

Saw blades; sections of saw blades; flat, metal kidneys with toothed edges; or notched tile installation tools all make great tools for producing sweeping multilinear marks, particularly on soft clay. As with the fluted surface, the marks made by toothed tools are greatly enhanced by many glazes and firing processes. Broken hacksaw and band saw blades can be recessed into wooden handles to make them easier to use. To increase the variation in the linear markings, some teeth can easily be removed with a file or carborundum grinder. The marks can be thought of as miniature fluting, done in a single sweep or movement.

Piercing

Piercing, or perforation, can be done with fine knives; metal tubes, usually brass; drill bits for wood or metal; or small, shaped brass tubes with retractable springs that push the cut pieces out of the tube. Timing is of the utmost importance when doing this type of work. If the clay is too soft, the object will deform or warp in subsequent firing. If it is too stiff, it likely will crack under the pressure of the piercing tool.

Fine filigree piercing also can be done after bisque firing when there is less likelihood of risk from breakage. Fine tungsten-tipped drill bits can be used in small Dremel or Foredom type drills. There likely will be a considerable amount of dust, so it's a good idea to wear a safety dust mask and glasses.

Cleaning

Any of the previously mentioned processes that create dust should prompt you to carefully clean the piece before firing or before glazing to prevent glaze application problems caused by dust or loose particle buildup. Crawling is the most serious of these problems. Small, stiff, coconut fiber brushes are available in multiple sizes in ceramic supply stores and are invaluable for cleaning such surfaces.

Scratching the Surface:

Carving Intricate Sgraffito Designs for Color and Depth

by Wayne Bates

The word sgraffito is derived from the Italian word graffito, a drawing or inscription made on a wall or other surface (graffito also gave us the word graffiti). Graffito is past participal of sgraffire, which means "to scratch." So the word sgraffito basically means to scratch and create a graphic or an image. In ceramics, sgraffito is a technique of ornamentation in which a surface layer is incised to reveal a ground of contrasting color.

I use sgraffito to get a clean line without masking or rulers, and I do more cutting than scraping. I use a handmade tool that is thin and cuts smoothly. I cut when the piece is stiff leather hard, which makes straight lines possible. If the piece is bone dry, the cut will be jagged and brittle. If the piece is too soft, the tool raises the edge of the cut and makes a higher ragged edge.

If your clay has grog in it, or anything coarser than fine sand, you won't get a smooth cut. I use a rubber-tipped air tool and a soft cosmetic brush to blow or brush off the cuttings. The cut pieces are still moist enough to stick if you touch them to the surface, so they should be removed frequently. You can use a thin coat of wax resist to protect light-colored areas from dark cuttings. The wax resist will burn off in the bisque.

Most of my engobe colors come from commercial glaze stains although not all commercial stains will work, but if you think of engobes as being closer to glazes than slips, additives can help produce the right colors.

I use a matt and a shiny glaze to cover the engobes on the face of the pieces.

I spray very wet, as if I'm pouring on a small stream of the glaze or engobe on the piece. The engobe sets quickly because the leather-hard piece can absorb some water, but too much engobe and the piece can collapse. If the engobe is too thick, it makes the color and the glaze crawl. Since the spray adds water to the piece, it must dry to the leather hard state again before it can be carved. When dry enough, store the pieces on cloth on top of plastic, and place cloth over them to prevent condensation from the plastic marring the color.

First I create the center spiral and circle using a foam rubber chuck on the wheel. All the other lines are done freehand on a banding wheel (*figure 1*).

The scraping of the larger white spaces is done last, when the piece is even harder. I try to take off only the layer of color (*figure 2*). I use the tool tip to make a sort of ditch that you can scrape to or from to make the larger white areas. I use the flat side of a rib to make the larger cuts.

There will be some edges that can be felt, and glazes will break away from these edges, but the glaze will fill in to make it smoother than when cut. Small nicks and cuts can be patched, but the spray overlaps are very hard to color match, so it is best to avoid mistakes! When almost bone dry, use 0000-grade steel wool to lightly smooth some of the cuts and to remove small bits of color.

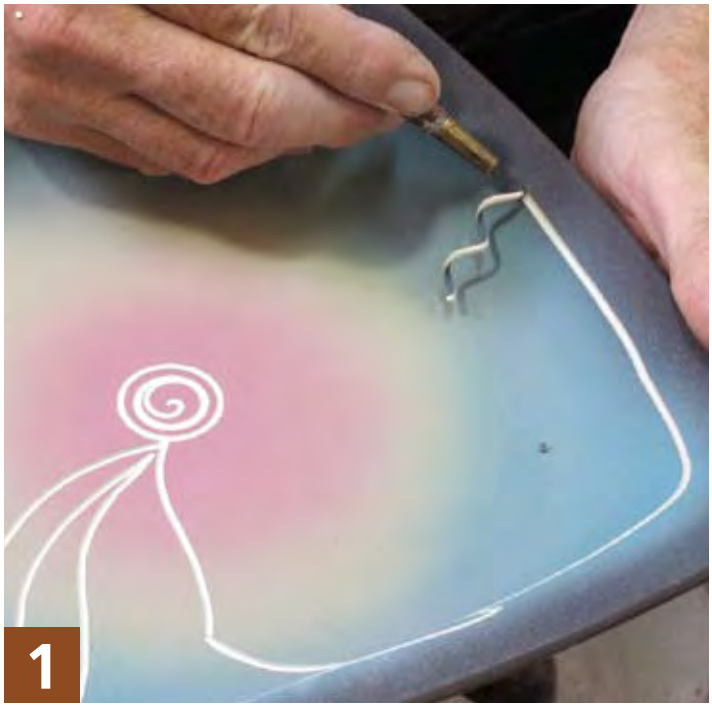
Plates, 10 inches square, sgraffito decoration with clear glaze, fired to cone 5.

Cross-hatching is another way of exposing the white of the porcelain and is done with a serrated-edge tool (*figure 3*). I add black dots of engobe using a squeeze bottle. When all the carving is done, the piece is air-dried then bisque fired, then a clear satin matt or a shiny glaze is sprayed on the front and solid color glazes on the back.

CAUTION

Overspray is hazardous. The engobe spray contains silica, which can be harmful if inhaled. Wear a mask, and make sure your booth has an exhaust system.

I use an automotive-detail-type spray gun to apply engobes and glazes. It has a smaller fan size than the full-size gun, has good volume and is much faster than an airbrush. It's a high volume/low pressure (HVLP) gun and it produces less overspray. I use a large HLVP spray gun for the cover glazes because of its high volume.



Place the platter on a foam rubber chuck on the wheel and create the center spiral as the wheel turns. Move the platter to a banding wheel and work freehand.

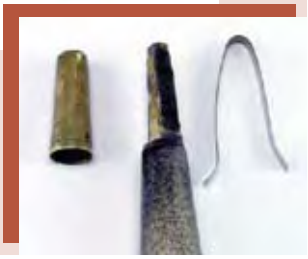
Scrape off large areas last using the flat side of a rib.

Cross-hatching is done with a serrated tool.

Tools

My sgraffito tool tips are made from the main spring of a pocket watch. The spring metal is thin and strong, doesn't have to be sharpened and keeps the same feel as it wears away. To make the tip, cut a piece of spring, heat it with a small torch and bend it to the shape you want. A small rounded point is used for the line cutting tips, and a broader rounder tip for large cuts. Glue the tip with white glue into the brass ferrule of the trimming tool and allow it to harden. Lightly heating the ferrule softens the glue and the ferrule can be removed and another tip glued into the tool. For ribs, cut them with tin snips from sheets of metal and flatten the edges, making two square edges for scraping (do not sharpen the edges). You can also cut serrated-edge ribs with the snips.

Assorted tools used in sgraffito.



Detail of trimming tool with ferrule removed and watch-spring cutter formed to desired contour.

Recipes

Sgraffito techniques can be a lot of fun, especially with a large color palette of engobes. Most of my colors come from commercial glaze stains. Frits, fillers and retardants are added, depending on the colorant used. The following engobes are mixed with Mason stains.

Engobes

UBL-45 Black

C&C Clay*	50 %
Ferro Frit 3195	20
Black #6600	30
	100%

UR-31 Crimson

C&C Clay	50 %
Ferro Frit 3134	20
Wollastonite	10
Crimson #6006	20
	100%

UG-35 French Green

C&C Clay	50 %
Ferro Frit 3134	15
Wollastonite	10
French Green #621	25
	100%

UB-18 Teal Blue

C&C Clay	60 %
Ferro Frit 3134	30
Teal #6305	10
	100%

UY-38 Hot Yellow

C&C Clay	50 %
Nepheline Syenite	10
Ferro Frit 3134	10
Wollastonite	10
Yellow #6481	20
	100%

*C&C clay is a ball clay. If not available, another ball clay may be used, but the results may vary. Although formulated for cone 6, many of these will work at higher and lower temperatures.

Glazes

The following glaze recipes can be used over the engobes, but they can also be tinted with stains.

R-1030 Satin Matt*

Cone 5

Barium Carbonate	11 %
Wollastonite	15
Ferro Frit 3134	19
Nepheline Syenite	33
EPK Kaolin	16
Silica	6
	100%

Similar to R-1015 but lower temperature. Will go shiny if fired higher. Top of my kiln.

R-1012 Satin Matt*

Cone 5

Barium Carbonate	11 %
Whiting	12
Ferro Frit 3134	17
Nepheline Syenite	44
EPK Kaolin	7
Silica	9
	100%

Similar to R-1015 but lower temperature. Middle of my kiln.

R-1015 Satin Matt*

Cone 6

Barium Carbonate	16 %
Wollastonite	15
Ferro Frit 3134	13
Nepheline Syenite	33
EPK Kaolin	14
Silica	9
	100%

G-19 Shiny Clear

Cone 6

Wollastonite	30 %
Ferro Frit 3195	30
EPK Kaolin	20
Silica	20
	100%

Color friendly base, will produce shiny versions of most of the Mason stain colors. Can be used as a liner glaze, unlikely to produce leaching.

Frosty Matt

Cone 6

Barium Carbonate	22 %
Lithium Carbonate	5
Nepheline Syenite	60
EPK Kaolin	8
Silica	5
	100%

High alkaline, distinct color characteristics, crystalline sugar like surface, turns copper turquoise, brightens most colors.

*Contains barium. Can produce leaching when used with heavy metals. No claims made for success or safety.

Carving Low-Relief Surface Designs into Wet Clay

by Ann Ruel

The process of carving breaks down into two basic categories: low and high relief. You may choose to incorporate additive or subtractive techniques to create relief ranging from sgraffito to sculpture in the round.

Low-relief describes carving into non-freestanding clay. That leaves the design visually attached to the background area. Clay is removed or added to strategic areas which play with light and shadows, thus creating an illusion of superficial depth across the clay surface. High-relief carving describes undercutting design elements so they appear to detach from the background space. Further, it may also incorporate sculpted clay added to certain areas on top of the background to create added depth.

Basic Considerations and Design Transfer

Consider the entire piece from top to bottom and develop a successful strategy from beginning to end. Know how the piece will be used. This question is important if your piece will hold liquids or be subject to a lot of handling. Adding clay to the outside of a mug increases its bulk and may not be a good choice. Remember that users need a comfortable place to rest their fingers and a smooth rim for their lips. Keep the inside of the mug or bowl free of crevices so it can be cleaned easily.

You can draw a freehand design using a pencil to lightly sketch the outline onto a moist clay surface (*figure 1*). Mistakes are easily erased by gently smoothing over the top of the unwanted mark with a slightly wet finger.

Computer clip art or line art is very easy to transfer to the clay surface. Print out your design and cut away the excess paper around the design. Press the design face down against your vessel and gently rub the paper until the ink is transferred to the clay (an Inkjet printer will give the best results). Keep in mind the design will be reversed on the clay surface (*figure 2*).

Another option is to draw your design on a piece of paper and cut around the outline. Place the paper on the areas where you want to transfer and use a pencil or sharp edged tool to lightly trace around the shape.

If you plan to carve multiples of the same shape, carving a stamp is a good idea. To make the stamp, I use a rubber eraser or a cut square of print block material. Draw or transfer your image on the stamp. Keep in mind that your image will be the reverse once imprinted. Carve your shape with an artist's gouge carving tool. This and the print block can be purchased at an art supply store. While the clay is fairly wet, place the stamp where you want your carving to go and gently push the stamp to create your outline.

Figure 1. Draw the design on the surface with a pencil tip or a sharp edged tool. Keep the elements simple without adding any detail at this point.

Figure 2. To transfer a printed image, lay it ink side down onto moist clay. Gently rub the design to moisten the paper. The moisture from the clay loosens the ink, transferring it to the clay.

Carving tools from bottom to top: needle tool, several sizes and various shaped loop tools, curved blade of a clean up tool.

Carve away negative space from the design elements. Create a variety of levels by shaving down design elements that should appear to recede below the more prominent foreground elements.

A finished carved piece. Don't worry about the burrs at this point, when the piece is leather hard I use my curved clean up tool to gently knock them off. To avoid cracking, cover the piece with plastic until it is dry.

Carving Tools

Pottery supply stores sell many types of carving tools you can use to achieve the results you want (*figure 3*). The needle tool is very handy for cutting into tight corners. A variety of different sized loop tools can be used for extracting negative space areas. Beveled edges are easy to carve with the right size ribbon tool. Finally, for undercutting, texture and cleanup, the curved side of a double headed clean up tool works well.

Plan Ahead

Success depends on the careful planning of your object, a systematic method of extracting the clay, and a slow drying time. It's important to remember the more clay you cut from the body the more delicate the piece may become. If it's a tall cylinder, begin cutting away from the top to avoid having the piece collapse due to a weak bottom and heavy top.

Carving Techniques

To achieve the look of low relief, draw an outline onto the clay surface. Keep in mind that the area within the outline is the positive space and the area outside the outline is the negative space. Carve away the negative space areas with a loop tool. Don't worry that your cuts are exactly at the same depth. A variety of different length and depth cuts enhance the illusion of mass. After the negative space is cleared away, examine the design. To create the illusion of perspective, first decide which objects will be in front and which will need to appear to recede. This may be as simple as overlapping some objects over others or deciding that the smaller objects are further back in space. Once you have your plan, begin to shave just enough clay from the areas where the shapes overlap so the one in the visual foreground is physically higher than the object that should appear behind it. You will also want to shave clay from any of the other objects that will be receding into the background.

Undercutting techniques create pieces with even higher relief areas. Instead of completely cutting away clay from underneath the edges of the design element, use the curved side of the clean up tool to gently separate the edges of the element from the background. This leaves extra clay on the positive areas, adding depth and leaving more material on which to add detail. Use other tools to add texture and detail to the design elements that need it. Remember, texture is easier to see on objects closer to you than objects farther away from you (*figure 4*). In other words, the addition or elimination of detail can also be a way to create depth in your carving (*figure 5*).

Timing and Drying

Timing is crucial with this process. If your clay is very wet when you begin carving, it may not have enough strength to hold its shape and the clay around the cuts will sag. If you attempt to make the cuts when the clay is too dry, the clay may crack or chip. If you have a large piece that is taking a considerable amount of time to complete, cover the areas you aren't working on to keep them wet and avoid cracking and unusual stresses. Try to dry the piece very slowly due to inconsistent thicknesses created by carving. Clay walls with varying depths will dry at different rates and have an increased chance of cracking. Place several sheets of plastic loosely around the piece and leave it until it is totally dry.

Ann Ruel is a potter currently residing in Chesapeake, VA, and a member of the Ceramic Designers Association of Hampton Roads. Her work is shown and sold in galleries across Virginia.

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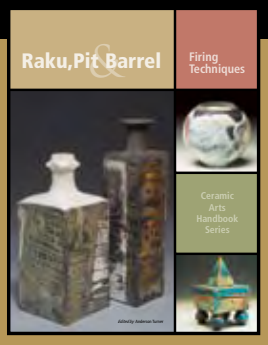

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