

On the Job

Greek Revival Column Repair

by Kyle Diamond



Repairing the colonnade involved rebuilding the porch, replacing rotted sections at the bottom of the non-structural columns, and eliminating makeshift plywood plinths (above) that had been added in an earlier repair attempt. The cantilevered portico was braced to prevent sagging, and the columns were held in place in pairs using 2x12s rigged to come-alongs anchored to the pediment above.

A few years ago my company, New Dimension Construction, completed restoration work on a 160-year-old Greek Revival in Millbrook, N.Y., located in the eastern Hudson River Valley. We spent seven months tearing down and replacing an addition with low ceilings that connected the main house to a kitchen addition, and completing extensive roof and exterior repairs. The work included raising the kitchen roofline, adding windows more in keeping with the building's style, installing new standing-seam roofing, and completely reconstructing or replacing the eaves, frieze, soffits, built-in gutters, and decorative railings. We finished out the project with the entry work described in this article.

Doric columns. A distinguishing feature of this home is its entry colonnade, which stands on a 6-foot by 30-foot porch that is about 2 feet above finish grade. The gable-end pediment trim and the upper three-quarters of the columns were in good shape considering their age, but the column bottoms and porch decking were another

story. Working with the owners on the design to refurbish the entry, we decided to re-frame the front porch with pressure-treated lumber, install new fir tongue-and-groove decking, and add stone steps and a stone-veneer foundation. Along with repairing the columns — which stand 13½ feet tall and taper from 25 inches in diameter at the bottom to 20 inches at the top — we would restore the colonnade to its proper “Doric order,” with the shafts of the columns bearing directly on the new porch deck. This meant eliminating the simulated plinths, which had been built from plywood boxes in an earlier effort to replace rotted column bases (see photo, above right).

New porch. Before repairing the porch, we had to support the columns and portico. The clients told us in a pre-construction meeting that, to make room for a circular driveway, the house had been moved back 30 feet and placed on a new foundation. And thinking back to when the plywood bases had been installed, they said they believed that the existing columns were not structural. It turned out they were right; I verified that cantilevered beams from the main house supported the portico

Porch Detail

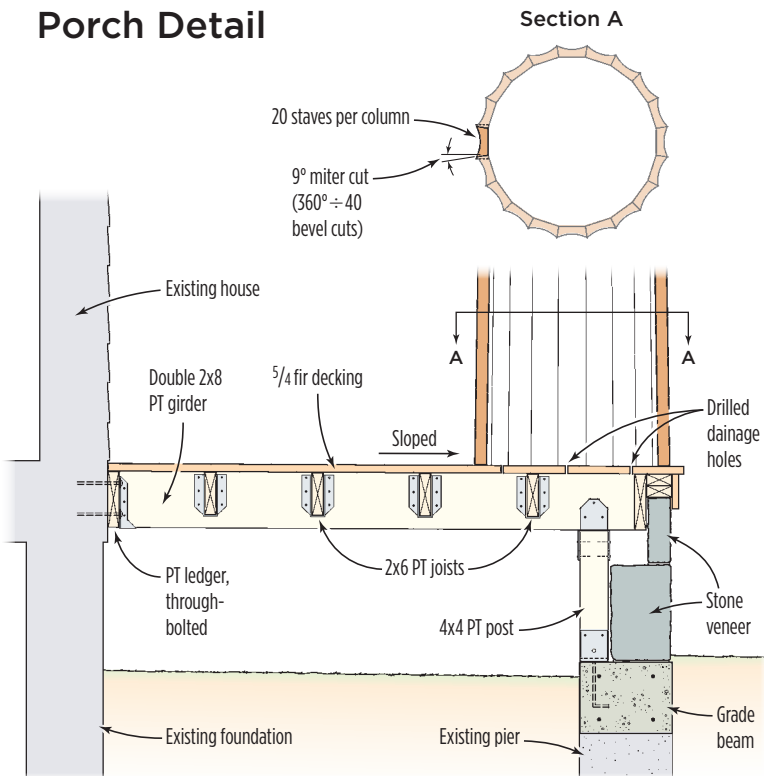


Figure 1. The porch was completely rebuilt. A grade beam poured over the existing concrete piers and faced with granite provided support for both the porch framing and the columns.



Figure 2. Spanish cedar boards were milled into fluted staves using a William and Hussey VFO6 molder. The custom-ordered knives, also from William and Hussey, cost around \$150. It took one man one day to mill all the stock, making two passes per piece to avoid chattering while hogging out the 1/2-inch-deep cut for the fluted profile (inset).

roof. This meant that before removing the column bottoms and existing porch, we only needed to install diagonal bracing to keep the portico from sagging (see top left photo, previous page). And because the four columns were not load-bearing, we just had to keep them from moving. We supported each pair with a 2x12 chained to a come-along that in turn was fastened to a metal strap fed through a hole drilled through the pediment.

With the columns and portico secured, we removed everything except the limestone slabs at both ends of the porch, and the four existing concrete piers that had been installed, one under each column, when the house was moved some 10 years earlier. We began the repair work at the long dimension of the porch, where we poured a reinforced grade beam on top

of the existing piers; this would support the stone veneer and 4x4 PT posts located under each column (see Figure 1).

After completing the framing, we installed T&G fir decking and 5/4 fir trim and painted it with Benjamin Moore Floor and Patio Paint. Then we installed the granite facing. We used 8-inch-wide stone for the first course and fitted a narrower, second course of 3-inch-wide stone around the new framing. At the corners, we mitered the new granite into the existing limestone slabs.

Match existing. Early on in the project, I examined the columns to see how they were built so we could match the fluted profile later on. I was surprised to find that the beveled edges on each of the 20 narrow boards, or staves, that made up the column were not joined with splines

or fitted joints, but only edge-glued and nailed. While removing the column bottoms, we also discovered that the staves were assembled from pieces that alternated between two basic lengths — about 3½ and 6 feet — creating one or two lap joints in each stave.

I had cut out a sample from one of the 20 staves at the base and determined that the columns were made from first-growth pine. For the replacement staves, we chose Spanish cedar, a wood that's highly resistant to rot and easy to work with (except for its powerful odor when sawn, which to me smelled like Raid insecticide). We also used it on the roof and for the gutter trim restoration. We bought enough 1½-inch-by-5¼-inch Spanish cedar to make 40 new staves of each length. This included a 5% waste factor, although at \$3,600 for the



Figure 3. Starting with a long piece, five to seven custom-cut staves were installed on either side of a temporary 2x12 support, which was then removed so the final staves could be installed. Each segment joint was edge-glued with Titebond II and clamped with stainless steel screws driven at an angle every 15 to 20 inches.



Figure 4. As a final touch, the clients — who named the house “Copperheads” as a joke because of their red hair — commissioned custom handrails in the shape of snakes. They were made and installed by Horst Around the House in LaGrangeville, N.Y.

materials, we didn’t want to waste too much. After setting up the molder and testing it with a pine mock-up (**Figure 2, page 22**), I ran all of the stock through.

Column repair. With the fluted staves milled, we still had the matter of fitting old to new. We calculated the bevel cut to be 9 degrees — $360^\circ \div 40$ bevels (20 staves per column with two edges each) — but we also had to contend with the column’s taper. The column’s diameter increased by 5 inches from top to bottom, which translated to a taper of less than $\frac{1}{8}$ inch on either side along the full length of each stave. But due to slight variations in the existing staves, every taper had to be custom cut. Using a Festool track saw, we site-cut the staves, flute-side up. We dry-fitted each piece, then primed all four sides with an alkyd primer, applying two coats to the face.

Prior to installing the new staves, we drilled a dozen $\frac{3}{8}$ -inch-diameter holes in the fir decking to allow any water that might get inside the columns to escape. We then began to assemble the new column bases — working first on one pair that shared temporary 2x12 bracing, then on the other. Once we had installed enough staves for both columns in a pair to be self-supporting, we removed the bracing (**Figure 3**) and installed the final

staves. We used nylon ratchet straps to clamp the whole assembly until the glue dried (see top left photo, page 21).

Finishing up. We did a pretty good job fitting the joints — the only wood filler we needed was for the screw counter-sinks. When it came to painting the columns, the clients had requested that we try to match the rough texture of the upper columns and pediment. After 160 years of paint being applied over old paint that wasn’t properly scraped, the existing wood had a rough, scaled finish surface. To duplicate the texture, we applied DAP acrylic caulk with a putty knife, giving the new wood the appearance of aged, scaling paint. For the top coat, we used an acrylic paint by California Paints. The final touch was the installation of custom-made handrails (**Figure 4**).

All told, the project took a three-man crew about two weeks to brace, demo, and build on site, including a day for milling. The cost to build the new porch was \$12,000, plus \$10,000 for the masonry, which included the grade beam, a foundation for the steps, and the granite and installation. Work related to the columns cost \$11,000.

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