

Mini-Lathe Stool Demo

Richard Rich – Woodturner

The purpose and arrangement of this demonstration is to 1) show how to build a stool from turned parts and 2) provide a relatively simple project for most turners to be able to complete at home.

This project is easily modified to fit mini-lathes such as the Jet 1014 by simply shortening the legs two inches. This project is not for the absolute beginner. Turning such a stool requires both spindle and faceplate turning skills.

To complete this project yourself, you will need the following project blanks:

- One seat blank – 9 $\frac{3}{4}$ round by 1 $\frac{1}{2}$ thick.
- Four leg blanks – 14 long by 1 $\frac{1}{2}$ thick (12 long for Jet 1014)
- One button blank – 3 long by 1 $\frac{1}{2}$ thick
- Four wedges – about 2 long by $\frac{3}{4}$ wide by $\frac{1}{8}$ thick with one end tapered
- Story stick

The following tools / equipment are needed:

1) Lathe (minimum 1014 size) with following components:

- Drive (steb style preferable) and revolving centers.
- 4 Jaw chuck with standard jaws and woodworm screw.
- Eye protection and full face shield.

2) Turning Tools

SRG, skew, spindle gouge, parting tool and bowl gouge (chatter tool optional)

3) Equipment

- Sharpening grinder w/ jigs
- Workbench of some type
- Sliding bevel
- Bottle of glue and small brush for spreading glue in mortises
- “F” style clamps or equivalent
- Cordless drill w/ charged battery
- Drill bits: 5/16 (for Nova screw centers) and 3/4 (auger or spade)
- Roll of masking tape
- Hardware store hand saw and a Japanese style flush cut saw
- Hammer
- Center punch
- Seat jig -12 square $\frac{3}{4}$ plywood with four 2” holes drilled at a 7” circle or corners cut

The following three pages are a step by step tutorial on how to make a stool.

This is for turners knowledgeable and familiar with the safe operation of lathe and tools. Anyone uncomfortable with turning the project, or inexperienced with the safe operation of the lathe and tools, should seek skilled guidance and instruction.

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SEAT LAYOUT

1. Place seat blank on workbench with center mark side up.
2. Use the protractor ruler to measure and spread the pencil compass - pencil to point to $3\frac{3}{4}$. Use this to draw a $7\frac{1}{2}$ circle by drawing the circle from center.
3. Find the grain line along the blank the best you can. Align the protractor with the grain line and make a mark at 45 degrees from center. With a straight-edge (the story stick will suffice), mark a line at 45 degrees from the grain line. Go from edge to edge.
4. Pick either side where the line intersects with the circle. Place the pointy end of the compass there. Stretch the compass out enough so the pencil will mark a short line outside the circle around the halfway point on both sides. Do this from the other side also. There should be X's on both sides of the circle. From these X's, draw a line from edge to edge. There should be four equal intersections around the circle. These are the leg hole drilling points and layout lines.
5. This is the bottom side of the seat blank.

SEAT DRILLING

1. Ready a cordless drill with a $\frac{3}{4}$ inch spade or auger bit. Center-punch the four leg intersections.
2. Use protractor and set a sliding bevel to 75 degrees.
3. Clamp seat blank, layout (bottom) side up, to the workbench. Leave half the blank overhanging the workbench edge. One leg intersection should be 90 degrees from the workbench edge, readily accessible to drill.
4. Place the sliding bevel alongside the layout line, leaving room for the drilling to take place. Drill through the blank using the sliding bevel to guide the drilling angle. The angle will be towards the center of the blank so the legs splay outwards.
SAFETY NOTE: Be careful to ease the drill bit and not apply too much pressure as the bottom of the hole can suddenly give way. In addition to being dangerous, it can cause more tear out than if moderate pressure is applied.
5. Drill the remaining three holes this way.
6. For the Nova G3 chuck screw center, use a 5/16 bit to drill a hole in the center of the blank bottom $\frac{3}{4}$ inch deep. Other chucks may require a different size hole to fit the crew center.

SEAT BLANK TURNING

1. Install 4-jaw chuck on lathe. Install screw center in chuck jaws.
2. Mount the blank onto the chuck screw center. Advance the tailstock revolving center for extra security.
NOTE: Longer screw centers than $\frac{3}{4}$ inch will need a spacer installed in front of the blank.
3. Mark the blank sides at $\frac{3}{8}$ and $1\frac{3}{8}$ from the blank bottom side (headstock end). Set the toolrest for cutting the bottom side of the blank. Turn the lathe on, the layout circle and the marks on the blank sides should be visible. If the marks are not visible, make them darker or longer.
4. With a bowl gouge, connect the layout circle line on the blank bottom with the first line $\frac{3}{8}$ from the bottom edge.
5. Turn the lathe off and re-set the toolrest to cut the top edge of the blank. With the bowl gouge, remove excess material from the blank top down to the second line made $1\frac{3}{8}$ from the bottom edge.
6. Round over the top edge to make a pleasing radius for the seat top, connecting with the bottom edge made earlier.
7. Remove the tailstock support. Dish the center of the seat like a very shallow bowl, being careful not to go more than about $\frac{1}{4}$ to $\frac{3}{8}$ deep.
8. Using wax or oil to reduce sanding dust, sand the seat blank smooth. Remove seat from chuck.

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BUTTON TURNING

1. Remove screw center from chuck. Clamp button blank securely in chuck jaws.
2. Turn exposed portion of blank round and smooth, being careful of the jaws.
3. Peel-cut round, plane cut towards headstock about $\frac{3}{4}$ inch until sides are smooth.
4. Smooth end face and chatter tool the end if desired. Using wax or oil to reduce sanding dust, sand and finish.
5. Leaving $\frac{1}{4}$ to $\frac{3}{8}$ from the face end, part down to 5/16 (or bit size used to drill center hole) to make a tenon about $\frac{1}{2}$ long. Parting slightly inwards towards the button face allows the edges of the button to seat completely around.
6. Part off.

LEG BLANK PREPARATION

1. Mark and punch centers on all four leg blanks.

LEG TURNING

1. Remove chuck from lathe.
2. Install drive center and revolving center.
3. Mount leg blank between centers.
4. Set toolrest to turn tailstock end first, which will be the top tenon portion of the leg.
5. Set calipers, one to $\frac{3}{4}$ and the other to 1 1/6.
6. Turn the blank round.
7. Using the story stick, mark the tenon and other leg details. For all designs including the bamboo style, the most important part is the tenon be marked 1 1/2 from the top of the blank and turned $\frac{3}{4}$ inch round. The tenon base must swell larger at the same place on all four legs. This provides a base for the tenon to stop against the bottom of the seat blank.
8. Turn the leg to the desired design.
 - Check tenon fit in a seat leg hole. It should fit snug and go in relatively easy. Like other woodworking mortise and tenon fits, try the gravity test. Install the leg tenon into a mortise. Lift the leg up. The seat should stay with the leg, at least briefly.
 - If you must beat the leg in with a hammer, it is too tight. Replace on the lathe and turn a bit off the tenon. Retry the gravity test.
 - If it miserably fails the gravity test, it is probably too loose. Turn another leg. It is good practice anyway.
9. Turn and fit all four legs.

WEDGE KERF SAWING

1. On a board with holes drilled, or corners cut out to give room for the tenon tops to extend through, install (dry, no glue) all four legs into the mortises of the seat. Seat them completely.
2. Arrange the tangential plane of each leg to the grain line of the seat.
3. Mark the leg at the tenon base at the layout line and number each leg and hole respectively, 1:1, 2:2 and so on. This allows you to replace the proper leg into the proper mortise on glue assembly.
4. With the legs attached, turn the stool over onto the legs.
5. Mark the top of the tenons at a 90 degree angle to the grain line of the seat.
6. Remove the legs. Draw a line down the tenon from the line marked on the top, stopping about $\frac{1}{4}$ inch from the tenon base mark you made earlier. Do this on all four legs.
7. Secure the leg with clamps on vee blocks.
8. Saw the line drawn down the tenon to make a wedge kerf on all four legs.

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DRY ASSEMBLY

1. Dry assemble the stool. Check to ensure the wedges will be 90 degrees from the grain line on the seat. If not, the possibility of splitting the seat is greatly increased.
2. Dry fit the button. Shave the tenon to fit if needed. It should fit snug into the hole.

STOOL ASSEMBLY + GLUE-UP

1. Place newspaper on the bench and put the board with holes drilled for the tenon tops on the paper.
2. With an old toothbrush or other disposable small brush, spread glue in each mortise.
3. Start with leg 1. Spread some glue on the tenon and seat it completely into the corresponding mortise making sure the alignment marks meet. Do this for the remaining legs.
4. Turn the stool right-side up on the bench. Spread glue on only one side of a wedge and hammer it into the sawn kerf of a tenon. When it makes a dull thunk or will not go further, it is done. Do this on all four tenons.
5. Spread glue on the button tenon and the underside of the button. Put some glue in the drilled hole. Seat the button completely.
6. Clean up any glue squeeze out with a paper towel.

WEDGE CUT-OFF

1. Place strips of masking tape on seat top around tenons.
2. Use flush-cut saw to cut off exposed tops of tenons and wedges.
3. Remove tape.
4. Later, you may chisel or sand to smooth tenon / seat top as necessary and apply finish as desired.

LEG LEVELING

1. Set stool on a flat surface to find out which legs need trimming. There are many methods to trim legs to length, here are two quick ones for minor trimming.
Method 1 - With a block plane remove wood from the bottom of the longer leg(s) until the stool sits flat.
Method 2 - Sandpaper is placed on the bench and the longer leg bottom rubbed across it.