Java With Style

By Malcolm Tibbetts

I'm reminded of a cute story about a little boy being asked by his teacher to name what he thought was the world's greatest invention. The little boy answered, "The Thermos." In surprise, the teacher asked, "Why would you pick the Thermos?" The boy replied, "Well, it keeps cold things cold and hot things hot, and it magically knows which is which."

A wood-turned, insulated travel mug makes an excellent gift or crafts show item. It is also a nice way to enjoy your morning brew. There are unlimited designs to the turned-wood wrap, so let your imagination go wild.

As shown on *page 61*, there are many construction techniques other than the one described here. Of course the simplest and fastest method is to use a solid piece of wood. Stacking segmented rings is a little more time-consuming, but it offers many design options. There are endless variations of laminated staves too. For small hands, a handle is a nice touch.

These step-by-step instructions are based on the stave-constructed cylinder with laminated wood layers used in the mug *above*. By mounting the cylinder off-center, you can create the assortment of surface curves. This is what I call lamination trickery.

Have fun with the possibilities.

Get started

For turning tools, you will need a ½" bowl gouge, a ¼" skew (optional), a small diamond-pointed scraper, and your favorite hollowing tool.

The initial turning of the inside presents some challenge. Until the inside is round, your

hollowing tool will bounce and jump as you attempt to remove wood from only one side. It can be done with a handheld tool, but I used an armrest Stewart-style tool, followed by an Eliminator (a relatively new hollowing tool available through Packard Woodworks). At the lathe, you will need a 4-jaw scroll chuck.

This construction requires ten ¼×2½ ×15" strips of contrasting hardwoods (I chose bird's-eye maple and cocobolo) and four 1/16×1½×15" strips of a third hardwood (I chose cherry). Veneer would also work for thin strips. By using 15"-long strips, you can produce four staves from each lamination.

Before you begin, have your mug insert in hand to verify all dimensions. The 16-ounce stainless-steel insert used here retails for about $9 from Smooth Turnings (smoothturnings.com).

Prepare the staves

With a drum sander or thickness planer, mill the hardwood strips about ¼" thick. The exact thickness is not critical, but strive for consistency. It is important that the layer thicknesses are all the same, otherwise the thickness of the glued stave material will not be consistent. Be sure to avoid snipe at the ends of your strips. If snipe is unavoidable, then mill longer material so you can cut off any snipe.

Using a water-resistant glue such as Titebond II, glue and clamp five layers of hardwood in alternating colors. I advocate putting a spring clamp wherever there's space.

If you choose an oily exotic hardwood, be sure to apply the glue soon after milling the hardwood so that wood extractives don't have a chance to seep onto the gluing surfaces.

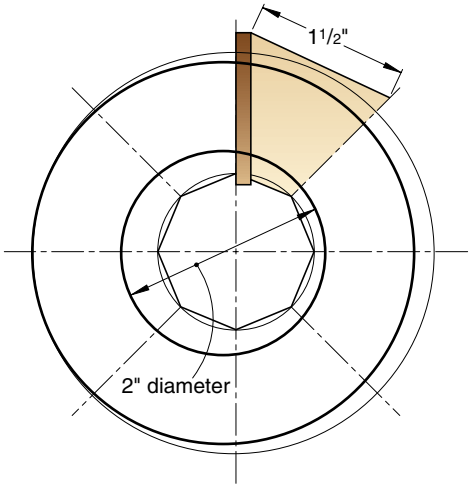
After a couple of hours, remove the clamps and allow the glue to cure for 24 hours or as recommended on the label. Using a glue scraper and then a jointer, clean up and square each lamination.

Set your tablesaw blade angle to 22.5 degrees and make a test cut to confirm the setting. When the angle is on the money, make a rip cut through the center of each lamination. Before making the second cut on the narrow staves, build the jig described on *page 61*.

Before adjusting the saw fence for the final cuts, make a couple of wider test cuts. With a crosscut saw, cut eight short staves from the strips. This provides one more confirmation of the saw-blade angle. Wrap the eight cutoffs with a rubber band to check the fit (**Photo 1**).

After confirming the blade angle, adjust the rip fence to cut staves with an outside width of about 1½". The tip box *at right* explains how I determined the width.

From each of the four 15"-long staves, cut two 7"-long staves for a total of eight. (The final length is 6¾"; you'll have an extra ¼" for fitting.) Before applying glue, dry-fit the assembly (**Photo 2**).



Determining Stave Widths

The simplest method is to draw a layout of the assembly. The drawing *above* shows my diagram. Before drawing my sketch, I knew the insert's smallest diameter (the bottom) was about 2" and I knew that I wanted to off-set the cylinder about ¼". Therefore, I decided that the cylinder's inside diameter should not be larger than about 1⅝". The insert's largest diameter (the top) was about 3½", which meant that my cylinder needed to be at least 4" in diameter (3½" insert + ¼" offset + ¼" wall thickness). In my sketch, the stave size is shown along with the width of my spacers. The bold circles represent the inside and outside of my offset cylinder, while the light circles represent possible dimensions of a centered cylinder.

—Malcolm Tibbetts

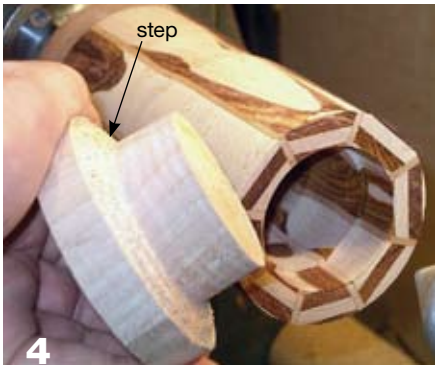

1

Cut eight short pieces to test that your saw blade is set precisely at 22.5 degrees.


2

Before applying glue, gather your clamping supplies and dry-fit the staves.

Hose clamps provide the ideal pressure for gluing up the stave mug wrap.



Turn a plug with a step; this will limit the depth of the plug insert.

After applying glue to the bottom plug, bring up the tailstock to apply clamping pressure.

With rubber bands holding the pieces together, wrap a few layers of masking tape around the cylinder. Then cut the tape along a stave seam, unroll the cylinder, apply glue, roll it back together, apply a few rubber bands, and tighten four hose clamps around it.

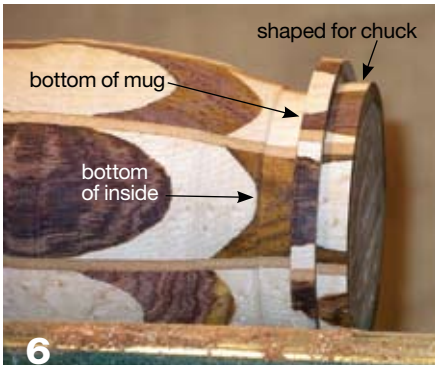
Prior to gluing, mount a faceplate onto a wasteblock and turn it to about a 3¾" diameter. After gluing together the cylinder, glue the wasteblock onto one end, slightly offsetting it about ¼" (**Photo 3**). Let the glue cure overnight.

Depending on the quality of your saw-blade cut, you might need to invest a few minutes in sanding the stave surfaces before gluing. To do this, adhere a piece of 80-grit paper onto a flat board and carefully rub each glue surface back and forth on it a few times. Be careful not to alter the miter angles.

Shape the cylinder

With the top of the cylinder securely attached to the wasteblock, use a ½" bowl gouge to rough-turn the outside and then true up the inside. As noted earlier, I used a Stewart-style tool, followed by an Eliminator on the inside.

To close the bottom, turn an opening with a step (**Photo 4**). Note the little step inside the opening.



Prepare the base of the cylinder for mounting in a 4-jaw chuck.

Check the fit frequently to get a snug fit between your wrap and the mug insert.

This limits the depth of the plug insert and determines the final depth of the cylinder. A small diamond-pointed scraper is a handy tool for making this type of fitting. The steel insert requires a minimum of 5¾" of cylinder depth.

I choose to orient the plug grain the same as the staves, which helps to minimize wood movement problems and provides a more desirable side-grain-to-side-grain glue joint.

To achieve a nice fit between plug and hole, it is easier to finalize the plug first and then enlarge the opening slowly while frequently checking the fit. When you're satisfied with the fit, glue the plug in place (**Photo 5**).

To remount the cylinder, turn down the protruding plug and shape a tenon to fit a 4-jaw scroll chuck (**Photo 6**).

With the mug held between a jam chuck and a live center, turn the bottom.

Turn the cylinder inside

Check the fit frequently as you turn and remove wood from the inside of the cylinder. As you approach the final fit, apply black crayon to the insert and rub the insert on the inside the cylinder. This provides evidence of where the fit is still too tight.

Other than at the top, the fit doesn't need to be precise. In fact, a little space provides room for

the insert to expand when hot and avoid stressing the wood cylinder. Take a little extra time fitting the top steel lip. For aesthetics and a waterproof seal, a snug fit is necessary (**Photo 7**).

Shape and finish

With the internal turning complete, finalize the outside shape. Instead of turning a straight-sided cone, use a skew or bowl gouge to turn a slight curve. The curve also provides a better grip.

For finish, apply several coats of lacquer-based sanding sealer (sanded between each coat), followed by four coats of gloss lacquer topped off with one coat of satin lacquer.

Handle-Building Tips

- For added strength, laminate at least three layers of thin wood. Keep the wood grain vertical.
- To shape your finger(s) hole, drill a top and bottom hole and then remove the wood in between.
- The teacup-style handle with only two connection points to the mug is too weak. A handle with 3" to 4" of gluing surface, such as in the photo *above*, is sturdier.
- If you have applied finish to the mug, roughen the mating surfaces before applying glue.

To provide a moisture barrier and minimize wood movement, it's a good idea to apply several coats of sealer to the inside of the stave cylinder.

Complete the mug

Use a jam chuck to reverse-mount the mug. To clean up the bottom, part off the tenon, and then use a jam chuck along with a tailstock (**Photo 8**). The jam chuck shown is an MDF disc with a precisely turned groove to snugly hold the top lip of the cylinder.

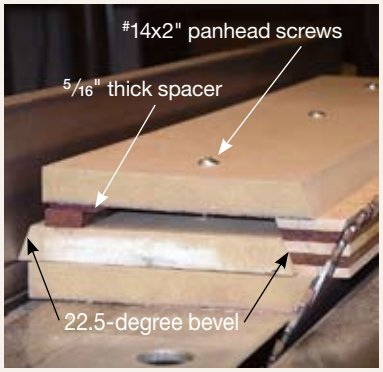
If your jam chuck is snug, your left hand can act as a keeper as you sand the entire bottom while the mug is still mounted on the lathe. After a little turning and sanding, sign the bottom with a woodburning tool or permanent marker. Then apply finish.

The last step is to permanently install the stainless-steel insert. To increase insulation properties, I applied a thin coating of polyurethane glue (Gorilla Glue is one trade name) to the inside of the cylinder. This type of glue foams as it cures, which fills voids and provides insulation. Before clamping, apply clear silicone adhesive into the steel insert's top groove. Wrap the finished wood and the steel insert with blue painter's tape to protect your surfaces during this final glue job. Because polyurethane expands as it cures, maintain clamping pressure for four hours.

Build a Ripping Jig

Building this jig may seem like a lot of hassle just to make four cuts, but it is worth the trouble. By having a large jig such as this, it's easy to attain a smooth pass through a sharp rip blade. Had the staves been wider, I could have made rip cuts on both sides of the staves without the aid of a jig, but pushing these skinny staves through the blade would be risky.

The photo *below* shows a lamination clamped in place as it passes through the saw blade.



Build this ripping jig from ¾" MDF, plywood, or particleboard. First rip both edges of the middle layer at the same 22.5-degree angle as the staves. Then glue the middle layer to the lower layer so that one beveled side rides along the saw fence and the other side acts as a support for the previously cut beveled edges of the laminations. Three #14×2" panhead screws provide the clamping pressure and a 5/16"-wide strip of hardwood provides a means of leverage. *—Malcolm Tibbetts*

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