The Three leg Natural Edge Bowl



"A Woodturner's Wonder" Big leaf maple burl measuring 22" W x 19 H

Turned and carved three-legged pieces can be challenging and are a lot of fun to make. The shape and design of a turned and carved piece can be changed on the fly and any changes in size, shape or design is welcomed. You allow yourself the opportunity to explore unlimited shapes, designs, leg styles, rim design, natural edge, manufactured rim, closed form, open form, big and tall or short and squatty forms. For this document I have turned a closed form natural edge three leg bowl.

The majority of the turning on this project is done using a ¹/₂" bowl gouge. I do use a ¹/₄" detail gouge, a power sander, 80, 120, 180 and 220 grits sandpaper and CA glue. The carving disks used are the Holy Galahad 4 inch disks made by King Arthur Tools that mount to a 4 ¹/₂" grinder. King Arthur makes four different grit disks in two different profiles, however, you will only need item #47871, a flat coarse blue disk. I occasionally use a rotary tool like a Mastercarver or Fordom rotary carver and some carving burrs for finer detailed carving.

Select a fresh cut or "green" piece of wood for this project. A fresh cut piece of wood will be much easier to turn and you will not have to deal with dry cracked wood. This piece will be turned in a side grain orientation. Although this piece will be turned from a large maple burl, I have included several pictures of a piece of straight grain timber so you will have a complete understanding of how the log is cut and how the layout of the bowl is determined. I will also show how to balance the rim of the bowl so that the two highest points on the rim are on the same elevation and the two lowest points are on an equal elevation.



Figure 1

Look at the center of the log and notice the direction of the split or crack in the center or pith of the log. Stay a minimum of 1" to the outside of the center or pith of the tree and, using a straight edge, draw a line from bark edge to bark edge following the direction of the split. (Do the same thing on the other side of the split and you will have two bowl blanks.) If you cut to close to the pith make sure you turn away enough materials to get away from the pith or the bowl may crack during the drying process. Try to use the same measurements on each end of the blank from the top of the bark edge to the line drawn at the bottom near the split or crack. It may be helpful to draw a line from the center of the pith toward the outside of the tree to line up the growth rings once the log has been cut in half as in Figure 1. This will help to make the bowl appear very well balanced.



Figure 2

Cut the log following the previously drawn lines as in figure 2.



Figure 3

After the log has been cut in half transfer the mark from the pith of the tree on the end grain ends to the side grain ends on the flat cut surface. Draw a line connecting the two marks as pictured in Figure 3.



Figure 4

Using a compass put the point of the compass in the center of the line and draw a circle for the diameter of the bowl as in Figure 4. Using a chainsaw remove the corners and excess of the wood outside the circle to round the blank. Once the blank has been rounded with the chainsaw you can proceed with the straight grain blank the same as with a piece of burl that I have selected for this project pictured below.



This is the whole uncut maple burl



Pictured above is the cut blank from the burl. The blank measures 24 inches in diameter by 24 inches tall.



Mount the blank on the lathe between centers using a two-prong spur drive in the direction of the grain. If you are turning straight grain timber keep the spur drive on the previously drawn line on the pith as in Figure 3. As long as the spur is on the line you will end up with an elliptical shape in the center of the bottom of the bowl. Moving the spur off of the line will move the elliptical shape to the side of the bottom of the bowl which is much less pleasing to the eyes and less desirable.

Now you will balance the high points of the natural edge rim. Keep the spur in the center of the blank and on the line and reposition the bark surface at the tailstock side so that the two high points (end grain only) are on the same level when it is rotated. I use the tool rest and measure from the tool rest to the bark surface then adjust as needed. Once the two high points are on the same level you will balance the two low points (side grain only) and get them as close to the same level as possible. Before turning you will need to stabilize the bark surface with CA glue. I glued the entire surface because I cored several bowls out of the blank. Now you are ready to turn the outside shape.

Rough the blank until it is round. Turn the bottom of the blank flat to accommodate a faceplate. I used a 6 inch faceplate and drew a 6 inch circle on the base while the blank was spinning to help align the faceplate. Remove the blank from the lathe, cut off the nub where the spur was and secure the faceplate to the blank. Mount the blank back on the lathe without the use of the tailstock and round the blank so there is no wobble and the blank runs true. Turn out the hole the live center originally made when roughing the blank then bring the tailstock back for support. Now you can increase speed and establish the outside shape of the piece.



After turning the outside shape use CA glue on the outside bark edge of the natural edge to stabilize the outside of the bark rim. On this piece the rim was closed inward excessively for a beautiful yet challenging closed form bowl. I incorporated the leg design into the continuous flowing form and added a small bump out foot at the bottom of the leg design. Now that the outside shape has been established and the bark and outside surface have been stabilized with CA glue, I cored 4 natural edge bowls from the closed form bowl. A center steady was used to keep vibration to a minimum while coring.



Now that the bowl has been cored the hollowing can begin using a ¹/₂ inch bowl gouge. Hollow out the inside of the bowl working from the bark edge downward. Be sure to keep the flute of the bowl gouge facing three O'clock and only make push cuts until you have turned below the bark edge. A pull cut can blow the bark off of the piece even after it has been glued. After hollowing down to below the bark on the inside, stop the lathe and glue the inside of the bark edge of the bowl. Now that the top, outside and inside of the bark edge have been stabilized with CA glue the rest of the hollowing can Continue.

Continue hollowing the bowl to where you would like the top of the legs to begin on the side of the bowl. I draw a line on the exterior of the bowl to mark the location of the top of the legs and another line where the bottom of the bowl will be as pictured below.



From this point you must establish where the bottom of the bowl will be and hollow down to the bottom. You cannot use calipers for this because the side wall begins to thicken gradually as the leg design begins to turn outward and the bottom of the bowl continues inward all the way to the bottom of the bowl. Turn a smooth, transition-free shape from where the legs start on the side wall of the bowl down to the bottom of the bowl. The walls will gradually become thicker by 1/8" to 3/16" more than the rest of the bowl for the carving of the legs. Hollow to the point where the legs begin then gradually increase the wall thickness for the carved legs. Remove material down to the bottom of the bowl so that legs can be carved. Make sure to give your bowl a nice, rounded bottom. Flat bottom bowls are not pleasing to the eye. After hollowing, power-sand the inside (only) of the bowl using 120, 180 and 220 grits and brush on a coat of lacquer mixed with thinner 50%-50% to keep the bowl from cracking and let lacquer dry for two to three minutes.



Remove the bowl from the headstock and remove the faceplate.

Set the bowl down on the bedways of the lathe facing up as it will sit. Now we will determine the amount of wood to remove from the underside bottom of the bowl inside the legs up to the bottom of the inside of the bowl. We will leave the bottom of the bowl's thickness at ¹/₄ inch. Since this bowl is so large I had to set two boxes on the bed of the lathe with a stick from box to box to use as a reference point. I made a mark on the stick where the measurement would be made from. I set the bowl in between the two boxes with the mark on the stick directly in the middle of the bottom of the bowl and measured down from the bottom of the stick to the bottom of the bowl and recorded this measurement of 12 ¹/₂ inches as pictured below.





Remove the bowl from in between the two boxes and measure the distance from the mark on the bottom of the stick to the bed of the lathe as pictured above. This measurement was $17 \frac{1}{2}$ inches. $17 \frac{1}{2}$ inches minus $12 \frac{1}{2}$ inches is 5 inches. This deduction means the bottom of the feet to the bottom of the inside of the bowl is 5 inches. I want the bottom of the bowl's wall thickness to be $\frac{1}{4}$ inch so I will subtract $\frac{1}{4}$ inch from 5 inches which is $4 \frac{3}{4}$ inch. The amount of wood to remove from the bottom of the feet to the bottom of the underside of the bottom of the bowl is $4 \frac{3}{4}$ inches.

NOTE:

For a smaller bowl you will not need any boxes to gain needed height. Place the tool rest next to the bowl with the **end** of the rest over the rim of the bowl and directly in the center of the inside of the bowl and lock the tool rest in place. Use a ruler and measure from the **end** and top of the tool rest down to the inside of the middle of the bowl and record this measurement.

Do not move the tool rest but move the bowl away from the tool rest. Now you will need to measure from the same place on the **end** and top of the tool rest exactly where you measured from for the first measurement to the top of the bedways and record this measurement. If the first measurement was 8 inches and the second measurement was 12 inches subtract the first measurement from the second measurement and you will have the thickness of the inside bottom of the bowl to the bottom of the legs. Our example is 12 inches minus 8 inches equals 4 inches. If you want the bottom of the bowl to be $\frac{1}{4}$ " thick then subtract $\frac{1}{4}$ " from the thickness which would be 3 $\frac{3}{4}$ ". This will give you a measurement of 3 $\frac{3}{4}$ " to turn and carve off of the bottom underside of the bowl inside of the legs.



I installed a vacuum pump, a 10 inch spindle extension and an 8 inch drum chuck on the lathe. The spindle extension was necessary due to the size of the bowl and the depth from the bottom of the bowl to the top of the rim. The bowl was jam chucked to begin the hollowing in between the legs and the tailstock was used for support. The leg thickness started at $\frac{3}{4}$ " at the foot then gets thinner above the foot and the thickness gradually increases as the leg continues up to the bottom of the bowl. I remove wood carefully up the legs to the bottom of the bowl until the measurement is $4\frac{3}{4}$ " from the bottom of the feet to the bottom of the bowl as pictured below.



Sand the entire exterior of the bowl and the legs inside and outside and the underside of bowl. Do not remove the "bung." Leave it for tailstock support while carving. After sanding to 220 grit, brush on a coat of lacquer and thinner mixed 50%-50% to prevent cracking.



Now we will determine the front of the bowl, the three equal leg locations and the design of the legs. Choose an area that you would like to be the front of the bowl and make a mark on the bowl as pictured above. At the top of the leg where the carving will start, lay out several radial lines all the way around the bowl that are spaced either $\frac{1}{4}$ " (or $\frac{1}{2}$ " apart on larger bowls) down to the bottom of the leg as pictured below.





I made a right angle centerline locator with a hole to hold a pencil exactly at the lathe's spindle height (in this case it is 12 inches) so lateral lines can be made on a bowl directly on the centerline (pictured above). Locate the mark for the front of the bowl and rotate the mark to the point of the pencil as pictured above while keeping the centerline locator flat on the bed of the lathe. Loosen pressure on the jam chuck so you can rotate the spindle/indexing wheel to 24 while keeping the front of the bowl where the mark is at center spindle height. With the indexing wheel locked in place at 24, rotate the bowl back to the mark on the bowl that indicates the front of the bowl at the 24 indexed position. Tighten the pressure on the jam chuck, unlock the spindle then rotate the bowl so that the indexing wheel is at 48 and lock the spindle in place at 48 on the indexing wheel. This will be the exact rear center of bowl. Using the centerline locator pencil, scribe a line from the bottom of the foot of the bowl up the side of the bowl to the top radial line as pictured below. This line will become the center of the bowl. To make sure this line is correct and in the right location, take the centerline

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locator to the back of the lathe, place it on the bedway and check to make sure the point of the pencil is directly on the mark that was previously drawn to indicate the front of the bowl.



Rotate the indexing wheel to 16 and lock the spindle at 16 then use the centerline locator and scribe a line for leg #2. Rotate the indexing wheel to 32, lock the spindle at 32 and scribe a line for leg #3. Now you have three equally spaced leg center lines for a reference point. This will make the layout of the legs very easy and exact to duplicate.

NOTE: My indexing wheel has 48 increments. 48 divided by 3 is 16. My indexing layout is 16, 32 and 48. Whatever your indexing wheel increments are you can divide by 3 and you will have the correct number to use for your legs.

If you do not have an indexing wheel, take a piece of tape and, starting where the front of the bowl mark is, wrap the tape around the apex of the bowl. Where the ends of the tape meet make a pencil mark on the tape. Remove the tape and tape it down to a table or any flat surface. Measure the length of the tape and divide this number by three. Make a mark at the 3 equal division numbers (the first mark will be the end of the tape) then put the tape back on the bowl in the same apex location starting with the end of the tape on the mark of the front of the bowl location. Wrap it around the apex and join the ends then transfer the three equal marks onto the bowl. This will give you three equally spaced leg locations. Now you can scribe the three leg centers using the centerline locator.



Be sure to draw the lines on the back sided of the legs as pictured. This will help keep the carving exactly the same on the back of the legs.



Draw one side of your leg profile design on the side of the bowl in the radial lines. Once you like your leg profile design it is easily duplicated to the other side by using dividers. Set one point of the divider on the middle line of the leg and the other point on the outside of the leg profile that was drawn then pivot the divider to the other side and make a mark. Keep the divider the same and rotate the bowl to another leg and repeat the process. Do the same with the third leg. Drop down one radial line and repeat. Continue until all of the measurements have been duplicated and transferred to the legs then use a black marker to connect to dots and outline the leg profile as pictured.



On the underside and back of the leg it is important to draw the leg design the same width as on the front of the leg as pictured below. Staying outside these lines while carving will keep you from accidentally carving into the backside of a leg that can drastically change the leg profile.



Lock the lathe so that the bowl cannot rotate as you carve and take your time carving. Carve a little and check the backside of the leg often. I find it much easier to stand on the front side of the lathe to carve the left side of the leg. I stand at the backside of the lathe to carve the right side of the leg.





When carving the legs make sure to carve straight in (as pictured above) and not at an angle. After carving the legs you can soften the edges of the legs with sandpaper.

You will carve away the material between the legs and you can caliper the wall thickness to verify how much material needs to be removed. Keep in mind that this is a subtractive process and you cannot put removed material back on so take your time and caliper often.

There is a fair amount of hand sanding however the majority of sanding is done using a power sander. I use three inch sanding disks and start using 80 grit then work my way up to 220 grit.



After carving and sanding be sure to brush on a coat of lacquer/thinner mixed 50%-50%. The lacquer does two things. One, it slows the drying process so the piece will not crack and, two it seals the cells so no contamination or staining will occur when handling the piece to be hand-sanded and finished after it has dried.

Allow the piece to dry for a week or two then apply a finish to the piece. Hand sand the entire piece using 220 grit (only) then apply a finish.



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