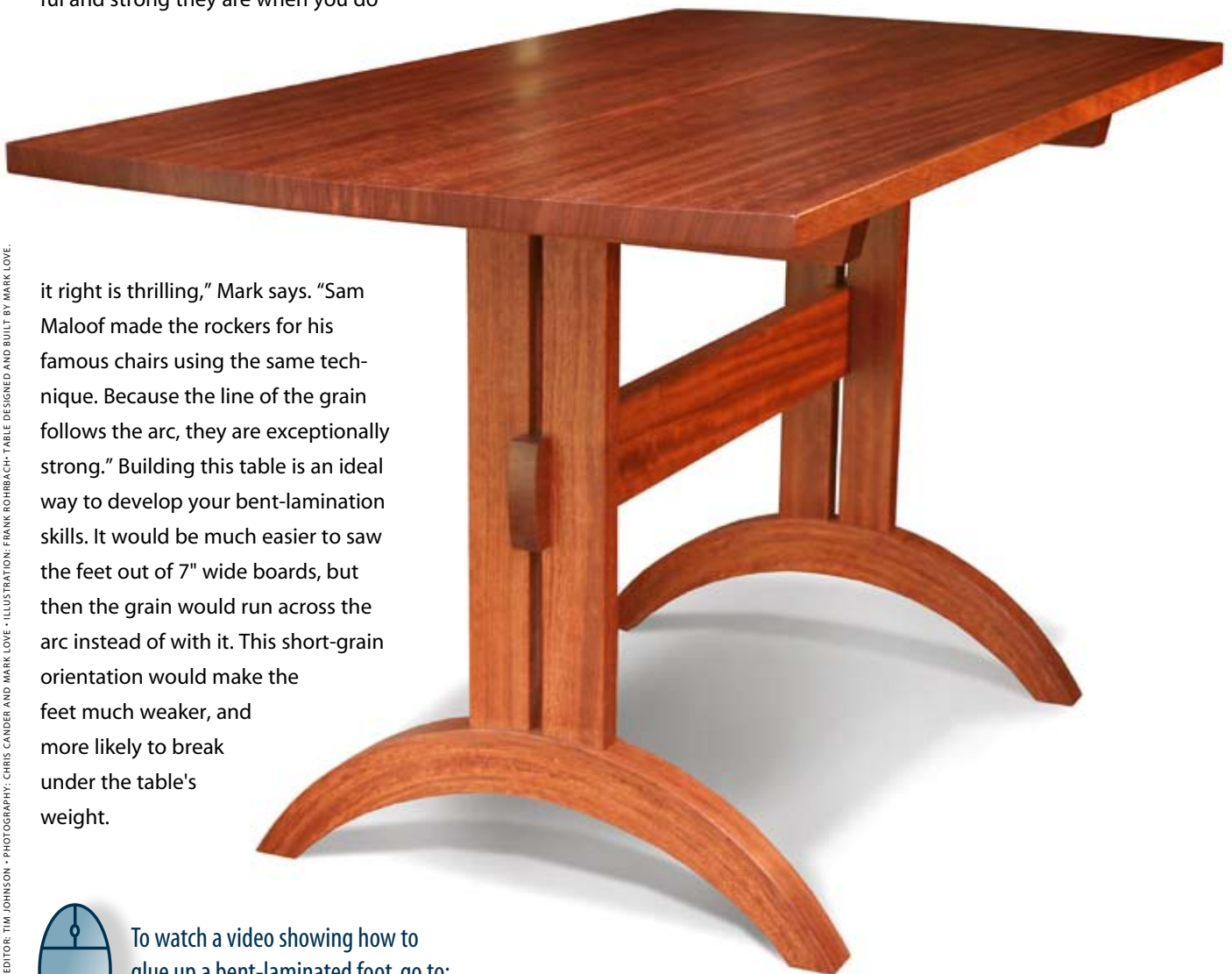


Trestle-Style Dining Table

THIS MODERN INTERPRETATION of a Shaker communal table appeals to furniture maker Mark Love's customers because of its elegant simplicity, ample legroom and the fact that it's easy to clean under. But Mark loves to build it because of the feet.

"Making these feet out of glued laminations and seeing how beautiful and strong they are when you do

Graceful bent-laminated feet are super-strong. by Chris Cander



it right is thrilling," Mark says. "Sam Maloof made the rockers for his famous chairs using the same technique. Because the line of the grain follows the arc, they are exceptionally strong." Building this table is an ideal way to develop your bent-lamination skills. It would be much easier to saw the feet out of 7" wide boards, but then the grain would run across the arc instead of with it. This short-grain orientation would make the feet much weaker, and more likely to break under the table's weight.



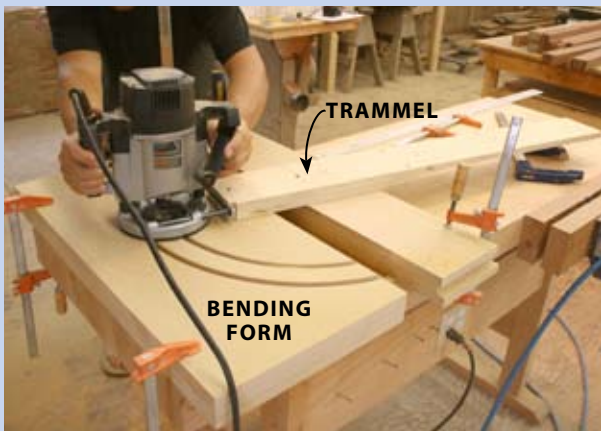
To watch a video showing how to glue up a bent-laminated foot, go to:
www.AmericanWoodworker.com/147/video



1 Saw laminations to make the feet. Each foot contains seventeen 5/32" thick laminations.

Materials

Mark built the 28" x 56" table shown here out of a single board of bubinga, an exotic hardwood with reddish-purple overtones and a ribbony texture. Bubinga is usually very stable and straight. "It's not essential to make the table from a single board, but I found one that was big enough for my entire cut list," Mark says. "It was a fun challenge to figure out how to do it, and I ended up with very little waste." To see the plans and cutting list for a 52" x 96" version of this table, visit www.AmericanWoodworker.com/147/LargeTrestleTable.



2 Make a bending form to laminate the arched feet. Use a shopmade trammel to rout a pair of arches in a glued-up MDF blank. Remove the curved section in the center to create the two-part form.

Rough out the parts

1. Roughsawn boards typically have end checks (cracks in the ends) that must be cut off. To make sure the checks are completely removed without wasting precious length, nibble each end in 1/16" increments. Make a crosscut and test the thin offcut—if it breaks when you gently bend it, make another crosscut. Repeat until you get an offcut that won't easily break. You can often lose several inches on a piece of hardwood by doing this, but it's a small price to pay when the alternative is discovering cracks in the completed project.



3 Test-bend the laminations without glue, and replace any that fracture. When the laminations draw together easily and tightly, without any gaps, they're ready to be glued. Unclamp, apply glue to each lamination and then clamp them all back together.

2. Lay out the parts on your boards before you start cutting. You may have to try several times in order to find the right combination of efficient use and good-looking pieces.

3. Mill everything to within 1/4" of its finished dimension (Fig. A, page 41 and Cutting List, page 42). Milling often releases internal stresses in rough boards, so once you cut the parts, sticker them and allow them to rest (ideally overnight) until the parts adjust to their new width and thickness.



4 The curve on the top surface of each foot must be consistent, so screw it to a "lazy susan" jig and sand down the high spots.

Laminate the feet

4. Each foot consists of seventeen 5/32" thick laminations. To make the blank from which the laminations come, mill a piece that's 2" thick and 36" long, with enough width to yield about forty 3/16" thick laminations. You can use multiple blanks if you don't have one wide

enough to get all the laminations, as long as the color and grain are consistent. Joint one edge of the blank. Then using the bandsaw, rip a 3/16" thick lamination and set it aside (**Photo 1**). The bandsaw leaves a rough edge, so you'll have to joint the blank after ripping each lamination. Repeat the process until you end up with 34 laminations (plus extras, for insurance) that are jointed on one side and bandsawn on the other.

5. Run the laminations through the planer, jointed side down, until they are all precisely 5/32" thick.

6. Glue together three pieces of 3/4" MDF to make the bending form for the feet (Part A, Fig. A and Fig. B). Cut concentric arcs into the form by setting the router up twice, but keeping the same pivot point on the tram-mel. Using a 1/2" straight bit, make several passes until you have gone as deep as you safely can. (**Photo 2**). Take the form to the bandsaw and cut along the channels you've just made. Flip over the two jig parts, so the rough edge left by the bandsaw is at the top. Then remove the rough edges by routing with a flush trim bit. Rub paraffin wax on both of the completed form's arcs to keep the laminations from sticking during glue-up.

7. Clamp 17 of the laminations in the form without glue and replace any that crack (**Photo 3**). Prepare to work quickly when you're ready to glue—yellow wood glue has only about five minutes of open time. Apply glue to one side of all 17 laminations and stack them, maintaining the original order to preserve consistency of the grain. Do not put glue on the outside faces of the top and bottom laminations! Place the stack in the form and clamp it together. This assembly is under considerable stress, so wait 24 hours before you remove the clamps.

8. The sides of the feet are rough when they come out of the bending form. Scrape off the squeezed-out glue and joint one side to flatten it. Then run each foot through the planer, to flatten the other side. Mill the feet to final 1-3/4" thickness.

9. Use a shopmade "lazy susan" jig

5 Sand the bottom of each foot flat after cutting it to final length.



6 Stand the feet on a flat surface to lay out the mortises. Mark a centerline to use as a reference point.



7 Rout through mortises in each foot in three steps. First, use a jig to plunge-route the mortises from the top, as deep as possible. The jig provides a flat surface for routing on the arched foot.



8 Next, tip the foot over and drill pilot holes deep enough to reach the mortises routed from the top.





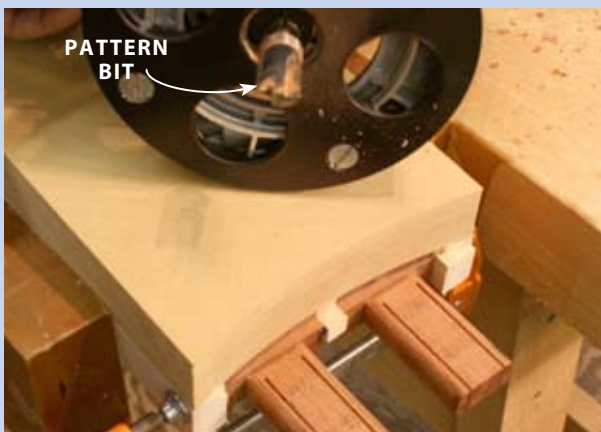
9 **Improvise a level platform** to complete the mortises. Install a flush trim bit, and plunge through the pilot holes. The bit's bearing rides on the walls of the previously routed mortises.



10 **Route the bottom edge** of each foot, to make it more graceful. Use the bending form (with a custom stop block attached) as a pattern to match the radius of the bottom arc with the top. Routing creates tapers at both ends of the foot.



11 **Round the uprights' tenons** to fit the mortises in the feet and top rails. Stop routing before the bit cuts into the tenon shoulder and complete the job by paring with a chisel or sanding by hand.



12 **Shape the uprights' bottom shoulders** to fit the arched feet, using a shopmade jig and a pattern bit. A pattern bit is a plunge cutting flush-trim bit; its bearing is mounted above the cutters.

to true the curved top edge of each foot (**Photo 4**). Fasten the foot to the jig's 14" radius circular piece with screws near the ends, so that it barely protrudes (about 1/32") beyond the edge. The ends of the foot will be cut off, so the screw holes won't matter. Clamp the jig's bottom (square) piece to the sander's table so that the foot almost touches the belt. Then gently tap it forward with a hammer until it just touches. Rotate the foot back and forth until your edge is smooth.

10. Cut each foot to its final 24" length. Lay each foot on its side and square a straightedge across the ends, 7" down from the top, at the center. Draw a line across both ends. At this line, the foot should measure 24" from tip to tip. Bandsaw each end below the line. Then sand to it (**Photo 5**).

Route mortises

11. Two through mortises must be routed in each foot (Fig. C). The surfaces are curved, so a pair of jigs are required to complete the job. The first jig guides the router on the top of the foot (Fig. D). The holes in the jig are larger than the mortises by 1/4" all around, which allows using a 3/4" guide bushing and a 1/2" mortising bit to rout the mortises. Find the centerline of each foot (**Photo 6**). This line will be your reference for positioning the foot in the mortising jig. Centerlines marked on both sides of the jig match up with the lines marking the center point of the foot. Clamp the jig to the foot, using a small clamp that runs underneath and squeezes the sides together. Clamp the assembly in your bench vise and then plunge-route the mortises halfway through the foot (**Photo 7**).

12. Finish the mortises from the bottom of the foot. First, drill pilot holes (**Photo 8**). Then use an improvised platform to hold the router level and a flush trim bit to finish the mortises (**Photo 9**).

13. Route the bottom edge of the foot, to lighten its appearance. Simply use the top half of the bending form to rout a 14" radius. Install a stop block to secure the foot and rout the arc with a flush trim bit (**Photo 10**).

Finish-sand before assembly

14. At this point, finish-sand both feet. "Nothing affects the final finish as much as sanding does," according to Mark (see "Sanding—Finishing's Essential First Step," page 43).

Make the top rails

15. Mill the top rails (B) to their final dimensions, and mark their through mortises (Fig. E). There's no need for a jig to rout these mortises, because the router will ride nicely on the flat surface. Install a 1/2" upcut spiral bit and set the router's edge guide exactly 7/16" from the outside of the bit. Then plunge-rout each mortise from both sides. This creates a perfectly centered 7/8" wide mortise, although a bit of chisel work is required to flatten the peaks left where the two cuts meet. Use the drill press to drill the counter-bored holes, through which the bolts that secure the top will go. Drill 1" deep with a 1" Forstner or spade bit, and then switch to a 3/8" brad point bit to drill the shank holes.

Cut the tenons

16. The uprights (C) feature wedged tenons on both ends (Fig. F). Start by cutting the tenon shoulders on the table saw, using the miter gauge equipped with a fence and a stop block. Saw the tenon cheeks slightly oversize on the bandsaw. Then install a dado set to precisely cut the tenon cheeks to final thickness.

17. Radius the tenon edges to fit the mortises with a 1/4" roundover bit, followed by paring or sanding (**Photo 11**).

18. Assemble each end to make sure everything fits. Then use the bandsaw to cut slots in each tenon for the wedges.

19. Now it's time to shape the bottom shoulders of the uprights, so they fit properly on top of the arched foot. Make a jig to hold each pair of uprights for routing (Fig. G). The jig has a 14" radius arc to match the foot and a center divider that exactly positions the uprights. Place an upright on

13 Routing leaves some work to be done to complete the uprights' arched shoulders. Remove the remaining waste by hand.



14 Complete the stringer. Cut dadoes for the uprights and shape its curved ends.



15 Assemble the base in stages. First, glue and clamp the stringer between the uprights. Work on a flat surface and mount the top rails to keep the uprights aligned.



16 Complete one end at a time. Apply glue and install the top rail and the foot. Then use clamps to gently draw the joints together.





17 Drive in the wedges as far as they'll go. After the glue has dried, cut off the waste and rout the wedges flush.



18 Place a straightedge across the top during glue-up, to make sure it stays flat when clamping pressure is applied.



19 Use a shop-made trammel to rout the top's ends. Complete the job in several steps, by making incrementally deeper passes.



20 Attach the top after applying the finish. Center the base and use a brad point drill bit to mark the locations for the threaded inserts in the top. Drill holes and install the inserts. Then bolt on the top.

each side of the divider with its top shoulder registered against the 1/4" spacer. Clamp the uprights together across the jig. Flip the assembly over and mount it in your bench vise. Then use a flush trim bit with a top-mounted bearing to rout the uprights' arched shoulders (**Photo 12**). Flip the uprights over, reinstall them in the jig, and repeat the process to rout the remaining shoulders. After routing, you'll have to finish the job by hand (**Photo 13**).

20. Fit the tenons in the mortises and check the shoulders. The bottom tenons will protrude. Cut off the extra length, leaving just a bit to be cleaned up later with a flush trim bit.

Assemble the base

21. Mill the stringer (D). Then locate the dadoes for the uprights (they're spaced 28-3/4"). Size the dado widths so that the unsanded uprights will almost, but not quite, fit. When the uprights are finish-sanded, they'll fit perfectly.

22. Draw the arc on each end of the stringer and then sand to the pencil line (**Photo 14**).

23. After finish-sanding all the parts, it's time to assemble the base. There's no joinery to hold the uprights to the stringer, so carefully measure and mark the centerpoints on both the uprights and the stringer, and match them up. Brush glue into the dadoes, install the uprights, and gently apply clamps. Then knock on the top rails to keep everything in place (**Photo 15**). Allow at least a couple of hours for this assembly to dry.

24. Remove the top rails, apply glue around all the tenons and slide them back on. Repeat with the feet (**Photo 16**). Draw the parts together with clamps, using small wooden blocks to protect the already finish-sanded pieces.

25. Complete the base by driving in the wedges that spread and lock the tenons (**Photo 17**).

Glue up the top

26. Lay out the rough-cut boards you've set aside for the top (E) to create a pleasing appearance. Once you're satisfied with your layout, draw a chalk triangle on the boards to make it easier to maintain the order as you joint the all the edges. Alternatively mark the edges "I" and "O" to designate which side goes "in" or "out" against the jointer fence. This cancels out unsatisfactory results caused by a slightly out-of-square jointer fence. Check the fit of each joint as you joint the edges.

27. Although they aren't absolutely necessary, you may want to use biscuits or splines to align the boards for gluing. Mark swears by Domino tenons, spaced at 10" to 12" intervals. Spread glue on the edges of each board and then glue and clamp the top (**Photo 18**).

28. Use a shop-made trammel to rout the 66" radius arcs on the ends of the top (**Photo 19**). Then finish sand.

Apply finish and attach the top

29. Apply your favorite finish to the top and the base. Mark uses a HVLP gun to spray lacquer in satin finish. Let each coat dry, sand with 400 grit paper, and then spray another coat.

30. Now the base is sanded, finished and ready to go. Place the top upside down on a blanket to protect the finish. Then measure and set the base onto the top where it will go. Poke a 3/8" brad point drill bit through the holes in the top rails and tap it with a hammer to mark the top.

31. Drill 9/16" deep holes in the top and use a T-wrench to drive in the 1/2" brass threaded inserts (see Sources, page 42). Position the base on the top and fasten it (**Photo 20**). There's enough play between the 3/8" shank holes in the top rails and the 1/4" bolts to accommodate the top's seasonal movement.

Fig. A: Exploded View

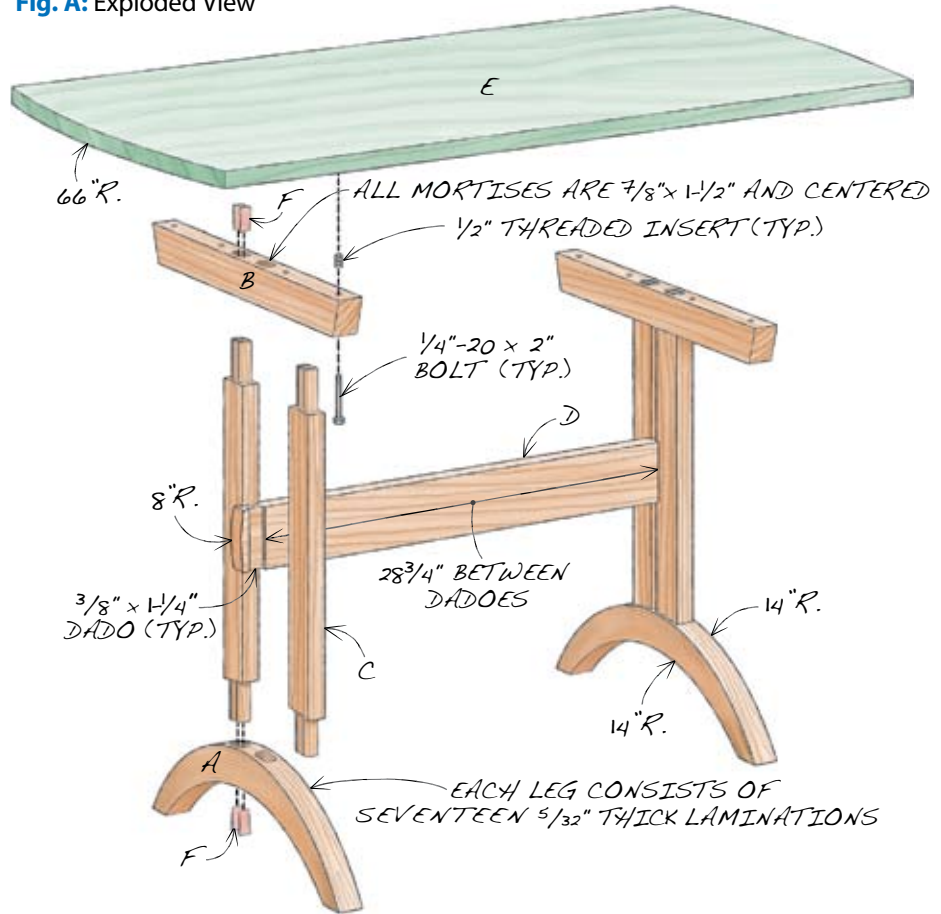


Fig. B: Bending Form

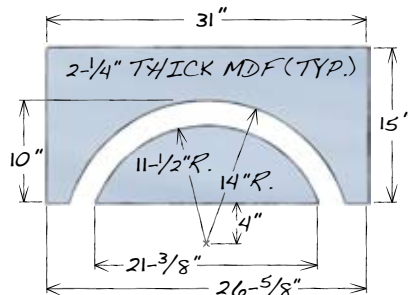


Fig. C: Foot Mortises

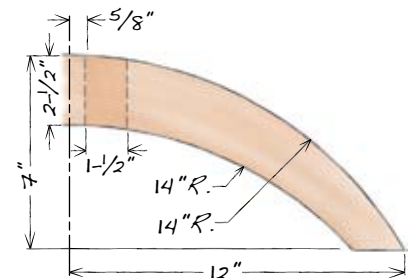


Fig. D: Mortising Jig

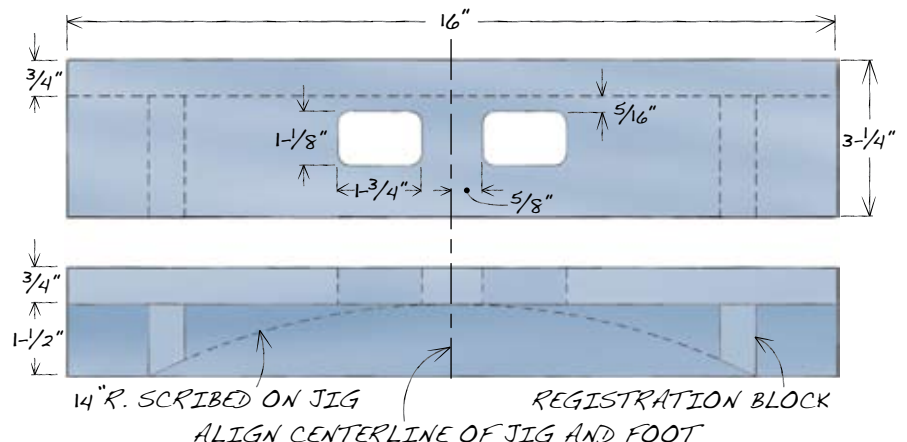


Fig. E: Top Rail Details

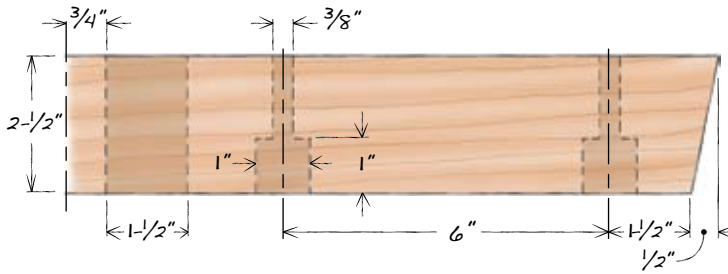


Fig. F: Upright Details

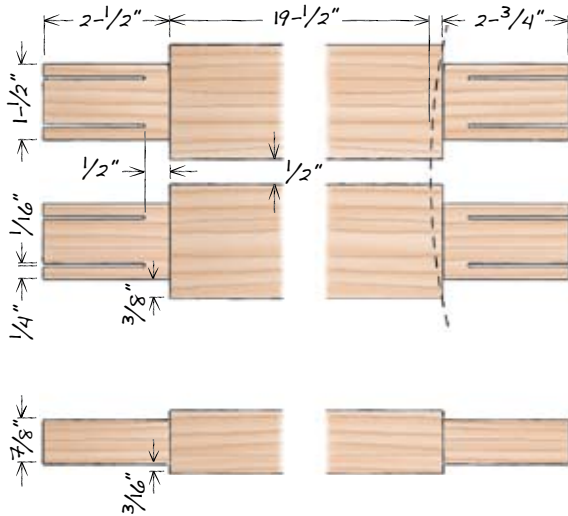
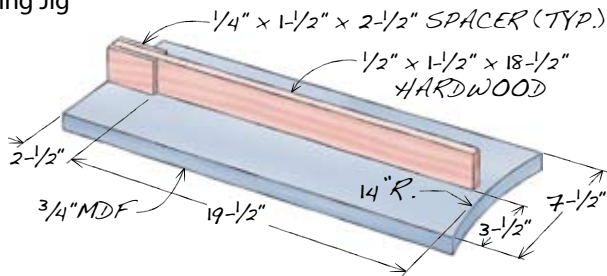


Fig. G: Routing Jig



Chris Cander is a freelance writer and novelist. In addition to writing for *American Woodworker*, Chris is a contributing editor to *Oxygen*, *Maximum Fitness* and *Clean Eating* magazines.



Mark Love is a professional furniture maker in Wimberly, Texas. To see more of his work, visit www.marklovefurniture.com.

Trestle-Style Dining Table

Overall Dimensions: 56" L x 28" W x 29" H

Part	Name	Qty.	Material	Th x W x L
A	Foot	2	Bubinga	1-3/4" x 7" x 24" (a)
B	Top Rail	2	Bubinga	1-3/4" x 2-1/2" x 24" (b)
C	Upright	4	Bubinga	1-1/4" x 2-1/2" x 25" (c)
D	Stringer	1	Bubinga	1-1/4" x 4" x 33-1/2" (d)
E	Top	1	Bubinga	1" x 28" x 56" (e)
F	Wedge	16	Walnut	1/4" x 7/8" x 2" (f)

Notes

- (a) Each foot consists of seventeen 5/32" x 2" x 36" laminations. The 7" width represents the foot's overall height, measured from the floor. The foot's actual width, measured at its widest point, is 2-1/2". The radius of both the top and bottom arcs is 14".
- (b) The length is measured at the top edge; the length at the bottom edge is 23".
- (c) The length is nominal, and will be reduced when the lower tenons are trimmed.
- (d) The distance between the two dados is 28-3/4". The radius of the end arcs is 8".
- (e) The radius of the end arcs is 66". The overhang to the top rail is 11-7/8".
- (f) The wedges taper from 1/4" to 0".



To see the plans and cutting list for a 52" x 96" version of this table, visit: www.AmericanWoodworker.com/147/LargeTrestleTable

SOURCES

McFeely's, www.mcfeelys.com, (800) 443-7937, 1/4-20 Brass Threaded Insert, #3606-BI, \$12.10 for 25.

Sanding— Finishing's Essential First Step



As I sand a part, I stop and hold it up to the light. In the reflection I can see whether or not I've removed the scratches from the previous grit.



The part on the left has been sanded all the way to 320 grit. The part on the right has only been sanded to 180 grit. Clearly, 180 grit scratches are so coarse they make the wood look dull.

"Nothing affects the final finish as much as sanding does," according to furnituremaker Mark Love. "For years, I applied oil finishes on my pieces. Oil finishes benefit from sanding to very fine grits, so I learned some important sanding lessons. I learned to work through the grits without skipping and to change paper frequently, to make sure that it's always abrading the surface; sanding with worn-out paper is never a good idea. I use a block to sand flat surfaces; Dura-Block hard foam sanding blocks are my favorites.

"I sand slightly diagonally, and change directions whenever I change grits. This makes it easy to see when all the scratches from the previous grit have been removed. When I sand with the final grit, I follow the grain, and finish by slightly rounding over the sharp outside edges by hand, without using a block.

"To ensure perfect sanding in even the tightest places, I finish-sand each part before I glue anything together—except for glue surfaces and boards for a table top or panel, which I sand after they're glued together.

"I now use clear lacquer as a finish. Like other film-forming finishes such as varnish and polyurethane, lacquer is much more durable than oil finish. To prepare dense hardwoods such as bubinga (shown here) for a film-forming finish, I start with 80 grit sandpaper and work through 100, 120, 180, and 220 grit, before finishing with 320 grit."

Mark sees a difference in the final appearance when he sands dense hardwoods to 320 grit, but some finish manufacturers don't recommend sanding beyond 220 grit, especially if you plan to stain the wood, or if you're working with soft woods such as butternut or pine. So check the label of the finish you plan to use and follow the surface preparation instructions.

How much finish-sanding do you do? To share the finish-sanding method that works best for you, go to www.AmericanWoodworker.com/147/Sanding.

