master class

How to sculpt a contemporary piece

SYMMETRY IS THE GOAL AND SMART LAYOUT IS THE SOLUTION

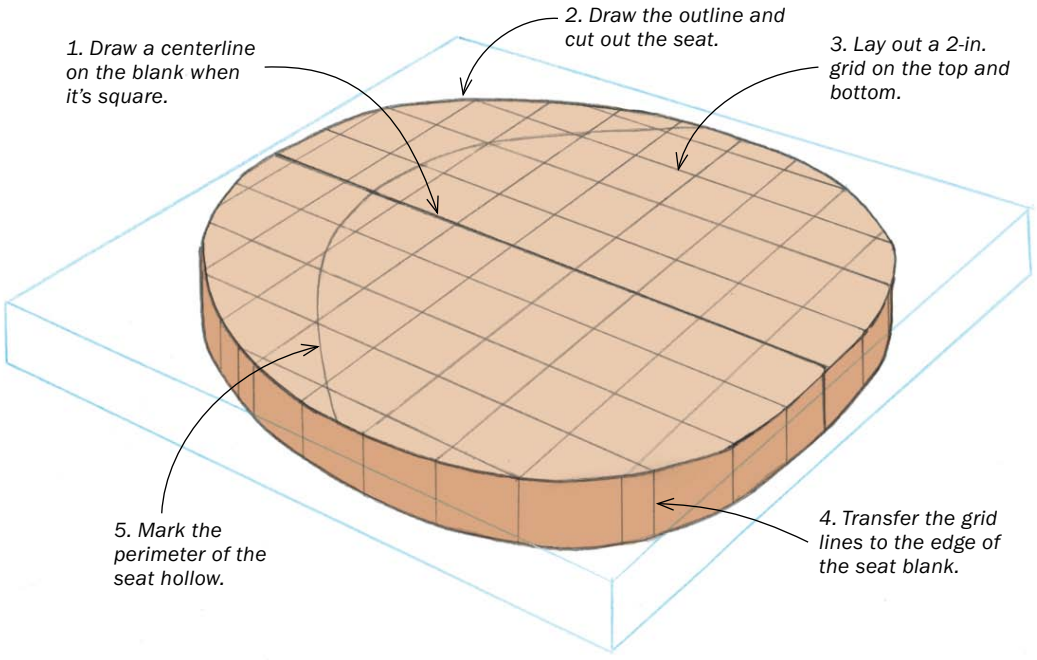
BY DANNY KAMERATH

Many of the chairs I make have shaped parts, and I've learned that they should feel as good as they look. Over the years, I've tried many tools and techniques and the ones I use now are the most efficient way to make shaped chair parts that are attractive and comfortable.

My layout tools are important, because they help me get a symmetrical shape. I use plastic vellum, a flexible ruler, a drafting triangle, a compass, and a pencil. The technique can be broken down into three steps: First, I rough out the shape at the bandsaw. Then I use an angle grinder equipped with a coarse disk called the Holey Galahad (katools.com, No. 47851 RCB) to shape the concave and convex surfaces. I follow that with a power sander and various grits of sandpaper, a coarse file, and sanding blocks to refine and smooth the curves.

Sculpted seat is a good example

It is difficult to make a symmetrical seat without some help. The grid creates intersections where you can check on both sides of a centerline for irregularities.



Draw the outline first. *Use a template to guarantee symmetry. Kamerath makes his by folding a piece of vellum (available at art-supply stores) in half and cutting the shape. The fold aligns with a centerline drawn on the blank.*

Photos, except where noted: Matt Kenney; this page (top): Danny Kamerath

I should note that this is a loud and messy process. I always wear safety glasses, a dust mask, and hearing protection. I also wear a pair of heavy leather gloves and tuck in my shirttails. Finally, I work outside when the weather permits. If I'm stuck inside, I set up a dust collector and large shroud to capture as much of the fine dust as possible.

Bandsaw defines the perimeter

Start by milling a piece of lumber for the chair seat flat and square. Next, draw a centerline along the grain on both faces and both ends to help keep the seat symmetrical.

Now fold a large piece of vellum in half and draw the shape of half of the seat on it. Cut out the shape and unfold the vellum for a perfectly symmetrical pattern for the whole seat. Place it on the seat blank, lining up the fold in the paper with the centerline on the blank. Trace the shape onto the blank.

Cut just proud of the line at the bandsaw, then sand down to the layout lines, taking great care to keep the curve smooth and remove all of the flat spots. This is an important step, because all the grinding in the world won't make up for a curve that starts out with flats. Here's how I do it: I stop often and check my progress by holding the curve at eye level and looking for flats. I also quickly run my fingers along it. Their sensitivity makes it easy to find flats in the curve. Mark the flat spots and then continue to sand until they're gone. Then drill holes for the back and legs at the drill press.

Draw a grid across both faces of the blank. The lines should be perpendicular to the centerline and spaced about 2 in. apart. Connect the lines on the faces with lines on the edges.

Finally, draw a circle on the top of the blank to act as a reference for shaping the concave side of the seat. For this chair, the circle has a diameter of 12 in. and is located 1½ in. from the center of the mortise for the seat post.

Make a grid on the top and bottom. *For the lines perpendicular to the centerline, Kamerath uses a drafting square registered to the straightedge, which he clamps to the blank.*

Mark the perimeter of the hollow. *Kamerath's compass is left over from his days as a graphic artist, but a beam compass would work just as well.*

Grinder scoops out and rounds the seat

The bandsaw works great for shaping wood along its edges, but it can't round or hollow the broad faces of a seat blank. I use a 4½ in. grinder for that.

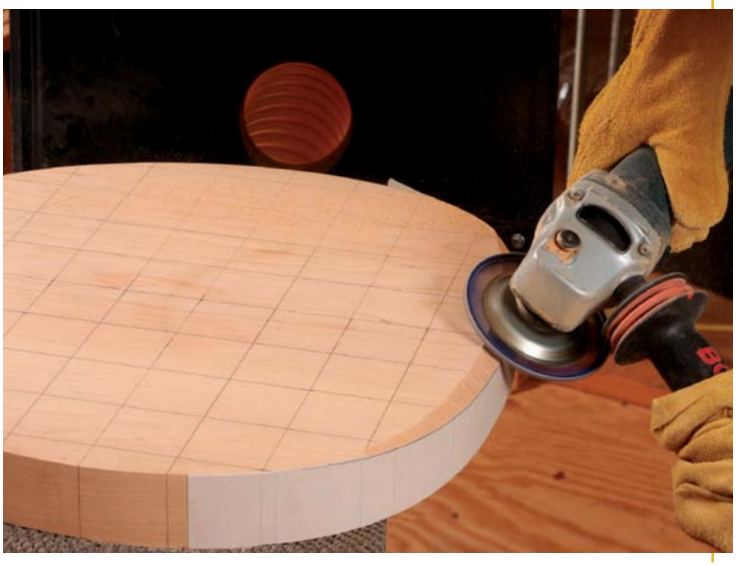
To get started, attach a strip of vellum to the front edge of the seat blank with spray-mount glue. The vellum should be as wide as the blank is thick and cover the front half of the edge. Draw a curve on the vellum. On this chair, it is level with the top on the sides and ½ in. below the top at the centerline.

Grind the curve into the edge of the blank with the grinder and a coarse steel wheel. At this point, peel back one half

Top: Start with the edges

For the sake of comfort, you need a gentle and smooth curve on the top front corners.

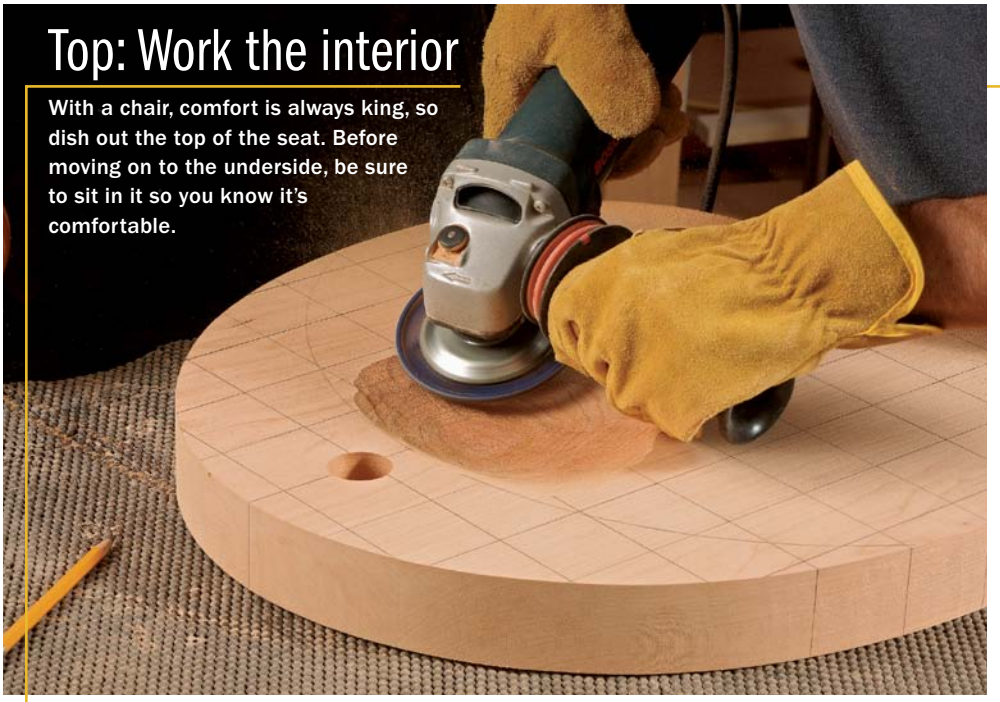
Lay out a relief on the front edge. *Draw it on a piece of vellum glued to the blank temporarily with spray adhesive. Then use an aggressive grinding disk (Kamerath uses the Holey Galahad coarse disk from King Arthur's Tools; katools.com) to grind to the line. After grinding the relief, fold the vellum over on itself to check for symmetry.*



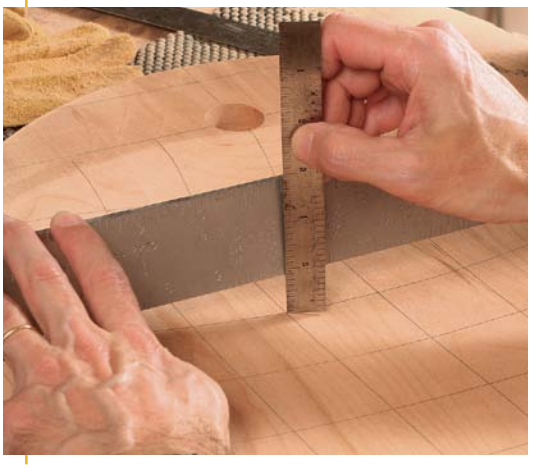
Drawings: Kelly J. Dunton

Top: Work the interior

With a chair, comfort is always king, so dish out the top of the seat. Before moving on to the underside, be sure to sit in it so you know it's comfortable.



Start with the grinder. *It makes a big mess, but most of it can be caught by a large dust hood hooked up to a dust collector. Then sand the hollow with a P60-grit pad on a random-orbit sander (above) to remove the marks left by the grinder.*



Redraw the grid. *Use a flexible ruler that follows the curve of the hollow. Check for symmetry by measuring at the intersections. Mark the high spots and take them down with the random-orbit sander. Then sand up through P220-grit.*

of the vellum, fold it against the other half, and check them against one another. Look for spots where the edges of the two halves don't line up with one another and use a pencil to mark the lower edge on the higher one. Re-glue the vellum and grind the high spots to match the low ones.

Now hollow out the rest of the seat top. Grind a slope from the front to the back that reaches its deepest point, 7⁄8 in., about 3 in. from the chair back. At that point, it rises more steeply to meet the back of the circle drawn earlier. Also, grind a shallow curve across the width of the seat. Replace the steel disk with the sanding disk and smooth the hollow.

As you are grinding and sanding, be careful not to remove the layout lines around the edge. They're used to check for symmetry. Here's how to do it. First, use a flexible rule to redraw all of the lines, including the centerline. Then lay a straightedge over the lines. Starting at the centerline, move out along the layout lines and measure from the bottom of the straightedge to the seat. I do this about every inch along the layout line, on both sides of the centerline. If you find two spots that aren't symmetric, use a random-orbit sander with P60-grit sandpaper to take down the high spot. Repeat this process over the entire seat.

Now is a good time for a break, so put your seat in your just-shaped chair seat. How does it feel? There shouldn't be anything poking you or any noticeable dips. If it fits your anatomy and you find it comfortable, then it will be fine for others, too. If there are a few uncomfortable spots, work them with the grinder and coarse sanding wheel.

After your break is over, turn the seat over and work on the convex bottom. The idea here is to lose visual weight, so start with the coarse steel wheel and round over the edges. Work your way back toward the center, but stay clear of joint locations. And leave enough of a flat near the centerline to

Flip the seat and shape the bottom

You don't have to worry about comfort here, just looks. Leave the area around the leg mortises flat so the shoulder on the legs makes good contact.

Grind a curve onto the edge. *Kamerath raises the seat blank on a block of foam so the grinder doesn't dig into his bench (above). Check for symmetry after redrawing the grid, marking the high spots with a pencil (right).*

File the high spots. *Use a coarse, single-cut file. Be careful to blend them into the surrounding area without creating any hollows.*

rest a straightedge on. After you're done grinding, use the straightedge to check for symmetry as you did on the top side. I use a large, coarse file to knock down any high spots, because it's easier to finesse the curve with it than the grinder.

Smooth all of the surfaces

With all of the shaping done, it's time to smooth the surfaces for appearance. Start with the top of the seat. Use the random-orbit sander and start with P100-grit paper. Sand the entire top, but be careful around the edges. You want them sharp for now. (They'll get slightly rounded over as a final step.) Then repeat the process with P150- and P220-grit paper. Finally, use a foam sanding block and P220-grit paper to remove any swirl marks.

After you're done with the sanding block, run your fingers over the seat to check for flat spots. If you find one, sand with the foam block and P220-grit paper until it feels right. Then sand the entire top with the foam block and P320-grit paper.

Next, sand the convex side of the seat using the same tools and grits as for the concave side. After the chair is completely assembled, sand everything with P400-grit sandpaper.

I shape the chair back with the same techniques. However, I don't start with a single blank. Rather, I start with a square spindle and turn a tenon on one end. I then glue a square blank onto both sides of the spindle at the opposite end. □

Danny Kamerath (dannykamerath.com) designs and makes furniture in Texas.

TIP

FOR THE BACK: TURN A TENON, THEN BUILD UP THE BLANK

The back has a round tenon that fits into a round mortise in the seat. Turn it on a narrow post and then add pieces to get a blank that's roughly the right shape.

Glue the three parts together. *After turning a tenon on the narrow center post, glue a "wing" to both sides.*

Rough out the shape. *From here, the shaping process is identical to how you made the seat.*