Double Axis Square Turned Bowl

Thames Valley Woodturners' Guild

Presented by

Paul Newton

INTRODUCTION

Your Presenter:

Paul Newton has been woodturning for approximately six years. He is a member of the American Association of Woodturners, and is currently President of the Thames Valley Woodturners' Guild in London, Ontario. He has demonstrated turning techniques at Guild meetings and Lee Valley Tool workshops. His turnings include bowls, vessels, spindle work, wine stoppers, and art pieces.

History

Woodturning bowls is a craft that has been passed down through generations, with the earliest known examples being over 4000 years old. Before the metal age, and the industrial revolution, vessels for eating and drinking were mostly made of wood or ceramics. The earliest of these were carved bowls and cups. Later artisans learned to "turn" wood on early pole lathes, creating more uniform shapes. With advent of the industrial revolution, turned wood items declined in use in favour of metal and ceramic bowls.

Woodturning enjoyed a resurgence beginning in the mid twentieth century, and is presently enjoying immense popularity worldwide as both a professional art form and a popular hobby. The American Association of Woodturners was formed in 1986, by a small group of American (and Canadian) woodturning artists. Today the AAW boasts over 15,000 members, and a network of over 350 local chapters worldwide.

Intent of this Seminar

In this seminar we will be turning a Double Axis Square Turned Bowl. Subjects will include:

- Lathe safety
- Bowl design
- Preparing and mounting the wood
- Turning the bottom (2 axes)
- Making the jig
- Mounting the bowl
- Truing the face
- Turning the inside of the bowl
- Finishing

Tools and Materials Required

- Bowl blanks – 6"x6"x3" Maple (2).
- 6"x6"x ¾" Wood Spacer (solid wood – not plywood or MDF)
- Sharp turning tools
    - ½" or ¾" Standard Grind Bowl Gouge
    - ½" or ¾" Fingernail Grind Bowl Gouge (Ellesworth)
- Spur Drive / Safety Drive for mounting the wood.
- Live Centre for the tailstock.
- Mounting Jig
    - 2x4 framing lumber (24")
    - 12"x12"x¾" plywood
    - Wood screws and Titebond Glue
    - Steel faceplate or
    - 3½" x 3½" x 1½" thick Maple to make a wood faceplate
        - Drill & Tap (Beall Tool)
        - CA glue
- Hot glue (gun).
- Sandpaper (120 / 240 / 320 / 400 grits).
- Finishes
    - Gesso
    - Liming Wax
    - Tung Oil
    - Rubber Gloves

SAFETY GUIDELINES

Wear Proper Attire!

- Always wear eye protection. A face shield is the best method of eye protection.
- Loose clothing and hair are dangerous because it can get caught in the spinning lathe. Tie back long hair, and wear clothing with short sleeves or roll up long sleeves. Remove jewelry and watches and rings as they can get caught up in moving parts.
- Be aware of the dangers of breathing wood dust. Wood dust is dangerous when inhaled in quantity. Prolonged exposure to wood dust can cause respiratory ailments. Wear a dust mask or respirator when sanding wood.
- Most finishes are not safe to breathe and precautions should be taken to avoid inhaling their fumes. A good respirator rated for finish-type chemicals would be a good

investment in your health and future mental capacity. Be aware that chemical respirators have a limited functional shelf life so the filters should be changed when necessary.

Keep your fingers and body parts out of harm's way.

- The toolrest on the lathe should be as close to the work as possible so that your fingers will not get caught between the toolrest and your work (⅛" to ¼" would be safe).
- Get in the habit of blowing the dust and shavings off the toolrest instead of wiping it off with your fingers. Using your fingers to clean off the toolrest might cause your fingers to get caught between the work and the toolrest.
- Always turn the lathe off before moving the toolrest. This prevents harm not only to your work but also to your body parts.
- Do not wrap sandpaper or buffing/polishing rags around your fingers or hand. If the cloth gets caught in the spinning parts of the lathe, your fingers will be pulled into the lathe.
- Use paper towels for applying finishes. Paper will tear off if caught in the lathe.
- Check to see if pieces are securely held in the lathe. Check again!
- Rotate piece by hand and check to see that it rotates freely and does not contact the tool rest.
- Pay attention to, and use the proper lathe speed.
- When in doubt, start lathe on slow speed and increase after you are sure all is OK.
- Before turning on the lathe, always double check the speed setting. Also be sure to check that the drive belt is on the proper pulley for what you are turning.
- Turn at a speed that is comfortable for you and is appropriate for the work. A good rule of thumb for proper lathe speed, (Craft Supplies Woodturning Catalogue), is that the product of the diameter of the piece times the lathe speed in rpm's should fall somewhere between 6,000 and 9,000. For example, a 10"-diameter turning times a lathe speed of 800 rpm's equals 8,000, which would be a safe speed as 8,000 falls between 6,000 and 9,000.
- Larger, or more off-balanced items should be turned at slower speeds.
- Stand clear when starting up lathe!

Listen to your inner voice – if it doesn't feel right; don't do it!

LET'S GET STARTED

Lathe Tools & Usage:

- Use only those tools meant for the appropriate task.
- For bowl work use bowl gouges, scrapers, parting tools (spindle gouges may be used for detail work on the outside)
- A Spindle Roughing Gouge is for spindle work only – NOT FOR BOWLS!!
- Make sure your tools are properly ground and sharp.
- Observe the 'ABC's of Woodturning (Anchor – Bevel – Cut)
- Understand the tool angle and the cutting angle for each tool.
- Take small cuts to start with – don't be too aggressive.
- Cut downhill – always have fibers supported.

Step One – Prepare and Mount the Blank

- Cut 2 - 6"x6"x3" bowl blanks and the 6"x6"x3/4" spacer. The 2 bowl blanks will eventually result in 2 bowls. The thickness of the blanks must be one half of the width, in order for the dimensions to work out.

- Examine the blanks first; check for cracks, bark inclusions and other faults. If the wood is "punky", or contains one or more of these faults, discard it.
- Line up the 2 blanks with the spacer between them. Using Titebond, glue the three pieces together and thoroughly clamp all pieces. Allow glue to dry overnight.
- Mark and draw a line along the central axis of the spacer board on all four sides. Find and mark the centre of the line on all four sides, and using an Awl, make an indentation at the centre.
- Using a compass mark the intended diameter of the circle you will turn (6"). Draw 45 degree lines across the corners approximately ¼" from the circle. Allow for some turning.

- Using a bandsaw, cut along the 45 degree lines and remove the corners. Do not discard the triangular pieces. You will need them later. Trim other corners to allow for easier turning.
- Mount the blank on the lathe between centres using a safe centre in the headstock and a live centre in the tailstock.
- Stand clear when starting up lathe.
- Start lathe on slow speed and increase after you are sure all is secure. Increase speed to a level appropriate for the work and your skill level.

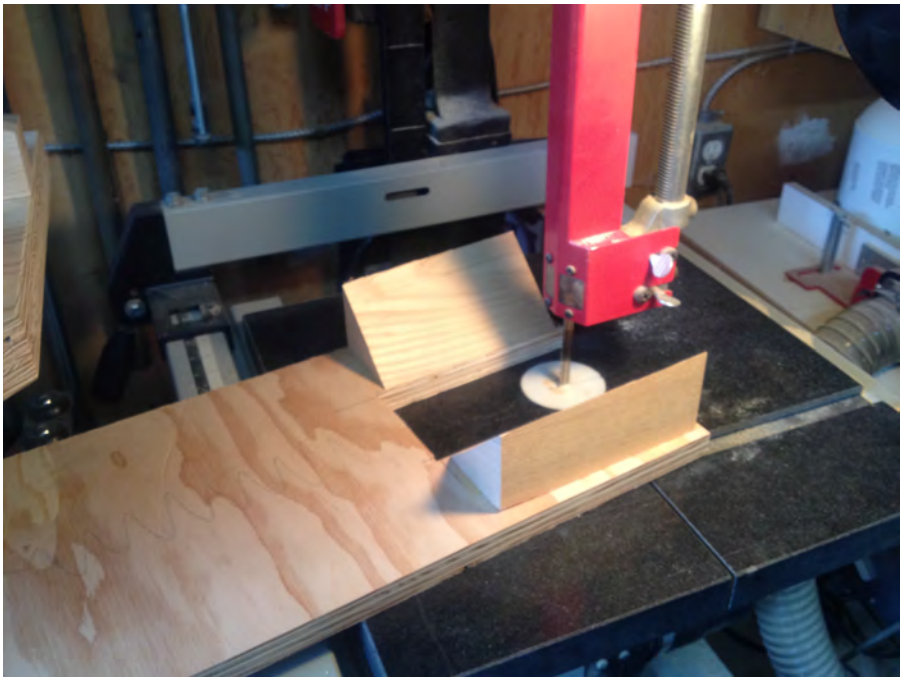
Step Two – Double Axis Turning

- Set on slower speed when first starting to shape the bowl. Speed can be increased as the wood is shaped to run balanced and true.
- Using a bowl gouge, begin rounding the piece across the face of the blank. Take small cuts and maintain the parallel face.
- Continue until you have turned the piece round to the spacer. Use a caliper and check to make sure the diameter is consistently the same across the piece and at both ends.

- If you intend to sand the bottom smooth, you must do it now.
- Rotate the piece 90 degrees in the lathe and mount between the other two marked centres along the spacer board.
- Using the bowl gouge, begin rounding the piece again across the face of the blank. Be careful to take small cuts and maintain the parallel face.
- Again, work slowly until you have turned the piece round to the spacer. Use a caliper and check to make sure the diameter is the same at both ends.
- The intent is get the four facets of the bottom of the bowl as even as possible.
- Sand now if necessary.

Step Three – Cutting the Blank

- In order to turn the top of the bowl(s) you will need to separate them. The easiest way is using the bandsaw, however now you have a somewhat round and unstable piece.
- Cut a piece of ¾" plywood to approximately 12" long x 8" wide. Cut a 4" wide x 8" long slot out of one end of the plywood. Now take two of those triangular pieces you cut off the blank earlier, and glue them to the plywood on either side of the slot with the blank wedged between them (don't glue the blank).



- Placing the bowl blank in the slot, hold the blank on the sides (not the end) and line up the centre line on the spacer board with the bandsaw blade. Slowly cut the two halves apart, by sliding the jig forward through the blade.

- Now you have two bowl blanks!

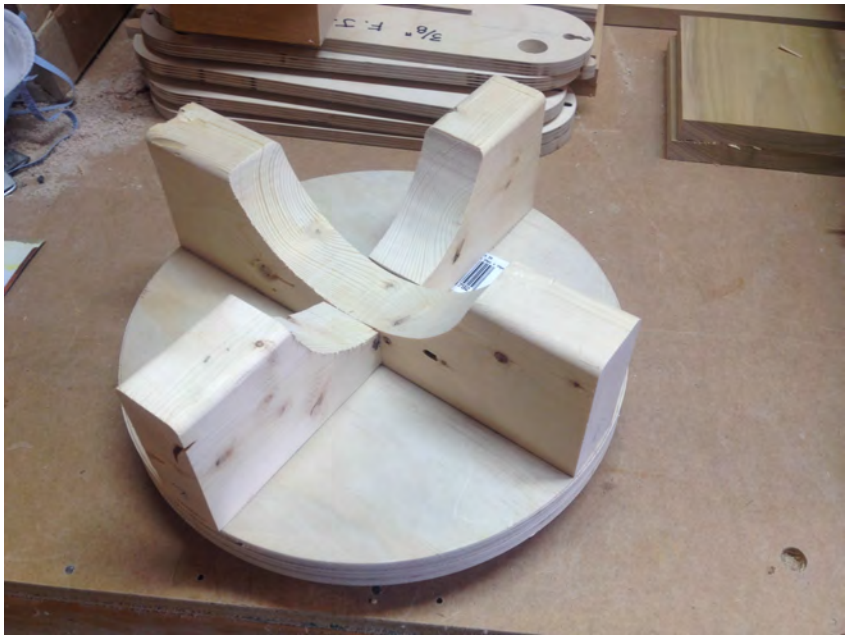
Step Four – Make the Jig to Hold the Blank in the Lathe

- Glue together two layers of ½" plywood and allow to dry. Find the diagonal centre and drill a small pilot hole through.
- Using a circle jig in the bandsaw, cut the plywood to 12" diameter.
- Centre and screw-mount the plywood to a faceplate.
- Turn the outside of the plywood round and true. Remove from the lathe.
- Layout lines for the 2x4 cross pieces on the faceplate.
- Cut 2 – 2x4s slightly shorter that the actual diameter of your plywood plate.
- Use a table saw to trim off one edge of each 2x4 to flatten.
- Lay out and pre-drill pilot holes from the back of the plywood into the 2x4s. Mark the position of each 2x4 so it may be screwed into the correct place later.
- Lay out the centre of the length of each piece, and on one, mark 1½" width for the cross piece.

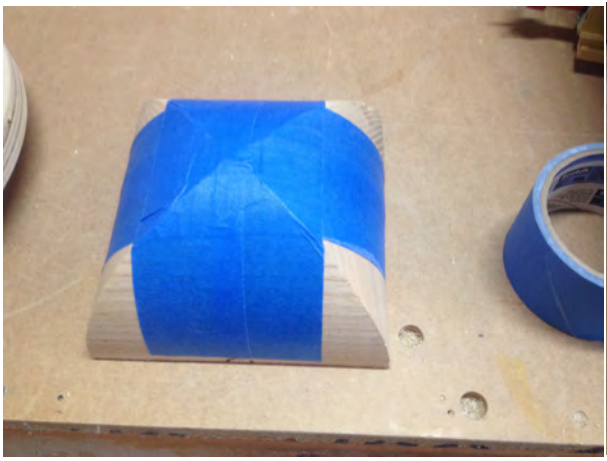
- Lay the pieces together with the flat edges facing away from each other, and mark a point ¾" from the edge between the two pieces on the centre line (both sides).
- Using a compass set to 3" radius, centre on the new points and draw an arc on the opposite piece. These will be the lines to cut out.

- Using the bandsaw, cut out the arcs. Cut the 1½" section out of the centre of one piece.
- Use a spindle sander to trim the curves so they fit well together.

- Screw the 2x4s to the plywood plate. The jig is ready.



- Put the jig on the lathe and run at low speed to check if it is running true.
- Apply masking tape to the back of the bowl in both directions. Using a hot glue gun, apply two glue beads on the inside of the curves sections of the jig and firmly push the bowl blank into place. Try to line up the blank with the face of the jig as best you can.




Step Five –Turn the Face and the Inside of the Bowl

- Mount the jig in the lathe.
- You may wish to bring up the tailstock for additional support initially, but it will need to be removed later.
- Set lathe at lowest speed again and stand clear when turning on.
- Begin by truing the surface of the blank across the top. Push cuts work best here so as not to chip the edges.
- Start hollowing out the inside with a bowl gouge using push cuts.
- Remove the tailstock when necessary.
- Start bowl gouge in neutral cutting angle and start the cut to get support for the Bevel.
- Open the cutting angle as you progress the cut.
- Return the cutting angle to neutral as you approach the centre.
- Move the gouge in an arc pattern from the rim, down to the centre.
- "Step" your cuts to work your way down the bowl.
- Stop periodically to check bowl depth.
- Do final cut as a fine finishing cut using the gouge or a round nose scraper.
- Sand and apply finish to inside surface.

(Step Six – Reverse the Bowl and Establish the Foot)

- Remove the bowl from the lathe and reverse it by mounting in a jam chuck.
- Begin flattening off the bottom of the bowl slightly to establish a small foot.
- Make the "foot" of the bowl slightly concave to allow the bowl to sit properly on a flat surface.
- Sand and apply finish.

A Few Pointers – Things to Remember

- Safety First!!!
- Be sure wood is always securely held in the lathe. Check again!
- Spin the wood by hand first to check securement and toolrest position.
- Start Slow!!!
- Remember the ABCs (Anchor - Bevel - Cut)
- Take small cuts – don't be too aggressive.
- Cut downhill – cut with wood fibers supported. Bevel rubbing.

Have Fun!

SUGGESTED RESOURCES

Associations

- AAW – American Association of Woodturners www.woodturner.org

Books

- Richard Raffan – The Art of Turned Bowls
- Richard Raffan – Turning Wood with Richard Raffan
- Mike Darlow – The Fundamentals of Woodturning
- David Ellsworth – Ellsworth on Woodturning
- Derek Hayes – Woodturning Design
- Bob Stocksdale – To Turn the Perfect Bowl

Videos

- Jimmy Clewes
- Richard Raffan
- Mike Mahoney
- David Ellsworth

Local Clubs and Guilds

- Thames Valley Woodturners' Guild (London) www.thamesvalleywoodturners.com
- Golden Horseshoe Woodturners' Guild (Burlington) www.ghwg.ca
- Grey-Bruce Woodturners' Guild (Kincardine) www.gbwg.ca
- Simcoe Woodturners' Guild (Simcoe) www.simcoewoodturnersguild.com
- Toronto Woodturners' Guild (Toronto) http://www.torontowoodturnersguild.com
- Woodturners' Guild of Ontario (Pickering) http://www.wgo.ca