

OUR MARCH DEMONSTRATION WAVE BOWLS & MORE WITH CHAD DAWSON

Natural edge bowls are an interesting art form that I have enjoyed over the past several years as I learned how to do woodturning. My interest in making bowls with undulating edges and patterns progressed from natural edge bowls to wave bowls. The idea of making bowls with wave patterns in the wood was introduced to me at Totally Turning in 2015 by one of the demonstrators – John Beaver.

The general idea is to cut through the bowl blank or partially turned bowl using a band saw and then add in some additional wood or alter the central piece of wood to stand out from the rest of the bowl. The wave effect is most dramatic when the bowl or other vessel has somewhat of a closed top or return to the rim so that you cannot see the entire wave when looking down from above.

The band saw cut is made as an arc across the central axis of the bowl. The best band saw blade is $\frac{1}{4}$ " wide and has a fine tooth and/or skip tooth pattern for smooth cutting and good saw dust removal. The difficult task is to hold the bowl blank securely in a jig while cutting across the blank. Two examples of useful jigs for band saws are described here.

CIRCLE CUTTING JIG

The simplest way to safely and securely cut an arc in a bowl blank with a band saw is when the blank is in a square form so that a circle cutting jig can be used. The bowl blank is glued on edge onto a $\frac{1}{4}$ " or $\frac{3}{8}$ " scrap of plywood. The central line of the block is marked down the plywood to locate a point between 4" and 12" from the center of the bowl blank. The choice of the length of the radius to be used determines the height



or amplitude of the wave effect in the bowl (*more about this later*). A hole is drilled at the desired radius length that will fit over the central pin of a hole cutting jig.

You can make a circle cutting jig using some $\frac{3}{4}$ " hardwood plywood, about 24" of "T" track, and a $\frac{1}{2}$ " piece of steel flat bar with a small bolt added for a pin. See the photos for an example and/or search the internet for plans. Alternately, you can buy one of the commercially produced circle cutting jigs for band saw use from companies such as www.rockler.com or www.woodcraft.com.



CHUCK HOLDING JIG

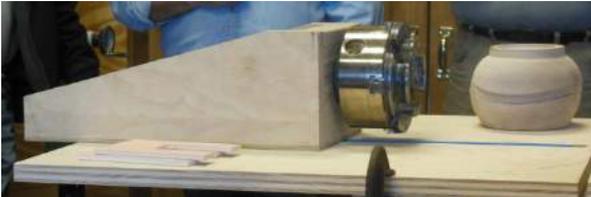
A more complex way to hold a bowl blank or partially turned bowl is using the chuck off your lathe with a jig built to hold the chuck on a circle cutting jig. The chuck is held in the 90 degree upright jig with a threaded shaft that is the same diameter and threads per inch as the head stock on your lathe. You will also need a large nut on the end of the threaded shaft to secure it into the jig. You can find fastener companies online. For example, my lathe has a $1\frac{1}{4}$ " diameter shaft with 8 threads per inch and I bought my supplies from www.fmwfasteners.com.

My jig was made from $\frac{3}{4}$ " hardwood plywood and was designed to be used on my circle cutting jig to achieve the arc that needed to be cut across the bowl blank. The bowl blank is held in the chuck with an inside or outside tenon. As long as you have a



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secure tenon, bowl blanks can be cut either as square or partially turned bowls. A chuck holding jig needs to be made for your chuck size and the allowable opening for cutting on your band saw. For example, my jig is only 6" tall because my 14" band saw has a 6" vertical opening for cutting. The jig is permanently centered in that 6" tall vertical space and the largest bowl blank I can cut is 6" wide.



FLUSH EXTERIOR WAVE CONSTRUCTION

A simple wave design that is flush with the outside edge of the bowl can be created by gluing one or more layers of veneer or other thin, bendable wood in a single arc cut made in the bowl blank. Orient the grain of the added wood in the same direction as the grain in the bowl blank. Use good wood glue, such as Titebond or white wood glue, to get a good bond on all surfaces; do not use epoxy, Gorilla glue, or CA type glues. Use a good number of clamps to ensure firm contact all around the blank and apply pressure gradually all around so as not to crack the cut pieces. The pieces will be slippery when glue is on all surfaces so alignment is a challenge on all sides of the bowl blank. [Editor's note – Add a few salt crystals onto your glued surface to assist with holding them!]

The same design idea can be made more complex by cutting the bowl blank more than once and gluing one or more layers of veneer or other thin, bendable wood in each arc cut made in the bowl blank. Alternately, thin wood (1/8 to 1/4") can be steam bent and dried with the cut bowl blank. When dried thoroughly, the pieces can be glued together to get a more layered effect with different colors and grain patterns.

When the blank is dried and clamps removed the bowl blank is turned just as you would any other bowl blank. No special technique or equipment is needed.

OFFSET WAVE CONSTRUCTION

A more complex approach to wave design construction can only be achieved using the *chuck holding jig* because

one or more slices are temporarily cut out of the bowl blank after the exterior of the bowl is turned to the desired shape. The wave design is made with either the wood protruding beyond the rest of the bowl surface or being sunken into the outer surface. A great effect for a dramatic wave, but it requires many sequential steps. The steps to follow are:

1. Turn a bowl blank on the outside and make a tenon on the bottom (foot); sand and finish the outside of the bowl.
2. Turn the bowl blank around in the chuck so the top faces the tailstock.
3. Leave the bowl blank in the chuck and drill a 1/2" hole in the center of the bowl blank to a depth at least 1/4" below the bottom of the wave piece to be cut.
4. Transfer the chuck with the bowl blank still attached to the chuck holding jig; make sure that the chuck is securely tightened onto the threaded shaft.
5. Calculate the radius you need to cut the top of the wave and position the jig to bring the cut into the bowl blank according to where you want the wave.
6. Cut off the top of the bowl using very consistent pressure for a smooth arc cut through the band saw; this defines the top of the wave.
7. Using shims between the chuck and the jig on the threaded shaft, recreate the same radius between the center of the circle cutting jig and the band saw blade so that the slice you are removing from the bowl is uniform in thickness. The thickness of the shims is equal to the thickness of the wave you are cutting out of the bowl.
8. Cut off a wood piece from the bowl blank to create a wave piece that is approximately 1/2" thick; this second cut defines the bottom of the wave.
9. Take the bottom of the bowl blank (still attached) and chuck off the jig and put it back on the lathe.
10. Cut a piece of temporary bendable material (foam core poster board, MDF board, etc.) that is the same diameter and thickness as the wave slice cut out of the blank. Drill a 1/2" center hole in the temporary piece. Place that temporary piece where the slice would have been and then place a 1/2"



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dowel through that temporary piece and into the bottom hole. Slide the top of the bowl over the dowel and mark the length of the dowel. Cut dowel to length.

11. Assemble the bottom, temporary piece and top of the bowl together, and held in alignment with the dowel. Bring up the tailstock with a cup tailstock to compress the entire assembly and hold it in place.
12. Check to be sure that the assembly is all secure and then turn the outer portion of the bowl to a small diameter by around $\frac{1}{4}$ to $\frac{1}{2}$ " , but maintain the same general shape. Sand and finish the outside of the bowl again.
13. Take the assembly apart and discard the temporary piece and replace it with the wave slice. Test that it fits together well by placing the dowel down the center hole. Carefully hand sand and finish the portion of the wave that sticks out beyond the top and bottom diameter of the bowl.
14. Apply wood glue to all joining surfaces and glue the entire piece back together again either on the lathe or off the lathe using large clamps to get a good compression fit. Carefully remove any glue that comes out of the joints before the wood glue dries as it would be difficult to remove later.
15. When the glue is dry, turn the rim and inside of the bowl as you would any bowl. The dowel will turn away easily as you complete the inside turning.
16. Finish the inside of the bowl (the outside was previously finished in steps 1 and 12). Remove the bowl from the lathe to finish the foot of the bowl.



DETERMINE ARC RADIUS

After much experimentation, it became clear that the radius used to cut the arc in the bowl blank needed to be different for different width pieces to achieve a pleasant looking wave design. The amplitude (height) of the wave is what is needed to visual understand what it will look like in the bowl and to calculate where the cuts should be placed in the bowl and where the center of the wave

needs to be placed for best visual appeal. Using a protractor I plotted out the height of an arc (wave) at each different radius from the band saw blade to the circle cutting center and at different width bowl blanks. That information is shown in the following table in 16^{th} s of an inch. Look at some of the photos to see how to use this information in laying out the plywood when using a circle cutting jig.

Approximate height (amplitude) of wave in 16^{th} s of an inch

Radius for Cutting on Band Saw	Width of blank to be cut				
	3"	4"	5"	6"	7"
4"	4	8	14	19	32
5"	3	7	12	17	24
6"	3	6	9	13	18
7"	3	5	8	11	15
8"	2	4	7	10	13
9"	2	3	6	9	12
10"	2	3	5	8	11
11"	1	2	4	7	10
12"	1	2	3	6	8

EXTEND WAVE DESIGNS TO OTHER PROJECTS

The wave design techniques explained above can be used in many types of woodturning projects – especially the flush exterior wave construction using veneer layers. That design works well with all types of vessels, vases, pepper mills, bracelets, and other objects. Multiple cuts work best if you do them one at a time, then glue the piece back together before adding more cuts, if you are trying to create multiple waves, cross cutting waves, waves at different angles, etc. The flush exterior wave construction offers many possibilities to go well beyond just wave bowls.

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