

Turning Segmented Bowls

featuring Mark Kauder

Our September demonstrator was Mark Kauder of Phenix City, Alabama. He is a founding member of the Bi-City Woodturners club which serves west central Georgia and east central Alabama. Mark began turning in 1998 on a JET mini-lathe making pens and other gift items but soon moved onto turning bowls and a larger lathe. In his own words, he “fell in love with segmented turning. It gives me lots of options and two bowls are the same. I just try to make bowls with attractive shapes, using nice combinations of wood and design features that do not over power the shape.” Mark is retired from the U. S. Army and now works when he is not turning as a computer networking engineer in Columbus. He has created a very attractive and informative personal website at www.markauder.com. He is a member of the AAW.



He gave a very informative presentation on the methods he uses to design, build and turn segmented bowls. He focused on seven different topics in his discussion. These were (1) bowl shape considerations including segmenting measurement definitions and design methods, (2) wood selection and preparation, (3) cutting segments, (4) gluing segments, (5) bowl assembly, (6) turning and (7) finishing. He had planned to discuss designing and building feature rings in segmented bowls but time did not permit him to address this topic.

With respect to segmented bowl shapes he indicated that he felt segmented turners, on average, turn the worst shapes with no good reason. He believes a contributing factor to these poor shapes is the perceived difficulty many believe that turning segmented bowls represents so that they are reluctant to constructively critique the results produced by the few that undertake the hobby. A common problem is that segmented turners allow foot shapes to be dictated by the chucking methods they use with the result that they are often too large. To avoid this problem he recommends using a face plate with a waste block on the bowl is built. Another problem is not using complimentary wood colors or using too many colors and segments in each layer. He does not recommend using museum pottery pieces as a reference because quite often these were made to be functional and not works of art.

The segmenting measurement definitions he introduced were:

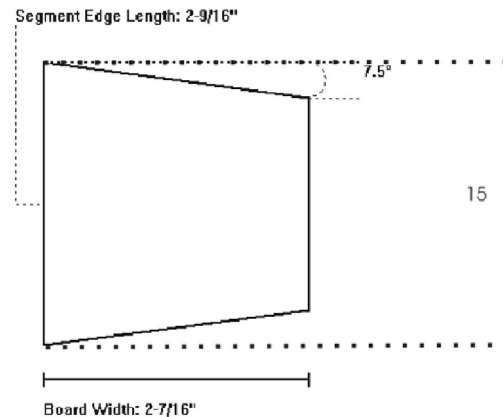
Segment Edge Length which determines the bowl circumference.

Board Width which determines the wall thickness.

Board Thickness which determines the height of a ring less sanding.

Segment Angle which is 360 degrees divided by the number of segments in the ring.

Miter Angle which is $\frac{1}{2}$ the segment angle or the angle which each side of a segment is cut.



The diagram at the right illustrates some of these definitions.

The initial method he recommends for designing a segmented

bowl is to draw an outline to scale of one half of the bowl on a piece of graph paper. If each layer is drawn on this graph then the dimensions and angles for the segments can be determined using the definitions above. He indicated that a number of software tools are also available to assist in this process. Some of these even allow for estimating the materials cost for the bowl knowing the expense of the lumber used. His preferred program is Woodturner Pro. Two other design tools he mentioned are Woodturner's Studio and Segmented Project Planner.



The primary considerations in wood selection he emphasized were to select woods with complimentary colors and similar densities. Combining very soft wood with hardwood can make smoothly sanding the finished bowl very difficult. When preparing the wood for segment cutting he recommends jointing one edge, ripping to width and then resawing or planing to the appropriate thickness.



Mark indicated that a variety of methods can be used for actually cutting the segments. These include a band saw, compound miter saw or table saw. Many segmented turners also use a sander to smooth the edges of segments to insure a tight joint. He uses a table saw for which he has built a sled with a fence set at the appropriate miter angle. He has built a different sled with the miter fence set for each of the different bowls he turns depending upon the number of segments in a ring. Although he uses a saw blade especially designed to provide polished end grain cuts, he indicated that any cut off blade with more than 80 TPI is satisfactory to begin cutting segments. He stressed the importance of measuring accurately when setting stops for cutting segments being consistent in the way sleds and jigs are use.



Several methods are popular for gluing segments into rings. Some involve clamps while others use no clamps. Regardless of the method used, Mark recommends using yellow carpenters glue for this purpose. The most basic approach is to glue the segments together as pairs where only hand pressure is applied to form a tight joint. These pairs are then joined with another glued pair to build up to the final ring. The approach which he uses is to place all the segments upright and together on a stretched piece of duct tape placed on a flat gluing board. The duct tape which he recommends is that made by Gorilla Glue. This technique allows him to wrap and hold the segments together without glue so that they can be inspected for fit. When satisfied with the segment edges, he then applies glue between the segments which he spreads to the bottom of the crevices between them using a putty knife. He then wraps the segments together again in a circle using the duct tape to hold them in place while he positions a metal strap clamp around them that is firmly tightened. The segment layer can now be placed on a flat surface and tapped with a rubber mallet to insure that the bottom face is



smooth. He suggests placing a weighted flat board over the segment layer while the glue dries. He separates the board from the segment layer with a plastic garbage bag to prevent the layer from adhering to the board.

The first step in bowl assembly is to insure that the rings which have been glued up have one side that is perfectly flat and are of uniform thickness. For this purpose a belt/drum sander can be used or a belt/disk sander. Mark uses a Perfomax drum sander now although he originally sanded the layers flat by hand using a sanding board. Another technique is to hold the ring on a lathe with Cole or Jumbo jaws and first smooth the faces with a scraper or gouge. This is then followed by sanding with sandpaper held flat on board pressed uniformly against the rotating ring.

The next step is gluing the segmented layers together to form the bowl. In this process is vital that the layers be aligned carefully so that they form concentric rings. The first layer glued to the solid base is the most important because the position of each subsequent ring will depend upon the accuracy of its location. Several methods are available to insure correct positioning. One is to precisely measure and mark from the outer circumference of the base where the first ring should be positioned. Another is to mark concentric circles on the base while it is turning on the lathe. Once the position has been determined Mark glues small stop blocks on the ring with CA glue to hold it in place for final gluing of the faces together. He uses either weights or a glue press to hold the layers together while they dry. The stop blocks are turned off when the outside of the bowl is finished. When gluing layer to layer, he offsets the segment joints an arbitrary but consistent amount to insure stronger interlayer bonding and because maintaining an entirely vertical glue joint is almost impossible.

When turning a glued up segmented bowl, Mark stressed the importance of taking light cuts at first because of the many protruding edges that have to be smoothed. He indicated that you can rough turn the bowl as it is being built, even finish turning the interior, depending upon the ultimate shape and assembly strategy. He recommends leaving the wall thick for bowl strength. He suggests checking the shape of the bowl curves by sight and by feel.

The most important step in finishing a segmented bowl is the sanding process in Mark's opinion because the ultimate finish is only as good as surface to which it is applied. He begins sanding with rough grit which uses to refine the bowl shape. An advantage in sanding the outside of a segmented bowl is that only side grain is exposed so that the surface being sanded is of uniform texture. He stressed that you should use sandpaper as if someone else was paying for it, i.e., keep it fresh. You should never skip a grit. The rule of thumb he uses is that the next grit to use should not be more than the previous grit number



increased by 50 percent. Depending on the grit scales for the sandpaper you are using this translates to 60, 100, 150, 220, 320, 400, 600, 1000 or 80, 120, 180, 240, 360 and so forth. You should not let the sand paper overheat and the bowl should be cleaned of dust between grits.

As far as the final finish to use, Mark prefers multiple coats of clear lacquer because each coat fuses to that below it so that a single layer of finish results. This property is advantageous when sanding out blemishes. He typically sands the piece between every several coats of lacquer. He does not recommend using Deft as a lacquer, either the liquid or spray, because of the retardants this product incorporates to allow for the smoothing of brush strokes. These slow the drying process which can result in cracks in the finish if multiple coats are used and insufficient drying time is allowed. The lacquer which he suggests is Behlens String Instrument lacquer which is available from several Internet suppliers as well as Highland Woodworking. He recommends using a spray gun to apply the finish.

A video of the Mark's presentation is available through the club library. He encouraged any members wishing to discuss segmented bowl turning further to contact him at mkauder@wcb Bradley.com. If you do so, he requested that you include "Segmented Turning" in the subject line of the email message.