Woodturning Project Tutorials by Larry Hancock

Helix

This project is in remembrance of Phil Wall who taught me how to do this project over the internet. I had hoped he would some day be putting this information on his own site but since that is no longer possible I will provide the information here.

I start with a cross grain oriented blank between centers. The heart of the log is on the headstock side and the bark side is to the tailstock. The wood I am using is pecan. The heart has a soft rotted area I will remove later. I have already rounded this piece to rough shape and turned a tenon to fit in the chuck. I always orient the blank with the side receiving the tenon on the tailstock side because it allows me more room for tool use and I am right handed so it feels more natural while turning.

I will be turning a round bottom bowl with uniform wall thickness of about 5/16” for the start of this project. There are other variations the bowl shape could be turned to but I will start with the basics and leave further exploration for another time.

The blank gripped in the chuck. I can now refine the shape. I want a smooth flowing spherical shape.

The tailstock is left in place for support until it is time to remove the wood in the bowl center.

The side ground gouge reaching in close to the chuck in a shear-scraping cut.

Once away from the chuck the nose of the gouge can be turned around and proceed with a good shear cut to the rim.

Taking a fine bevel rubbing cut to finish the shape up to the rim. Check the blank for any torn grain areas and remove them with a freshly sharpened edge and light cuts before proceeding to hollow.

Sand the outside now while the surface is still running true.

Start hollowing with the tailstock still supporting the blank. A big catch in a cross grain oriented turning can split the wood at the tenon, it is safer to leave the tailstock as support until it gets in the way of further hollowing.

The gouge is removing the cone of wood from smallest to largest diameter. This cut is easier than cutting the opposite direction because the gouge does not have to cut into unsupported endgrain.

Start turning the rim to thickness. The bevel is aimed in the direction of cut. The start of the cut on the flat area of the rim is the hardest part, once a shoulder is cut the bevel can contact to keep it from skidding across the surface the cut is a simple push toward the bowl bottom.

The center section can be removed using the same cutting action as the inner bowl wall. Use the waste wood here as practice for removing the very center of the bottom without leaving a nub or depression.

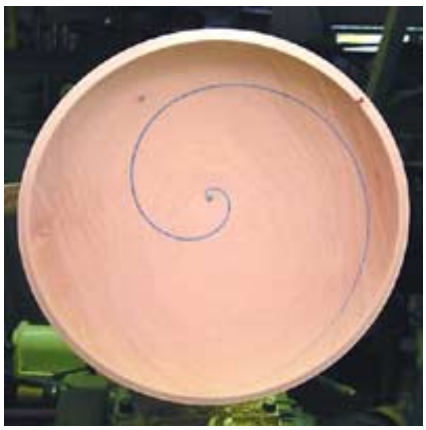
Check the wall thickness. Once the desired rim thickness is achieved continue to the bottom in steps of about an inch at a time until finished. I have a thickness of about 5/16”.

This wood is fresh cut and warps as the turning progress. At times you may find that two sides of the bowl have a ridge left. If the difference is slight don’t worry about it as long as the grain is cut smooth without tearout. The ridge can be removed with power sanding later.

Sand the inside smooth. This is very important because a pencil is going to be pulled across the surface to make the mark for cutting the helix.

Make sure that the inside surface is a smooth continuous curve without any bumps.

I use a colored pencil with a blunt tip so it won't break easily. With the lathe spinning at a slow speed, around 200 to 300 rpm's, let the pencil find the center. If your lathe won't go that slow you will need to go to its slowest speed and make your mark very fast. Pull the pencil down or to the side in a straight line quickly, maintaining contact with the wood. Stop the lathe and see what kind of mark you have made. If you have a mark that is 1 ½ to 2 full revolutions in the bowl from bottom to top that will work fine. Too many revolutions and the pieces will be hard to separate once cut. If it did not make a good mark the first time sand it away and try again until it does.



This is what your mark should look like. There are 1-½ revolutions from bottom to top. The easy part is over, now we need to make two more marks equally spaced around the inside by hand to match this one.

The index plate on the pulley assemble comes in handy for dividing the outer rim into three section. With the 48-hole plate on my Oneway lathe I move the bowl 16 holes at a time to mark the outer edge.

Set the tool rest close to the edge of the bowl and align the first mark with it. Index 1/3 around and make the next mark, another third around and make the last mark. There are now three equally spaced reference marks on the rim of the bowl. You can also use dividers to walk around the rim but if you are like me and only have six-inch dividers you will have to set them to make two steps for each mark. This bowl is 11” in diameter and the rim circumference is about 35”.

Hold a pencil against the wood and make some reference circles at steps from the rim to the bottom. The exact distance the circles are separated by does not matter; they are for reference marks only.

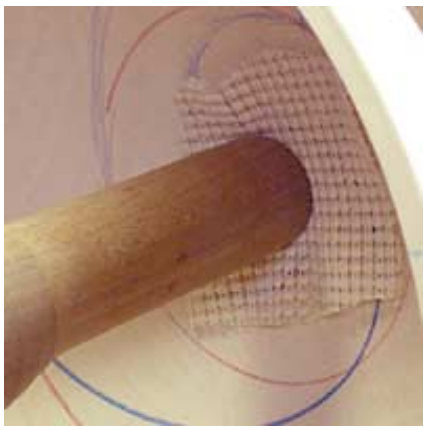
Using dividers to mark intersections at the reference circles. Walk the dividers from the original mark around the bowl in thirds and make a mark every 120 degrees so you have the three equally spaced marks.

Hand draw two more spirals to match the original using the marks at the reference circles. For me this is about the hardest part of this project.

With the spiral marks completed I drill the center with a bit so when I reach the bottom of the bowl during band sawing I can turn the blade inside the hole and cut back out. The depth drilled only needs to be a little more than the wall thickness of the bowl.

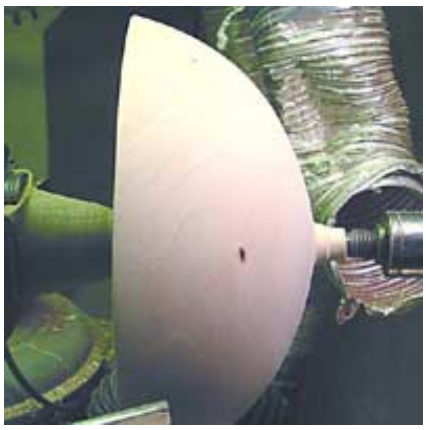
All three spiral marks and the drilled hole completed.

Reverse the bowl to turn away the waste and complete the round bottom. The tailstock center mark form the original mounting is still there for easy reversing.

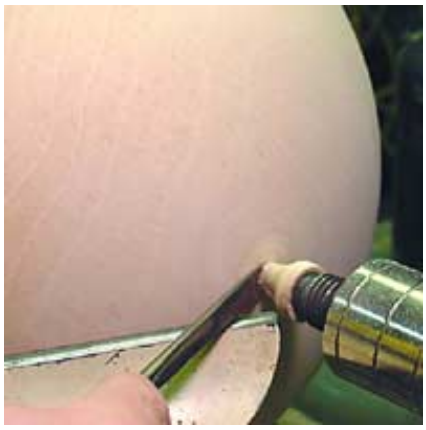


I compress the bowl between centers using a piece of non-skid foam on the waste wood drive side.

I use light cuts, pushing in the direction of the headstock, to remove the waste for the bowl bottom.



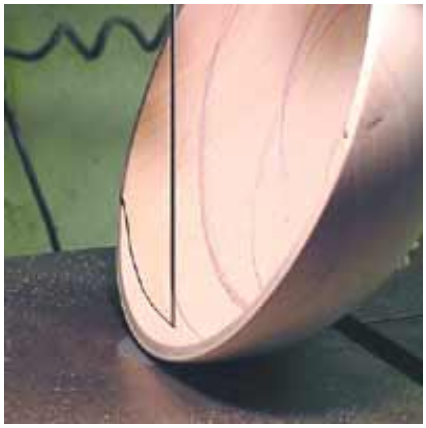
The bottom nearly finished.



The final paring I do with a carving gouge while rotating the wood by hand.

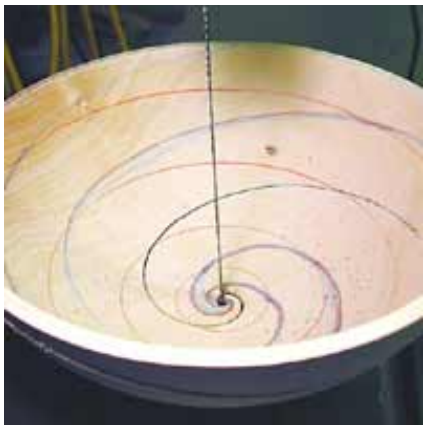
Now the dangerous part of this project, sawing the bowl into sections. KEEP YOUR FINGERS OUT OF THE BLADE PATH! Keep the section of the bowl being cut in contact with the saw table surface, rotate the bowl to the blade.

The cut starts with the bowl on its side at one of the marks. I am using a 1/4" blade.



As the cut progresses the bowl bottom will be moving closer to the saw table surface.

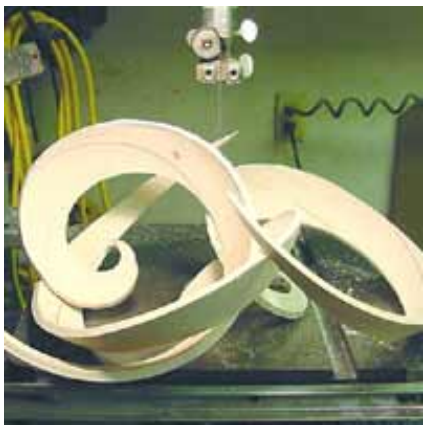
About half the way through.



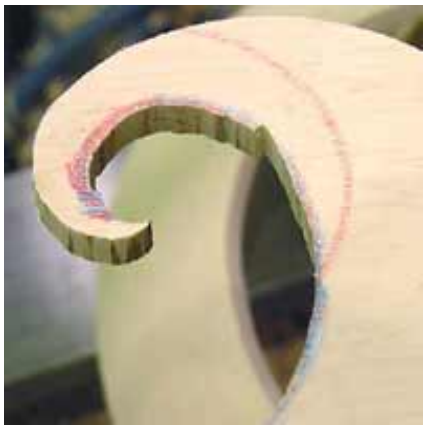
The first cut is complete. Now start at another of the spiral marks and cut back out to free one piece.

Nearly finished with cutting one section of spiral.

One section is now cut.



Cut along the last mark and you have the three sections ready for sanding and finish.



The blade can leave some rough surface to sand in the tight curve areas.

I use small sanding drums to sand the smaller radius curved areas.

A larger drum sander mounted on the lathe in the chuck works well for sanding the larger inside curve areas.

A belt sander can be used for the outside curve sanding most of the way around each piece.

With a little hand sanding and a finish applied the project is completed. This is just the start of what can be done with this process. Color one of the spirals dark, texture one piece or the outside of all pieces, turn beads on the outside, turn the outer rim thick and taper to thin at the bottom, just use your imagination for more possibilities.

Now you can have some fun rearranging the pieces of your interactive sculpture made from a simple round bottom bowl.