

Pattern Routing Exterior Details

This production-line method of shaping helped put a new deck on a Tudor house

by Joseph Wood

“All right, a Tudor!” That’s the first thing I thought when I arrived at the Roses’ house in Coronado, California. I was there to see about replacing their old deck, and my favorite jobs are outdoor projects where I can re-create custom millwork on period houses.

When I design and build a project for a house with a particular style, whether it’s Southwestern, Victorian, Craftsman or whatever, my first step, after looking through my own books, is to go to the library to find out what details define these styles. In this case I was replacing a deck, and my goal was to build one that would look good on a Tudor-style house.

I found that Tudor homes exhibit a heaviness both in construction and in details left exposed. These homes are usually half-timber construction infilled with brick, stucco or stone, and the timbers are big; roofs are steep with wide bargeboards, and colors are often dark.

I did a few things to lend this deck a Tudor quality (photo right). First I sheathed the deck sides to give the profile bulk. For the railing I fabricated broad, pattern-routed balusters of 1x6 redwood. And to create a Tudor theme, I erected an open-roof timber-frame entryway, or pergola. For a heavy look, I stained the deck dark. The finish I used on this deck, and on all my outdoor projects, is Olympic oil-based deck stain. In this case it was Espresso semitransparent stain.

Enclosing the crawlspace—The size and the shape of the deck were restricted by a driveway and a walkway, so I pretty much built the deck with the same perimeter as the old deck. I placed a new continuous concrete footing around the perimeter and built the supporting structure from pressure-treated Douglas fir. The deck joists bear on a 4x6 girder that’s supported by a stemwall of pressure-treated 2x4s spaced 16 in. o. c. I sheathed the stemwall, enclosing the crawlspace beneath the deck, to get a heavy look consistent with Tudor architecture. Exposed posts or a lattice skirt would have looked too light. To ventilate beneath the deck, I built mahogany grilles with redwood frames.

All of the exposed stock on this project is kiln-dried clear-heart, vertical-grain redwood, the sweetest wood to work that you could ever find. Redwood is great for outdoor use because it’s stable—no warping, checking or splintering—and it lasts a long time. Its workability allowed for a lot of pattern-routed details—most notably the profiled members on the railing and the pergola.



Deck complements house. A timber-frame pergola, closely spaced balusters and an enclosed crawlspace—all made of redwood that’s been stained dark—make this deck appear as if it were always part of the Tudor-style house.

la—that really helped the deck work with the Tudor-style house.

Pattern-routed balusters—On the railing I wanted a heavy look in keeping with the Tudor style, but I didn't want a heavy feel. So I used closely spaced 1x6 stock for the balusters and opened them up a bit by cutting each one into a decorative shape. Both bottom and top rails are dadoed to receive the balusters, which are separated with spacer blocks. I attached the top spacer blocks with hot-melt glue. Balusters and bottom spacers float free.

The balusters' heart-shaped design is my own, and I used a router and a template, or pattern, to cut the balusters. Pattern routing is faster and more accurate than cutting with a bandsaw, then sanding the profile edge.

The key to pattern routing is starting with an accurate template. So long as I spend time on fabricating the template, I'm assured of accurate cuts on my workpiece, especially when I'm cutting many identical pieces, such as the balusters.

I make my templates from 3/4-in. medium-density fiberboard (MDF) because it doesn't warp, and it's easy to cut and shape. It's also dense, so it holds up to pressure exerted by router-bit bearings. This is important because I often use the templates again on other projects.

My templates start as a sketch of a profile I like on a piece of MDF. I cut the profile with a bandsaw and sand it. To get a perfectly symmetrical template, I cut only one side of the profile. I use this one-half profile to pattern rout one side of another piece of MDF. Then I flip the half-profile template over and rout the other side of the MDF, ending up with the same contours on both sides.

The half-profile template is exactly half the width of the finished template. By marking a line on the finished template along the inside edge of the half-profile template, I can flip it over and position it accurately.

When I'm cutting side details, such as the profile of the balusters, or if I'm removing a lot of material, I first remove the excess with my bandsaw (top photo, right), leaving perhaps 1/4 in. of material for my router to remove.

Pattern routing is simple; I attach a template to a workpiece and run a top-bearing flush-trim bit around the template to cut the finished piece (bottom photo, right). Sometimes I tack the template to the blank with a couple of brads; I also make templates that can be clamped to the workpiece without interfering with the router. On this project the baluster templates were tacked in place, but some of the templates I used in shaping the pergola were clamped.

Redwood cuts like cheese, and I can rout practically any kind of pattern I want. But when the router bit comes out of the stock at a right angle to the grain, some tearout or splintering usually occurs. So about 1/2 in. from the end of the cut, I stop routing, go to the outside of the workpiece and slowly and carefully back the bit into the stock to meet the previous cut.

Building a pergola—The Roses' house, like many Tudor-style homes, features exposed timber framing infilled with stucco—a style called



Getting it close. The baluster profile on the 1x6 redwood was sketched from a pattern, then the excess material was removed to within 1/4 in. of the line with a bandsaw.

Getting it perfect. Pattern routing involves running a top-bearing flush-trim bit around a template to cut the workpiece. Here, the baluster pattern is tacked to the workpiece below it.



half-timbering. I've always wanted to try timber framing because it combines both woodworking and construction skills. This deck provided a perfect opportunity because a timber-frame element reinforces the Tudor theme. The pergola is made of heavy redwood stock and features a truss with mortise-and-tenon joinery and a big dovetail at the base of the king post. I did the mortise-and-tenon and dovetail work mainly with flush-trim bits in the router and various templates and jigs. Sharp chisels cleaned everything up.

I used heavy stock—6x6 posts to hold the pergola up, 4x6s for the truss and the carrying beams, and 3x6 rafters—to match the size of the half-timbering on the Roses' house.

I began by setting the posts on anchors in concrete pads and through-bolting the posts to blocking between the joists for stability. Then I fastened the decking and set the pergola's carrying beams in notches at the tops of the posts. At the house end, the carrying beams are mortised into the 1½-in. thick stucco and lag-bolted to the 5/4 sheathing and the first-floor rim joist.

The decorative ends on the carrying beams and on the rafter tails are my interpretation of Tudor: not delicate, but clean cuts, and massive without being square. It took four passes to pattern rout these shapes on the 3½-in. material.

For the first pass I used a ½-in. dia. by ½-in. long top-bearing flush-trim bit, guided by the template (top left photo, above). Then I removed the template and made another pass, this time guiding the bearing on the sides of the previous cut (top right photo, above).

I then changed to a ½-in. by 1-in. top-bearing flush-trim bit and made a third pass, guiding the bearing on the sides of the cut (left photo, facing page). On 4x stock, three passes brought me better than halfway through the workpiece.

Next I cut off the excess stock with a jigsaw, keeping the blade about ¼ in. from the profile line (middle photo, facing page). For the last pass I flipped the piece over and used my 3-hp router with a ½-in. by 2-in. bottom-bearing flush-trim bit, guiding the bearing around on the walls of my last router cut (right photo, facing page). The finished cut is square to the surface and requires no sanding.

With a round-over bit I shaped a decorative profile on the faces of the carrying beams, making two passes, the second one lowered so that the vertical part of the bit cut a shoulder.

Oftentimes, the bearings on routers can heat up and blacken or even seize. So before I use a bearing bit, I give it a shot of bearing lubricant, which I picked up at the local tool outlet.

Fabricating the truss—I wanted an uncluttered truss to match the spacing of the half-timbering on the house, so I designed a simple king-post truss with two webs (drawing facing page). I drew the truss full size on my workbench to get the angles and the dimensions.

To cut the profile of the 4x4 king post, I used the same pattern-routing technique I used to cut the balusters.

I used templates I made for an earlier project to shape the dovetail that connects the king post to the bottom chord. When pattern routing hard an-

Routing thick stock



Bit rides against template. With a rafter-tail template clamped to the 4x6 rafter stock, the author guides a ½-in. flush-trim, top-bearing bit along the template's edge to begin shaping the end profile.



Bit rides against previous pass. Using the same router setup but with the template removed, the author guides the bearing along the cut made by the first pass; in effect, the rafter becomes its own template.

gles, such as the narrow portion of the dovetail and the wide portion of the dovetail mortise, the bit leaves a curved portion equal to its radius, and this curve must be squared up with a chisel.

A bridle joint connects the king post and the top chords; that is, the top chords are forked to fit over tenons in the king post. The lower ends of the top chords have long mortises that accept the tenoned ends of the bottom chord.

Although the heavy top-chord timbers aren't likely to sag over their short 7-ft. 6-in. spans, I added 2x4 webs for stability and looks. I cut the mortises and the tenons for the webs traditionally, with a handsaw and a chisel.

Then I put the truss together. I used pegs and construction adhesive to secure all of the tenons and construction adhesive only in the dovetail. I tapped all of the pegs in a little and put in button plugs for a nice finished appearance.

I set the truss on top of the posts and the carrying beams. Four long dowels—one in the top of each 6x6 post and one into each carrying beam—hold the truss in place, and the whole thing was further secured with a countersunk lag screw into each carrying beam.

The pergola's ridges sit in a half-lap at the top of the truss and butts into the stucco. Once the ridge was in place, I set the three pairs of 3x6 rafters. These aren't as tall as the 4x6 truss chords, so the 10, 2x3 purlins are let into the truss chords ¾ in. The final task was installing the pendant (see sidebar) under the trusses' king post.

Imagining my forefathers' approval for my first timber-framing project was one of the most satisfying moments of my building career. □

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Making finials

One late night I happened to catch an old British film on television. In this film there was a scene in a Tudor-era church, and while the plot was unfolding, I was eyeing the architecture. Sure enough, I saw at the top of a newel post a knoblike ornament, called a finial, that I could use on the deck's railing. I used the same design for a pendant directly below the truss' king post.

I cut both the finials and the pendant from 6x6 redwood stock on a bandsaw and narrowed the base to 4 in. by 4 in. on a table saw. The only difference between the finials and the pendant is that I trimmed the base of each finial with redwood brick molding.

First I made a pattern of the finial profile from ¼-in. plywood. Then I traced the profile on a piece of redwood and cut it on the bandsaw. To profile the rest of the sides, I couldn't trace the pattern on the finial, so I tacked to the workpiece a length of ¼-in. plywood with the outline of the finial drawn on it (photo below). Then I cut the rest of the finial. —J. W.

