

**Multi-Axis Woodturning Workshop
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- 1) Introduction to Multi-Axis Woodturning
- 2) Brief History
- 3) Applications – when to use multi-axis turning
- 4) Tools
 - $\frac{1}{2}$ " , $\frac{3}{4}$ " , & 1-1/4" roughing gouge
 - $\frac{3}{8}$ " & $\frac{1}{2}$ " detail spindle gouge
 - Parting tools (standard & thin kerf)
 - 1" & 1-5/8" forstner bit
- 5) Techniques
 - a) Vision
 - b) Sequence of turning the work
 - Mount 2" x 2" x 12" block of Cherry between step center and live center turn 1-5/8" tenons on both ends $\frac{3}{8}$ " in length
 - Use 2 each 3" x 3" x $\frac{3}{4}$ " thick plywood or hardwood scrape, draw diagonal lines both sides and use compass and draw $\frac{1}{2}$ " , 1" , and 1-1/2" radius circles on one side of both pieces, on reverse side drill 1-5/8" hole $\frac{7}{16}$ " deep. On the reverse side of the two pieces punch indication dimple on $\frac{1}{2}$ " and 1" radius lines where they intersect the diagonal lines. Use the 1-1/2" radius lines and use bandsaw to round off corners.
 - Dry fit to ensure tenons fit properly and insure alignment of diagonal lines on 3" end piece with corners of two inch square blank. Remove and CA ensuring diagonal lines and diagonals on blank are aligned.
 - On 2" flat blank use 6B pencil to draw front, rear profile of figure and a 1" diameter tenon $\frac{1}{2}$ " long with a fillet cut

- above the tenon to cover the glue joint where the finished figurine is attached to the base.
- The proportion can vary, however, Head .13, neck .05, torso .26, butt .17, legs .34 feet .05. To convert this to my 12" blank we need 7/8" for tenons 1/2" unusable next to tenons or 12"-1-1/4"=10-3/4" usable space. My layout lines will be head 1-1/2" Neck 5/8", torso 3-1/2", butt 3/4", legs 3-3/4" feet 5/8" these are all approximate since humans come in different sizes and your figurine needs only to be your values.
- c) Cuts and shaping of wood
- Multi-axis turning or drawing in wood requires patience and allowing or letting the wood shadow come to the tool, take care not to push the tool into the wood.
 - Unsupported edges catch: Use the ABC's 1) anchor the tool, 2) lightly rub the bevel heel on the wood, 3) cut with the edge at approximately 45 degrees to the on coming wood.
 - Start cuts with the handle anchored against body and lowered, align bevel in the direction of the cut, then pivot the edge into the wood by raising the tool handle and turning the tools edge as needed for shape your cutting.
 - Establish cut prior to moving the tool across the rest.
 - Use your body to anchor the handle and keep your other hand on the rest applying downward pressure on tool steel to the rest.
 - Rest height needs to be adjusted as material diameter is changed allowing for the varying tool thicknesses. Note: rotate lathe manually once rest is adjusted to ensure proper clearance.
- d) Sanding as you go
- Be sure to remove all sanding grit or you will need to sharpen your tools often. Alternative is make all cuts

and after all cuts are made set up the same multi-axis and sand to remove turned edges and torn wood grain.

- Machine sanding and hand sanding with the grain will ensure a better finish.

e) Speed control – “make it quick”

6) Demonstration

a) Sample of completed project

b) Let's turn!

- With figurine head located at the headstock end start on center.
- Cut tenon and fillet for glue up to base.
- Use drawing and align tailstock 1" radius dimple that is appropriate to cut front of feet and rest of figure, stopping the lathe frequently to ensure only the proper amount of material is removed to your drawing.
- Reverse tailstock alignment to 1" radius dimple that is opposite on same diagonal line and remove material to penciled line on blank.
- On one of two remaining flats use 6b pencil to 1st draw line down the center of blank. Draw hour glass figure and front view ensuring proportions or same on both sides of drawing.
- Use the appropriate axis as required to cut from the feet to the head the using your drawing as a guide.
- **CAUTION: DO NOT MAKE ANY DIAMETERS LESS THAN 1/2" WHILE ROUGHING OUT. SHOULD A SMALLER DIAMETER BE WANTED? ROTATE THE PIECE SO THE CUT IS MADE AT THE HEADSTOCK END AND REMOVE THE WOOD CAREFULLY AS A FINAL CUT.** Due to the multi-axis turning a lot of torque can snap wood if too small of diameter. Use of speed control to start and stop lathe will reduce start-up torque on smaller diameter wood pieces.

7) Pick up your figure with both hands; examine it for pleasing curves with no flat spots. The quest to develop the most pleasing curves requires experience and probably another figure so this is yours and my challenge.

A bit about me...

My interest began in junior high school when I used a metal lathe to turn functional tools. Although interested in woodturning I didn't have access to a wood lathe. I was introduced to wood turning by my wife, Katharine in 1987 when she bought a shopsmith and we attended the Shopsmith School of woodturning.

Professionally, I am a member of the American Association of Woodturners, and was a former member of the Central New York Woodturners and am presently on the board of directors and a member of the Carolina Mountain Woodturners. Contemplating retirement as a nuclear mechanical maintenance supervisor I realized that I needed to be an accomplished woodturner by utilizing books, videos, and hands on workshops. Wanting to go beyond turning functional items and working to Gallery quality and design I attended workshops with premier master turners of our times (Ray Key (boxes & bowls), Andre' Martel (end grain lamps), Jonathan Nickelson (range rider woodhats), etc.). The skills that I learned along with substantial amount of wood chips and angel hair helped me to demonstrate my wood turning skills. I have done demonstrations for the Central New York Woodturners on a foot-powered treadle lathe from the 1890s and also on a new electric lathe to demonstrate the advantages of technology, at the historical Society of South Jefferson's Strawberry Festival in Adams, NY, and the New York's State fair in Syracuse, NY. I have also demonstrated at the Carolina Mountain woodturners on an electric lathe at the The Woodworking Show in Charlotte, NC, etc.

I have been working with wood for over 45 years and now have the opportunity to work full time with one of five wood lathes in my studio. It has been my lifelong ambition to become a professional wood artist and wood designer utilizing the versatility of wood as a medium. My work presently is in MIYA Gallery in Weaverville, and Curiosity Shoppe, Helens, GA.