Two Lessons from a Porch Addition

A plumb-bob foundation layout and a cable-tensioned balustrade customize a tract house

by James C. C. Rice

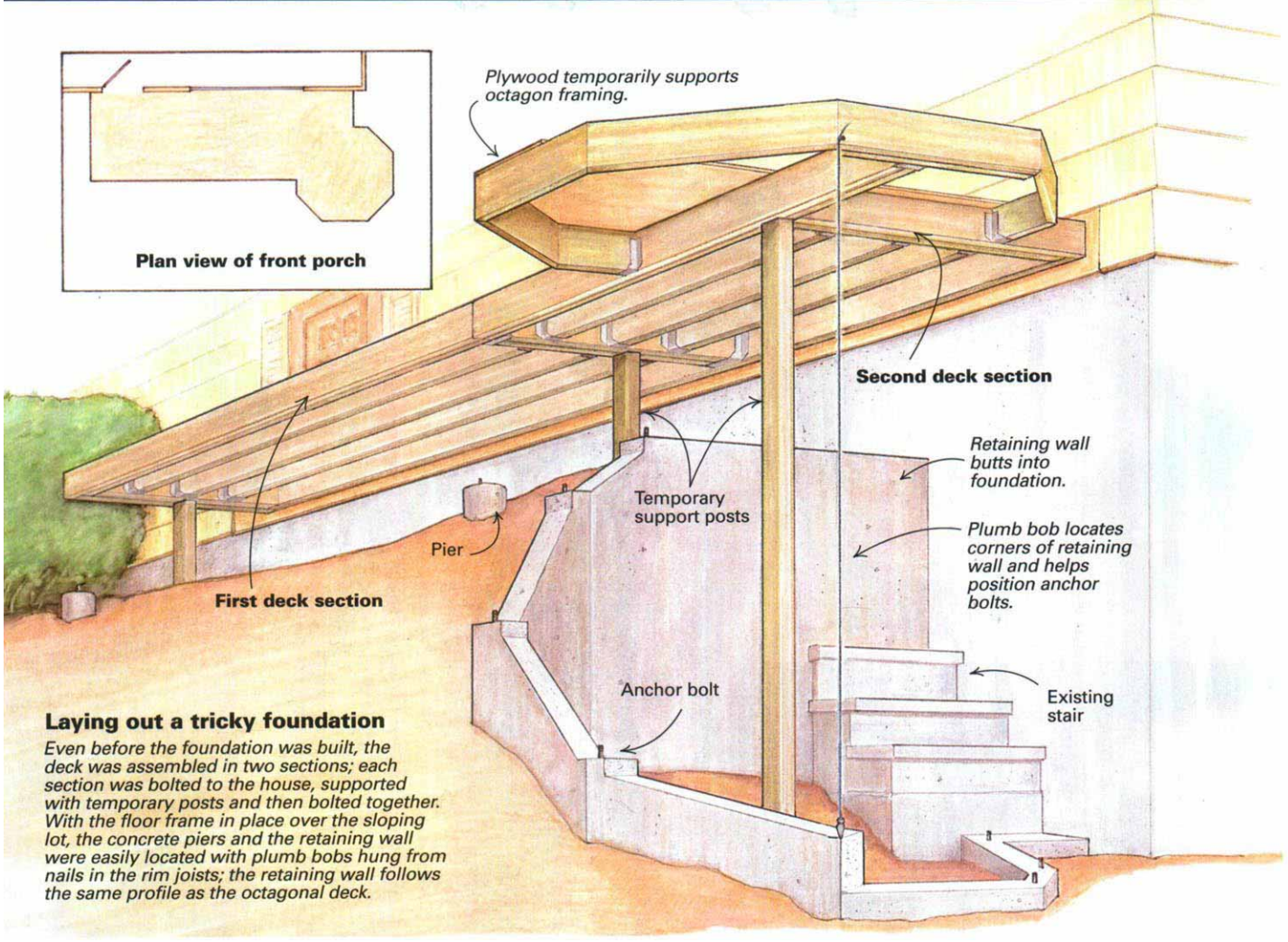
New porch, new look. The original nondescript, split-level house (inset) was transformed with a new entryway (top). The new construction includes a roofed porch with a cedar-clapboard sunburst, an octagonal deck (at right) and a curving entry stair. The porch was built right over the old precast stairs.

Everyone's heard the story of the drunk who stumbles into a house down the street because it looks just like his own house. I guess the neighborhood sot could have shown up at Ed and Loretta Korzon's place. Their split-level ranch (inset, left) was built during the suburban speculative housing boom of the late 60s and was identical to the rest of the houses on the block.

In fact, the Korzons hadn't endured such an episode, and they might have had their front stairway to thank. Steep and treacherous, this precast stair pinned against the foundation was a struggle to climb—even while sober. The Korzons had pretty much given up using it. The basement shop door had become the primary entrance for the Korzons and their guests.

The Korzons wanted to use their front door again, so they hired me to design and build the covered porch with a curving front entry stair pictured here (photo above). Along with the gable-covered entry, I placed an octagonal deck in the northeastern corner of the porch. Its shape

Top photo, this page: Rich Ziegner



Laying out a tricky foundation

Even before the foundation was built, the deck was assembled in two sections; each section was bolted to the house, supported with temporary posts and then bolted together. With the floor frame in place over the sloping lot, the concrete piers and the retaining wall were easily located with plumb bobs hung from nails in the rim joists; the retaining wall follows the same profile as the octagonal deck.

mimics a bay window on the house's north elevation. The deck offers a wonderful vantage point to view the distant hills and gives the house character. Laying out the octagonal foundation and devising a sturdy railing system for the octagonal porch were interesting challenges, and in this article I'll talk about how I dealt with both.

Frame first, foundation second—The Korzon house occupies a dynamic, steeply sloped corner lot. Finding a way to lay out the new porch foundation accurately along the steep, irregular ground was the first problem.

Half the porch is supported on 10-in. piers. For the other half, including the octagonal deck, I designed a sloping octagonal retaining wall that returns into the existing foundation (drawing above). Why a retaining wall? In the first place, I decided to build the new front porch over the old precast staircase. Only the top landing and the bottom two steps were removed. I wanted to use the material excavated from the pier holes to level out the ground below the porch and bury the precast stair. The retaining wall holds back this excavated material. Also, piers supporting each corner of the octagon would have been so close together that it was easier to dig a trench.

As I tried to figure out how to lay out the foundation, I realized how much easier it would be if the porch floor were already in place. Then I could just drop plumb bobs down from the framing to locate the piers and the retaining wall.

Plumbing the forms. Plumb lines at the deck corners help locate the foundation forms.

Beveled supports. Posts were milled to continue the octagon down to the retaining wall.

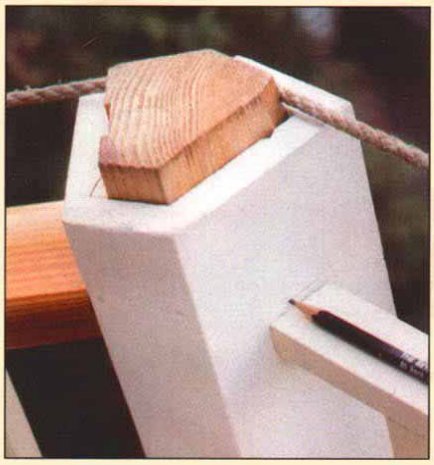
Building the floor frame first would simplify the task of laying out the foundation. So now my problem was figuring out how to install the porch floor without a foundation to support it.

Framing the floor—I could frame the porch floor most accurately by building it on the ground and raising it in two sections. To construct the section that includes the octagon, I built a template from two pieces of plywood screwed to some 2x4s. On it, I drew the octagon's framing, trim, and column and newel-post locations at full scale. The template reduced the math necessary to determine the length and shape of the framing members. Often I just scribed individual members right from the template.

The octagon cantilevers over the porch's rim joists, so I tacked a sheet of plywood on top of the floor framing to hold the octagon in place (remember, I've got no foundation yet). Then

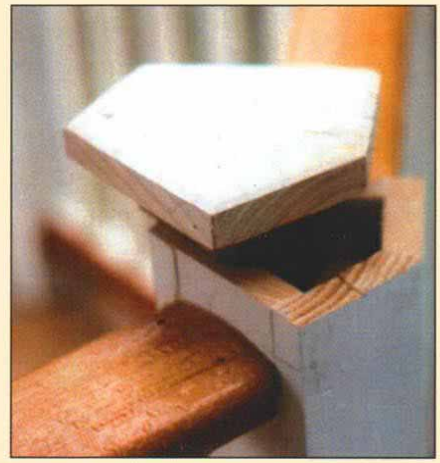
Drawings: Bob Goodfellow

Cable-tensioned balustrade

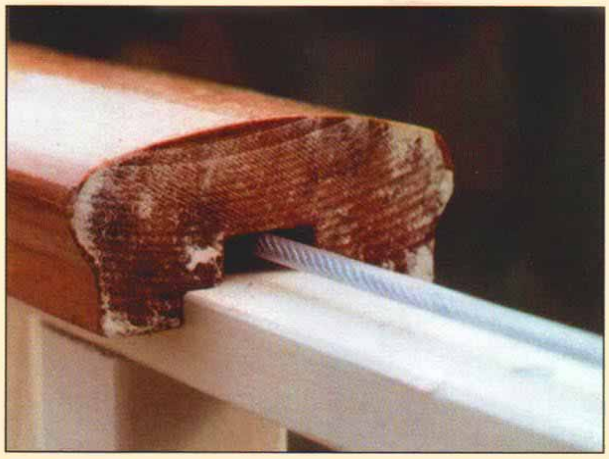


Marking the cable hole. Railing sections were held between newels with a rope so that the newels could be marked and bored for the cable that strengthens the handrail.

A cable channel. The rough newel was cut to size, then a channel was routed for a length of copper tubing. The cable passes through the tubing to protect the wood from damage.

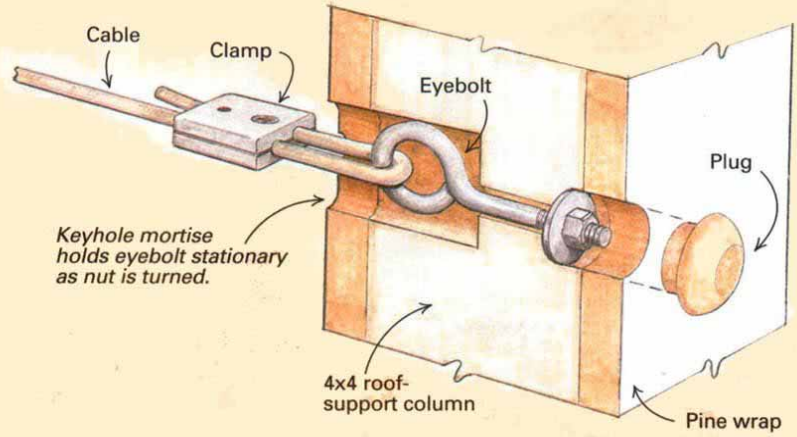


To cap it all off. Cut on a table saw from clear 2x8 cedar, the newel-post caps were sanded and varnished. A block screwed under the cap fits into the newel post.



Handrail conceals cable. This cedar handrail was grooved to hide the cable. Once the cable was tight, the handrail and a corresponding rail at the bottom of each section were fastened to the newels with galvanized 16d finish nails.

Anchoring the tension ring
The tension ring, a length of stainless-steel cable, is anchored at the columns that flank the octagon. The cable loops through the eyebolt and is clamped tight. Cable tension is adjusted with a socket wrench.



each section of the floor frame was lag-bolted to the house and to each other.

Supporting the edge of the floor frame temporarily was easier than I had imagined. Three 4x4 columns, 2 ft. in from the edge, did the trick and left me room to dig the pier holes and the trenches and to place the concrete.

After bolting the two floor sections together, locating the piers was easy. I started a few nails along the rim joist and hung plumb bobs.

I did the same for the retaining wall, which bears on a concrete footing. I dropped plumb bobs from each corner of the deck framing, measured 1 ft. to both sides of the bob and dug a circular trench below the frost line. The ground was firm, so it became the form for the footing.

When it came time to pour the retaining wall itself, I built forms to match the profile of the octagonal deck (left photo, p. 63). The forms sat on the footing, plumb with the deck framing. To get the sloping effect in the retaining wall, I built hinged plywood doors at the top of the forms. As the forms filled with concrete, I closed the doors, tacked them shut and continued the pour.

Finally, I used plumb bobs to locate the anchor bolts in each corner of the retaining wall and in the piers. Later I attached galvanized steel post anchors and installed permanent pressure-treated posts to support the porch and the deck.

Shedding water—The porch floor is 5/4 Douglas fir tongue-and-groove decking that runs perpendicular to the house. It's important to pitch exterior T&G decks because water cannot drain through the joints. In this case, I installed the posts along the rim joist 1 in. shorter than level to facilitate water runoff. The posts supporting the octagonal deck were cut to match the same slope, and their faces were milled at 22.5° (right photo, p. 63) so that the trim below the deck would attach smoothly to the rough framing.

The decking was back-primed prior to installation. I let the decking run long, trimmed it to size and routed the edges with a roundover bit. After sanding the surface, I finished the deck with two coats of Benjamin Moore Moorwood Deck Stain (Benjamin Moore & Co., 51 Chestnut Ridge Road, Montvale, N. J. 07645; 201-573-9600) tinted light gray. This stain penetrates the grain and repels water like wax. It's a superior finish but requires annual reapplications.

Completing the porch—With the decking installed, I was out of the hole, and the rest of the framing was straightforward. The 5-in-12 gable porch roof was framed on top of the house roof, and the outboard end rests on a built-up carrying beam and four 4x4 cedar columns. The new roof follows the same fascia and overhang lines as the existing roof, but it has a rake overhang.

I decided early on not to put a roof over the octagon because it's the section of the porch that stands highest above the ground, and a roof over this high section would overwhelm the rest of the house. The railing around the octagonal deck

works much better with the sloping site because it serves as a stepped transition between the roofed section and the ground.

However, I couldn't put a column at each end of the roof because the one at the northeastern corner would land in the middle of the octagonal deck. Instead, I put a column on both sides of the octagon, and the roof's carrying beams cantilever over these columns. To balance visually the pair of columns at the octagon, I placed two columns on the other end of the porch. Both pairs create thresholds—one frames the view (photo right), the other frames the front door.

After installing ⅜-in. Douglas fir ceiling bead and trimming the soffits and the carrying beams with clear cedar, I fabricated a sunburst at my shop and nailed it on the gable end.

Below the porch, I trimmed the rim joist, the posts and the lattice in clear cedar. The square lattice I used was hard to find, but it works much better with the porch design than common diagonal lattice would have. With the bulk of the trim out of the way, I turned to the project's final challenge: building the octagonal balustrade.

Cable strengthens railing—Because an octagon is strong in compression but weak in tension, octagonal railings tend to be loose and rickety. The railing I built for the octagonal deck has square-cut handrails that butt into five-sided newel posts. I worried that this railing would loosen when people leaned on it. Then a light went on: How about a tension ring?

A tension ring is commonly built into the top plate of a circular building with a conical roof. The tension ring keeps the walls from splaying under the roof load. In the octagonal railing I built, the posts and the top and bottom rails act in compression, and the tension ring—a continuous steel cable threaded through the posts and anchored at the columns—provides tensile strength. People can lean against the railing until they cramp up, yet it stays tight.

At the local marina I found plastic-coated stainless-steel cable and some flat-profile clamps; at the hardware store I bought two 4-in. stainless-steel eyebolts with nuts and washers, and at the plumbing supply store I purchased a short length of ⅜-in. copper tubing. I used the copper tubing as a sleeve to protect the wood fibers where the cable passes through the newel posts. I put the railing together and held it tight with a rope so that I could mark where the cable would enter the newel posts, which were not yet cut to length.

The newel posts are wrapped in clear pine; I made the wraps separately and slipped them over the rough newels. Next I set the railing sections (which I had preassembled) on 2x4 blocks between the newels. Then I scribed the posts (top left photo, facing page).

I removed the railing sections, then used a ⅜-in. wood-boring bit to plunge through the wraps into the rough posts about ¼ in. The drill marked precisely where the cable threads through the rough posts. I slid the wraps off and inserted a short length of copper tubing in each one. Next I cut the rough posts off directly above the ⅜-in. boring-bit marks. I then slid the wraps, with the copper tubing installed, back over the rough posts and traced the tubing's outline. I used a router with a ¼-in. straight bit to cut a channel for the tubing (top middle photo, facing page).

View from the octagon. The octagon's height and location make it a good lookout point, and the cable-tensioned handrail adds security. Above, the corner of the porch roof cantilevers over columns that frame the view. The decking is 5/4 Douglas fir finished with a clear deck stain.

Anchoring and lightening the cable—Installation of the cable was a breeze. The cedar handrail stock I purchased has a milled groove on the underside (bottom photo, facing page). This groove was a fine place to conceal the cable. The cable runs beneath the handrail, through the center of the newel posts and ties to the two support columns flanking the octagon.

The cable is anchored at the support columns with eyebolts (drawing facing page). I scribed the entry point for each eyebolt shaft when the railing was held temporarily and bored a hole. Above and below this hole I drilled others to make a keyhole mortise. This mortise prevents the eyebolt from turning as it's tightened.

I slipped in the eyebolts, threaded the nuts, passed the cable through the eyes and clamped it. I had to widen the channel under the handrail a little so that the clamp would fit. At the back of each column I drilled a hole big enough for a deep socket; once the cable was tight, I popped in a finish plug. Then I used 16d galvanized finish nails to attach the top and bottom rails to the newel posts.

The finishing touch is a five-sided pyramidal cap on each newel post (top right photo, facing page). I made the caps out of clear cedar 2x8 stock, sanded them and finished them and the top and bottom rails with Benjamin Moore Impervo 440 Spar Varnish. □

James C. C. Rice designs and builds custom homes with Atlantic Contractors in St. Thomas, USVI. Photos by the author except where noted.

Photo this page: Rich Ziegner