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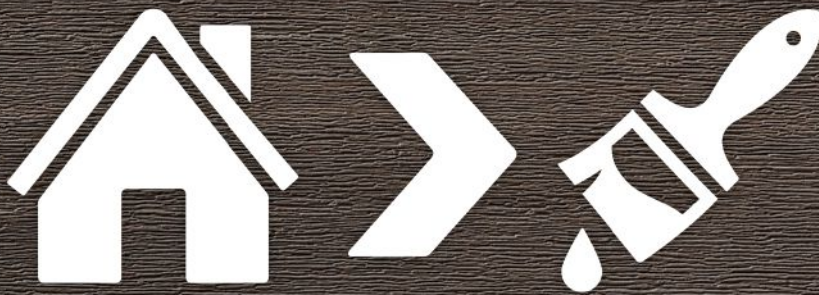
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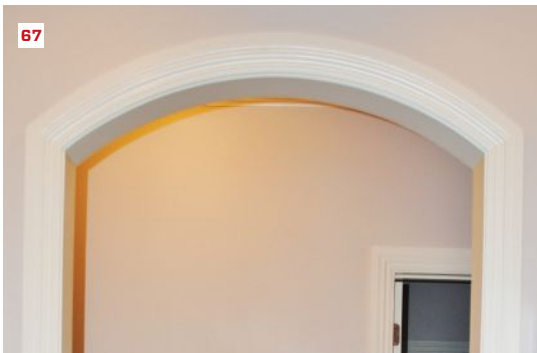
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On the cover: Shane Fenton, of Thompson Johnson Woodworking, replaces a pier foundation for a cottage on Peaks Island, Maine. See the story on page 23. Photo by Ted Cushman.

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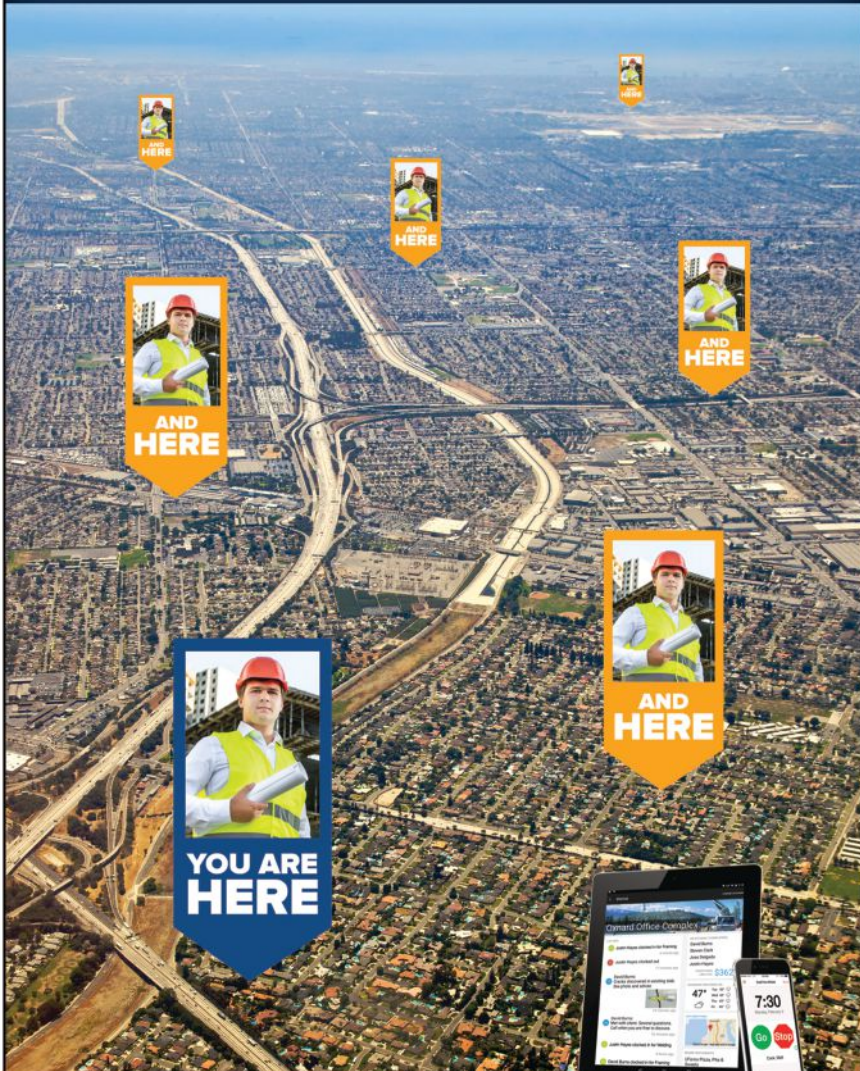
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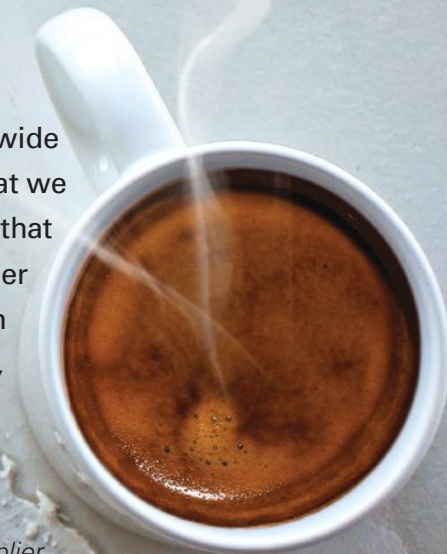


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BY GREG AND SUE BURNET

## Training the Trades

### New JLC column focuses on educational programs

**Ask most business owners** in our industry what the biggest challenge is that they face in their business, and they're likely to tell you it's finding competent, responsible, qualified labor. A contributing, and perhaps even primary, reason for this is the phasing out of "traditional" training programs in the U.S. Once widely accessible, these programs have gradually fallen by the wayside as parents and school counselors pushed students away from the trades and construction jobs

and toward alternative careers. This, coupled with the aging-out of skilled tradespeople and the fact that many professionals left the industry during the recession, has helped create a deep void in our industry's labor pool.

Frankly, this shortage could not have come at a worse time. Products and materials are evolving and becoming increasingly more complex, making them exceedingly "installation-dependent." Building defects are on the rise, due in part to poorly-trained workers installing complex material systems. And while the economy may still be a bit shaky, it has recovered enough that the lack of skilled labor is now perceived by many as one of the leading drags on growth.

#### FINDING THE PROGRAMS

The vacuum created by the gradual disappearance of formal trade and apprenticeship programs is, to a degree, being addressed by a variety of groups, from government programs to industry trade associations to manufacturer-specific product training to individual building professionals who have taken it upon themselves to share their knowledge with others and inspire professional growth. The challenge with many of these efforts is that they are not well known, and those seeking the offerings may not be aware of them.

JLC is interested in changing that dynamic by providing coverage to organizations and individuals working to educate the building industry. Our goal is to create a resource for those interested in entering a construction-related field, or for those simply looking to acquire or improve skills related to their profession. One way we hope to achieve this goal is by compiling an accurate resource of training and education programs aimed at the building industry. Another is by providing focused coverage of relevant, worthwhile, unique, or innovative training programs, classes, schools, and conferences.

#### LOOKING FOR YOUR INPUT

To this end, we would like to hear about training or educational opportunities you have had experience with. In this column, we hope to highlight some of

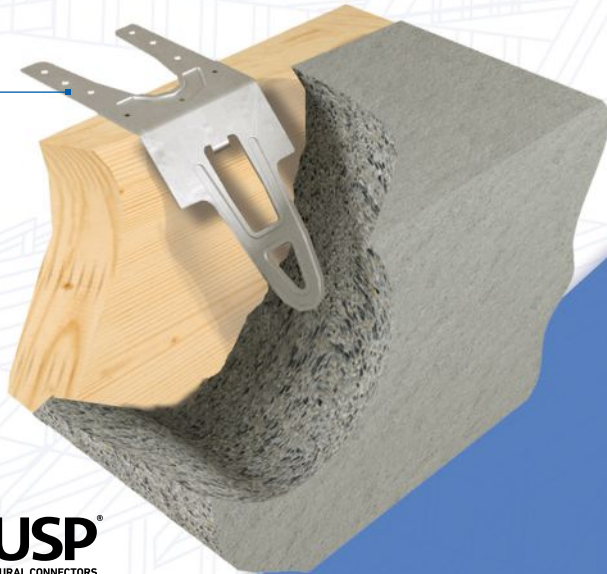


Photo by Roe Osborn

Greg Burnet teaches the fine points of installing engineered siding at a JLC Live presentation. Though perhaps better known than most, JLC Live is just one of many educational initiatives. Send us info on others.

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## Training the Trades



Online coverage will include a calendar listing of upcoming training events.

the opportunities that catch our attention. Additionally, we hope to compile an online database where people can go to find educational opportunities in their area.

### ONE SMALL STEP

*JLC* recognizes the challenges faced by our industry are daunting. And while we wish we could solve the problem with the push of a button or the wave of a wand, we understand that the issues are complex and that they warrant ongoing attention if the industry is to come back from the edge.

We see this new page—both online and in print—as a small but important step toward filling this critical need. Greg and I, along with *JLC* staff, will be working to assemble and update the database. We hope that you will all join our efforts to develop a means to connect better skilled workers, to make training more accessible to those seeking it, and to elevate our chosen professions to a higher level of respect and competence.

In the process, we hope to stir the conversation about how careers in the building industry can be rewarding on many levels, how vital they are to our economy, and how crucial people in the trades are to a healthy society. We look forward to this journey and hope that our new section will be a useful tool for all.

If you have a suggestion or would like to let us know about a training program, please send us an email at [JLC\\_Training@hanleywood.com](mailto:JLC_Training@hanleywood.com).



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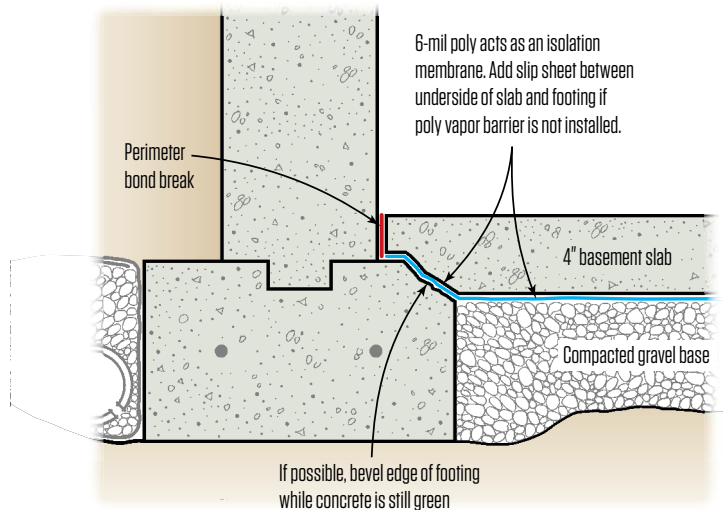
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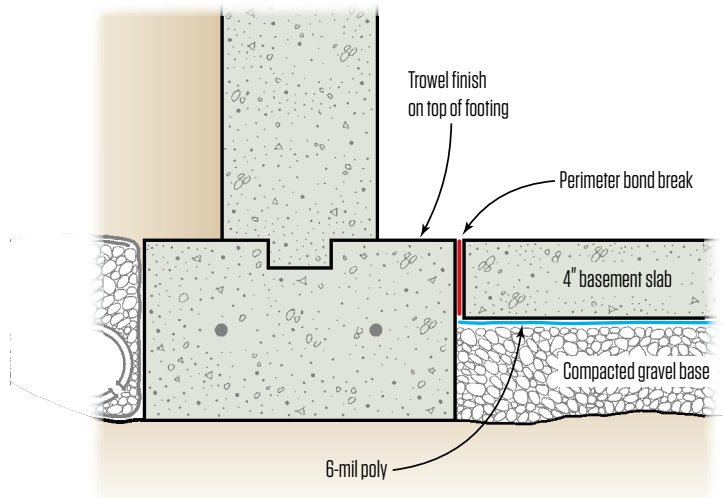
**Q** I have a client who needs more basement headroom in a house that I've already framed, so the slab would need to drop below the edge of the footing. What's the best way to detail the edges so that the slab doesn't crack?

## Dropping Slab Below Top of Footing

### Slab Dropped 2 Inches



### Slab Dropped 4 Inches



**A** Rick Arnold, author of *Working With Concrete* and a frequent presenter at JLC Live, responds: Dropping the level of a basement slab to gain headroom isn't done very often—I've been asked to do it only a few times. If you catch the problem before the first-floor deck is framed, it's much easier just to add a layer or two of mudsills. That said, dropping the level of the slab can be done after the fact. The key is to isolate the slab so that it moves independently from the footing and foundation or stem walls. If the slab binds to the footing and wall, the odds are much greater that defects (cracks) will occur as it tries to move.

The first way to allow the slab to move independently is to install a bond breaker (expansion joint) around the perimeter of the slab. Products such as Reflectix Expansion Joint are readily available at most building supply stores. This foam-like material is 4 inches wide and ½ inch thick and comes in a roll.

Next, I would install an isolation membrane or slip sheet between the underside of the slab and the footing. This could be something as simple as a strip of 6-mil polyethylene that covers the top and side of the footing and that you put on just before you pour the slab. If you're installing a poly vapor barrier over the entire basement slab area anyway, just continue it up and over the footing.

The good news is that basement slabs are not exposed to the elements or wide variations in temperature, so they are much less prone to movement than exterior slabs, such as one in an unheated garage. This means that you might get away with reducing the thickness of the slab on top of the footing to as little as 2 inches, a situation that would normally cause defects in an exterior slab.

The full-thickness slab does move at a different rate than the thinner part that laps over the footing, which makes the transition point between the two thicknesses particularly vulnerable to cracking. So one thing you could try is creating a beveled edge on the top inside corner of the footing. Just shave or break away about 2 inches of the footing concrete at roughly a 45-degree angle with a flat-bladed shovel while the concrete is still green. (If the foundation is in and the floor is already

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## Q&A / Lowering a Slab / Pressure-Treated Cedar Shingles

framed, chances are that the footing concrete would be too hard to “shave” very easily). It may not look pretty, but the angled edge of the footing makes the transition more gradual and reduces the potential of a cracked slab where it transitions to full thickness. But even with this added precaution, I would never guarantee that the slab would not crack.

I normally don't use wire-mesh reinforcement in a basement slab. If the base is prepped correctly, wire mesh shouldn't be necessary. A basement slab won't move up or down, and with it closed in on all sides, it has no lateral forces acting against it, unlike an exterior slab. For those folks who do use wire mesh, placing it correctly in the center of a 2-inch slab would be nearly impossible. It's hard enough placing it in the center of a 4-inch slab.

I don't believe that fiber-reinforced concrete would be much help, either. The fibers are meant to help prevent microscopic cracking that occurs during the curing process, but they don't generally increase the flexural strength of the concrete, so it's doubtful that the fibers would prevent cracking where the slab thickness transitions. Also, fiber-reinforced concrete can be a real pain to work with during the troweling, and it adds significantly to the cost of the concrete. I would just go with the standard 3,000-pound pea-stone mix.

Another thing that could be done if you think you might be asked to provide more headroom in the basement is to take a little extra time after pouring the footings to trowel a decent finish on top. Then I would prep the bottom of the hole so that the top of the 4-inch slab is even with the top of the footing. This strategy provides a full 4 inches of extra headroom and keeps the thickness of the slab consistent throughout the entire basement, minimizing the potential for cracks.

**Q** A client is considering pressure-treated cedar shingles for the roof on his new house. What are the pros and cons to using these shingles vs. regular cedar?

**A** Chris Yerkes, a cedar-shingle installer certified by the Cedar Shake and Shingle Bureau (CSSB), and owner of Cedarworks, in Brewster, Mass., responds: In my 13-plus years installing cedar roofs, I have been asked to install regular cedar—both western red and Alaskan yellow—shingles and shakes, as well as pressure-treated (PT) cedar shingles. And both treated and untreated shingles can give you a long-lasting roof. But no matter what type of shingle you choose, the keys to the longevity of a wood roof are proper installation and quality materials.

**Air circulation.** In my experience, the No. 1 killer of wood roofs is rot from the inside out—usually a result of poor installation. When there isn't enough air circulation behind the shingles to allow them

to dry after a rain, the resulting moist environment is ideal for rot. When PT shingles first came out, many old timers thought that the treatment was a magic bullet that would keep the shingles from rotting, so they used PT shingles as a shortcut, eliminating the “breathing” requirement altogether. Treated shingles may slow the rotting process, but I’ve seen improperly installed PT shingles that failed way before their time. A properly installed red- or yellow-cedar roof should last 25 to 30 years, depending on site conditions and geographic location. Properly installed treated shingles may add five to 10 years to that number, all else being equal.

There are two basic approaches to roof shingle installation: skip sheathing, where the shingles are installed over a ladder-like series of wooden strips, and solid sheathing. With the more traditional skip-sheathing method, the underside of the shingle is exposed to air below the roof, whereas in a solid-sheathing application, a layer of ventilated underlayment material, such as Cedar Breather, lets air circulate underneath the shingles to let them dry out.

**Fasteners.** The second major factor for a successful installation is using the proper fasteners. I never use galvanized fasteners for any kind of roof shingle—only stainless steel. For most inland cedar roofing jobs, I use standard-grade 304 stainless steel coil nails. As an approved CSSB-warranty installer, I’m required to use a higher-grade 316 stainless steel nail on any roof installation within 11 miles of a body of salt water. I live on Cape Cod, so almost all my local installations are done with the 316-grade nail. Additionally, because of the preservatives in fire- and CCA-treated shingles, stainless steel is an absolute must for fastening in those applications.

**Maintenance.** Keeping the surface clean improves the longevity of any wood roof. This includes keeping valleys free of debris and keeping gutters clear. A more difficult problem for some roofs is the growth of moss and lichen, which live off moisture in the wood and act as sponges during rain events to prevent the wood from drying properly. Excessive moss growth can usually be seen on houses that are under large trees that shade the roof or on north-facing roofs, either of

which can slow drying due to lack of full sun. Treated shingles are less prone to this growth, but we usually install a strip of copper along the ridge of every wood roof. Precipitation hits the copper and trace amounts dissolve and run down over the shingles, killing the moss along the way. Lead or zinc work as well, but copper is a nice aesthetic touch in addition to being practical.

Working with treated shingles is similar

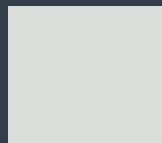
to working with regular cedar ones, but my crew members always wear gloves and take added precautions when working with treated cedar—as do smart carpenters who work with treated wood when building a deck. The price of cedar shingles can vary greatly depending on the market and availability. Pressure-treated-shingle prices vary as well, but they usually run 10% to 15% higher than prices for untreated cedar.



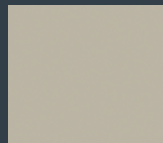
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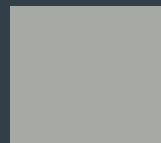
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BY RACHEL CONLY AND HEATHER THOMPSON



## Replacing an Underbuilt Foundation

**We are a builder and a designer** living on an island off of Portland, Maine, and often work together on custom projects. In a recent summer-cottage remodel, the value of our experience working as an integrated team quickly became evident—especially when things got complicated.

The proposal was fairly simple. The owners of this seaside home, built in 1900, wanted to rebuild a weathered and worn porch from the roof eaves down to the ground (1, 2). We would also enclose a portion of the existing porch to extend the living space, and renovate the kitchen. The house is an existing, non-conforming structure located within 75 feet of the area's high-tide line—in

other words, inside the City of Portland's Shoreland Zone (as mandated by state law). Consequently, we were not allowed to expand the building's footprint, and all new construction needed to take place within the home's existing dimensions.

### FOUNDATION FACTORS

The house was built on concrete piers. Some of them were obviously tilting (3), and the home's floors were uneven. Clearly, the foundation had moved in response to winter frost action in the clay soils. As a result, the house was hinging at the first floor, toward the beach. So, right from the start, the scope of work grew to include an

investigation of the existing concrete piers (which had been replaced once already, improperly, not long ago) to determine whether they all reached 4 feet in depth (as required in Maine) and whether they were set on solid footings.

We knew we would have to fix a select few, but after some digging, we discovered that none of the existing concrete piers extended below the 4-foot frostline. Many were only 18 inches deep. We also didn't find any spread footings under the piers. So, Heather wrote up a change order to cover the cost of replacing every pier.

While the crew dug, we puzzled over soils and drainage. The site is very wet; it

Photo: Ted Cushman



sits right next to a salt-water bay, with land sloping uphill behind it. Rain and snow-melt create surface flows onto the site, and ever-present groundwater is moving downhill toward the ocean. In rainy periods, the home's small front yard, adjacent to a road that passes between the house and the gravelly beach, gets soggy. In winter, that water freezes into a sheet of ice.

To maintain existing vegetation prized by the owners, digging was limited; our original plan for addressing drainage was to elevate the grade around the house using an

"L"-shaped retaining wall and footing. One leg of the "L" would replace the foundation piers along the east side of the house with a poured concrete frost wall footing. The other leg would run along the edge of the road (the downhill side of the property), and serve as a new concrete retaining wall. We would place fill to mitigate ground water and create an uphill swale to divert surface flows around the property. The retaining wall along the road would also help prevent plows from pushing snow onto the property in winter, which exacerbates the problem.

### ZONING CONCERNS

Our initial drainage plan hit a snag called "Shoreland Zoning." Creating a swale and adding that much fill to the site would expose us to the city's regulations for a "Level I" site plan review process—and the street-side retaining wall would kick us up into an even more extensive "Level II" review. The dollars were adding up. The proposed work would be costly, even without the additional red tape. Fill is expensive (and everything costs more on an island)—and we would need ancillary survey services.

So, we scaled back and instead decided to install a French drain on the uphill, south side of the property, starting behind the house and extending as far west along the perimeter of the yard as the city would allow without requiring further site plan reviews. Since daylighting was not feasible, without spilling onto the road or a neighbor's property, the French drain would terminate into a drywell.

It is important to note a sub-story here. The original plan (the house scope, swales, and retaining walls) was backed by a wetland specialist and approved by the DEP (Department of Environmental Protection). However, the city has its own formalities and procedures. So, while not the most effective solution, the French drain strategy would have less impact (stripping, grading, grubbing, excavating) on the natural state of the yard and would help us balance performance, cost, and compliance—by reducing the water on site and steering clear of a more costly site plan review, while still meeting environmental standards.

Since the frost wall supporting the home's porch—within the existing footprint—was already approved on all accounts (DEP, Shoreland Zoning, building code), as long as we didn't place fill in the front yard, we agreed to move forward and build that part of the project. If the owners ever decide to invest in the fill and the more intricate drainage system and approval process down the road, that wall is ready to go.

In building the wall, we had expected to hit ledge just a foot or two below grade—at least at the uphill end of the wall. But, it turned out that the heavy clay soil was deep—so deep that we had to dig down to

Photos: 1 & 3, Rachel Conly; 2, Shane Fenlon

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below the frostline, build wooden forms (4), pour a spread footing (5), and form up and pour our stepped frost wall (6).

Excavating for that foundation wall made the drainage problem on the site more evident. We didn't have a particularly rainy fall; the puddles you see in the photos are typical at this location even in a light rain. Puddles also indicate tidal and ground water.

#### WEATHER WORRIES

Peaks Island, where we work, is a vacation destination with relatively few year-round

residents. Most of the homes we work on are summer vacation houses. Customers do not want you to build in June, July, or August. So that means most of our projects—and certainly the big jobs—happen in the fall, winter, and spring, and we're always racing to finish excavation and concrete work before a hard freeze. This year, we were lucky: We were able to get the frost wall poured in November, before freezing weather set in. By the time it got really cold, we were decking the new porch (7). Unfortunately, the freezing weather did

hit before all of the concrete piers under the house were replaced. The cold weather, combined with the drainage issues, compounded the difficulty of digging and pouring in that low space.

The hard part of pier replacement is digging in unforgiving crawlspaces, which are typical on the island and familiar to Heather's crew. On one crawlspace job, the crew had to cut the handles on their shovels short and crawl on their stomachs beneath the house to get started. This time, we hired a local subcontractor and his crew, who dug

Photos: Shane Fenton



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the piers out by hand, one at a time. That crew also set disc-shaped precast concrete footings in place, 6 inches thick by 24 inches in diameter.

After the holes were dug, water and fine mud seeped into them and then froze. When Heather's carpenters, Shane and Chris, were ready to pour new piers, they had to start by breaking surface ice and pulling it out in chunks, and then pumping out the remaining mucky water. Once that grunt work was out of the way, the job was simple. Shane and Chris just had to drill holes into

the footing disks **(8)**, hammer  $\frac{3}{8}$ -inch rebar into the holes, set Sonotube forms over the rebar **(9)**, backfill around the bases of the tubes to stabilize them, and fill the forms with concrete **(10)**.

Working under the floor in the crawl-space slowed things down. It's muddy work: The thick, sticky clay collects on everyone's boots and clothes. Shane and Chris had to mix concrete outside in a portable mixer, then carry the wet concrete into the house in five-gallon buckets, dump the buckets out onto a board next to each tube, and push the

concrete mix into the tube with their hands. They plumbed the freshly poured piers under the existing floor frame supports and braced the tubes with 2x6 lumber **(11)**. After the piers set and cure, they'll reframe the posts down onto the new piers.

*Rachel Conly is owner of Rachel Conly Design, a high-performance residential design company. Heather Thompson is owner of Thompson Johnson Woodworks, a high-performance custom building and remodeling company. Both are based in Portland, Maine.*

Photos: Ted Cushman



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## Revitalizing an Urban Row House

BY ROB CORBO

**The problem with row houses** is usually light. We do a lot of work on inner-city row houses, and these buildings typically only have windows on the narrow front and back sides, so the interiors tend to be dark and gloomy. On a recent project, we were tasked with bringing in as much natural light as possible to the lower two floors of a four-story row house. We accomplished this by opening up the entire back wall on two floors (1). While we expected the process would be similar to past projects (see “Retrofitting an Oversize Door in Structur-

al Brick,” Oct/14), this was the first time we had attempted to remove two stories worth of brick. The result of opening up this wall and removing some interior framing did provide what the clients wanted—more light and added “volume” (2, 3) for what had been a cramped and dingy interior (4).

When my clients purchased this building a couple of years ago, the existing interior was in rough shape, though not without charm. Fairly elaborate plaster molding ran throughout the upper three floors (5), and part of our task was to save as much of

this ornate plasterwork as possible.

As is typical on these older buildings, the floors were out of level by as much as 2 inches over the building’s width of 14 feet—a complicating factor that we would have to accommodate when framing in for the new window wall.

### OPENING THE WALL

To start, the existing first-floor windows and wall framing were removed, exposing the three-wythe brick wall on the interior side. Next, we carefully removed enough of

Photos by Rob Corbo

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the outer brick (6) to fit the first structural steel channel for what would eventually be a built-up steel and 2-by fitch-beam assembly (7).

With the outer steel channel in place, the remaining two brick wythes were removed from the inside, allowing us to install 2-by stock and a second steel channel for the fitch-beam assembly. The assembly was bolted together, completing the fitch beam (8). The finished masonry opening was roughly 10 feet wide by 17 feet high.

### NEW DRAINAGE AND SLAB

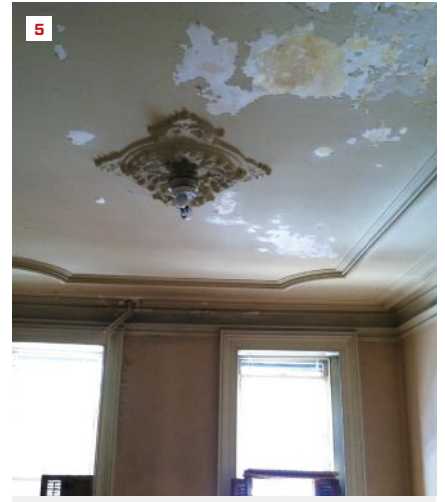
Drainage to keep the grade-level basement dry required new drain lines and a new slab (9). The under-slab prep work consisted of running the storm run-off and wastewater in two separate, parallel lines with check valves to the street as required by the city. We joined them together just before they exited the basement into one line to the city sewer—the storm and sewer lines are still one and the same in Hoboken, N.J.

After the plumbing rough-in was complete, we prepared to pour the new slab by installing compacted gravel, a vapor retarder, rigid insulation, and welded-wire mesh. When it was time to pour, the concrete was off-loaded onto a temporary, site-built chute (10). We had to close down the street for a day for the concrete truck, and this required that we hire an off-duty police officer to keep the peace.

### REFRAMING

We started reframing on the first floor. As with most of the row houses we work on, the existing floor framing runs parallel to the front and back walls and is pocketed into the side party walls. At stair locations, the joists are mortise-and-tenoned into a header for the stair box-out. Usually this header is undersized and ends up splitting along the pocketed mortises. To remedy that, we install a new LVL header and re-attach the existing joists with hangers, as we did here (11).

Next, we turned our attention to framing within the masonry opening to receive the new doors. Rather than infilling with a bunch of 2-by stock, we installed a couple of LVLs ripped (we took off about ¼ inch) to



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match the existing joist depth (12). We weren't too concerned about compromising their structural integrity; in this case, the LVL was essentially just blocking. However, the clients are thinking about adding a deck off the kitchen in a year or so, and the LVL should provide good anchoring for a ledger, if they choose to do that.

We installed steel angles to support each end of the LVLs, securing the angles to the brick with lag bolts and shield anchors (13). We then sistered the inner LVL to the existing floor joist and fastened the

LVLs together with structural screws.

#### WINDOW WALL

Starting at the garden level, we began installing the sliders. We had to contend here with the out-of-level first floor, as can be seen in the decreasing series of cripples above the door (14). Normally, we build everything as close to level and plumb as possible. But in this case, the clients were willing to live with the settled floors because they wanted to leave as much of the existing plasterwork in place as possible.

And in the end we were able to hide the discrepancy on the exterior.

With the garden-level door installed, we moved on to the kitchen slider. The first-floor ceiling height allowed for an 18-inch-high finished transom above the door (15). This helped bring in more natural lighting.

#### INTERIOR WORK

On the first floor, we removed an existing hallway and closet separating the living room from the kitchen (see again photo 4, page 32), which contributed to the congested

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feel in the center of the house. We opened up this area, installing an archway at the kitchen entry (16).

Most of the new plaster crown was installed in this central area, though there was quite a bit of patching and rebuilding of existing crown throughout the house.

Plasterwork usually runs us anywhere from \$100 to \$150 per lineal foot. Our plaster sub typically makes crown molding on site in 3- to 4-foot sections. To form the crown molding, the sub pours plaster into molds, as he does for more complicated profiles, like these with egg-and-dart trim (17). He does this extrusion work on an 18-inch-wide by 6-foot-long table. The sections of crown are butt-joined together and fastened with dry-wall screws. The seams are then filled with joint compound and sanded. In addition to the molded sections, he also works by hand, extruding the plaster with a knife cut to match the existing profile (18).

To finish the exterior, we applied a “lin-tel” over the masonry opening to match the existing window heads (see again photo 1, page 30). For this we used a two-coat stucco—a Portland-cement-and-sand-mix scratch coat, set in mesh, with a tinted finish coat. Finally, we installed a temporary Juliet balcony, which will serve as a guardrail until we build the deck off the first-floor kitchen next year.

*Rob Corbo is a building contractor based in Elizabeth, N.J.*



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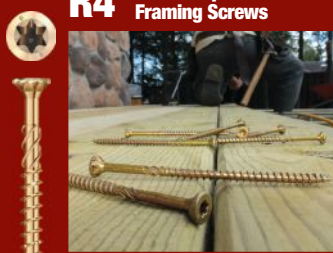
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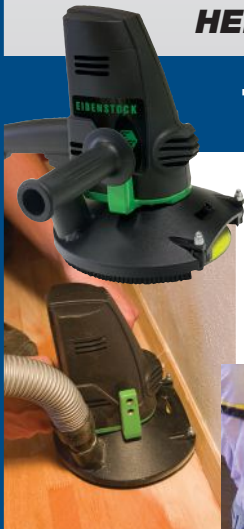
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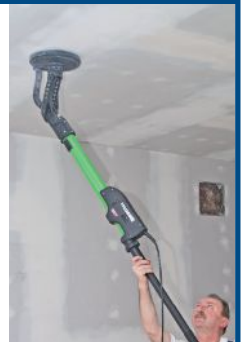


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BY MELANIE HODGDON

## Building a Team for Growth

**Some complaints about** the lack of qualified carpenters are justified. If you are having trouble finding good help, you may need to create it yourself. Let's look at the approaches of two contractors who have decided to add to their production workforce.

### THE PLAYERS

Doug Doitt has come up through the ranks, after starting out working with his dad. Doug has excellent skills and prides himself on his skills as a planner and as a carpenter, as well as on his ability to find creative solutions for sticky situations.

Tim Trainer worked construction in the summers during school. He enjoys the challenge and satisfaction of creating something beautiful and enduring and has decided to start a remodeling company. His carpentry skills are average, and he prides himself on his commitment to a sustainable business, his skills as a teacher, and his ability to build an autonomous team.

Newt Newbie is a new hire. He's loyal and willing but has few carpentry skills. He shows up on time, puts in a good day's work, and is curious about the building process. Let's examine how Doug and Tim might interact with Newt on a simple one-story addition project.

**Doug and Newt.** Doug starts the layout. He demonstrates how to mark out stud locations 16 inches on-center, tells Newt to keep going around the perimeter, and then leaves. Newt dutifully continues marking 16-inch intervals, hits a corner 7 inches from the last stud on one side, and marks the next location 9 inches from the corner. When he finishes, he lets Doug know. Doug instantly sees what Newt did, shakes his head in disgust, mutters a few less-than-complimentary remarks, and re-does it himself.

**Tim and Newt.** Tim explains to Newt that stud layout is critical and you need to think backwards from the finished product. The intervals have to work for the sheathing, standard insulation batts (if used), and the drywall. He then tells Newt that although there are a couple of standard intervals, on this job the studs will be laid out 16 inches on-center. Tim starts the layout and after demonstrating two or three marks, asks Newt if he has questions. Newt thinks it looks straightforward and agrees to finish up the layout. Tim then asks Newt to speculate on how he should handle the corners. Tim

helps Newt devise a plan for the entire layout and hangs around to observe and reinforce Newt's first marks. When Newt is finished, Tim reviews the work and compliments Newt for creating a correct layout.

**Newt's reaction to Doug.** Doug hasn't helped Newt understand the reasons behind the layout, didn't challenge Newt to come up with a solution for the corners, and failed to give Newt the opportunity to correct his errors. Even if Newt doesn't make the exact same mistake again, he hasn't grown as a planner and hasn't been introduced to the idea that workers coming after him will depend on his work to perform their work. In addition, he has learned that Doug holds all the knowledge and that his expertise is required for the project to be produced correctly.

**Newt's reaction to Tim.** Tim has engineered a positive experience. Newt has learned how to mark a simple layout, but more importantly, he's been introduced to the concept that the project is a team effort, and the work of every individual must integrate with the work of others. Newt feels competent and is eager to learn more. He has learned that Tim encourages questions and supports Newt's attempts to find solutions. The stage is set for him to become a valuable contributor to the team.

### THE ENDGAME

The point, in this highly simplified example, is that the owner—not the hire—will determine whether or not a self-sufficient team is created. Doug is focused on controlling the process. He holds the important information, he makes the decisions, and he is ultimately personally responsible for the work performed. He attempts to impart specific skills without providing context. Tim understands that a valuable employee thinks ahead and makes decisions that reflect his understanding of how the next piece of the puzzle will interact with what he's doing now. Therefore his emphasis is on introducing skills within the context of the entire project and on fostering planning and problem-solving.

So ask yourself, where will Newt's level of skill and value be after a year of working for Doug compared with a year of working for Tim?

*Melanie Hodgdon is owner of Business Systems Management.*

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BY CHRIS ERMIDES



## A Case Study in Foundation Waterproofing Failure

**This past spring**, I took over the site supervision and project management of a custom-home build while working for a construction management firm in upstate New York. The project had undergone a series of fits and starts, thanks in part to the weather.

Construction had broken ground in late December, on the eve of one of the worst winters in recorded history. Despite the rough weather, the workmanship was some of the best I'd ever seen. When I arrived on site, the house hadn't been completely dried in on account of a scheduling conflict with the company contracted to build the cold-roof assembly—which would lay over the SIP roof panels and incorporate the eaves. So not surprisingly, as the spring rains poured down, water leaked inside.

The framers had already gone above and beyond their scope by flashing the SIPs with Grip-Rite ShingleLayment. But where the Zip wall sheathing met the SIP panels (an area that would eventually be covered by the roof overhang) proved to be a weak spot at this stage of the construction. A good part of my first days on the job was spent chasing leaks in order to keep the subcontractors working inside. Before long, I was able to seal up the house so that construction could continue while we waited for the overbuild and roofing crews to arrive.

### WET BASEMENT WOES

Days of heavy rain came with the spring thaw, and because the house sits at the bottom of a steeply-pitched

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site, a good deal of water was pushing against the foundation. While I was temporarily spot flashing, I discovered an area in the basement that had puddled (1). The architect and I at first assumed water had migrated inside through the leaks between the Zip wall and the SIPs. But we grew puzzled when we couldn't trace its path. Hopefully, once the roof assembly overbuild was in place and the exterior fully flashed, we surmised, the water we saw in the basement would disappear. Unfortunately, that did not happen. Even after days of sun and warmer temperatures, water continued to appear in the basement.

There was still a lot of elevation work left to be done to the site. The footing drains, which were day-lit, all ran consistently and it was obvious they weren't causing any problems. The only possibility left, the architect and I agreed, was a failure somewhere in the foundation membrane. And so, on his firm's direction, we excavated the front of the house where the problem was occurring.

The foundation was formed out of ICFs and consisted of an 8-inch ledge, which was to support a full-depth veneer of stone siding (2). Because ICFs react adversely to solvent-based products (think about what happens to a Styrofoam cup when you put



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gasoline in it), the original design drawings called for Rub-R-Wall Aqua, which is a water-based spray-applied waterproofing membrane. But because the foundation was poured in the winter, this spec had to be abandoned in favor of a system that could be applied in cold temperatures. So the spray-applied-membrane approach was replaced with Miradri 860.

Even before we excavated the foundation, we had observed areas where the membrane was falling off the ICFs. There were large air bubbles under the membrane where it had begun peeling away below the stone ledge, as well as areas missing counterflashing—all

troubling observations (3). I noticed areas where the membrane had been lapped in the wrong order (4). Given the small channels in the ICF, water could easily trickle down and behind the membrane—especially in areas where dirt prevented proper adhesion (5). Excavation revealed even more troubling issues, however.

Miradri 860 requires a water-based primer to be applied to ICFs before the membrane is set. The primer is light-blue in color and leaves behind a blueish tint that's visible up close. According to the primer specs, it was suitable for the temperatures the foundation crew was working in. And the flashing



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membrane is nearly impossible to peel off in areas where it is applied properly with this primer—think about trying to pull ice-and-water membrane off roof sheathing on a hot day. So when it is installed correctly, the Miradri works beautifully. But this proved to be far from an ideal, technically sound installation.

It was apparent that not only was primer missing from a large portion of the installation, but a green sealant, which I later learned was meant only for seams, had been used in its place. Goopy and sticky as this sealant is, it's also thick, so when applied to large areas, it prevents the sheet membrane from fully adhering to the ICF (6). This explained the bubbling we found.

After removing all of the Miradri, we closely inspected the ICFs, and in particular, the joint between the ledge and the side wall. There were some areas where the pour clearly hadn't been ideal, as evidenced by small air pockets and sloughed concrete (7). We presumed some honeycombing was present, though it was impossible to source; the architect and I believed that the water was trickling down behind the sheet mem-

brane via grooves in the ICFs, pooling in these defective areas, and then finding its way down to where there likely existed similar areas.

By now, of course, warmer weather had arrived, and we considered revisiting the Rub-R-Wall Aqua spec, especially since the garage was scheduled for the same treatment. But we concluded that at this stage of construction, the expense would be too great to take this route. Our remediation plan was simple: Remove all of the previously applied sheet membrane and seam sealant, clean the ICFs thoroughly, and allow them to dry. The next steps included priming the foundation with the primer specified by Miradri and then reapplying the sheet membrane properly in shingle-style with close attention to inside corners (8).

This methodology proved successful, as the basement is now bone-dry. While the process was not enjoyable, I was grateful to be sweating it out in sunny, 75°F days instead of working amidst gray skies and sub-zero temperatures.

*Chris Ermides is a senior editor at JLC.*



Nº 4 OF 5

## THE ENFORCER

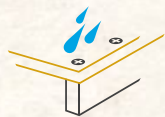
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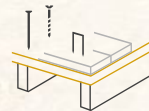
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BY TED CUSHMAN

## Unvented Flat Roofs: Theory Meets Practice

**Advanced high-performance builders** sometimes have to venture into uncharted waters, designing and building novel assemblies in the quest to create a cost-effective and durable airtight superinsulated envelope.

To help guide those first-of-their-kind designs, Passive House builders, in particular, typically rely on energy modeling tools. Depending on which flavor of Passive House the designer chooses for certification, he or she may select different tools. If the hope is to be certified for compliance through Europe-based Passive House International (PHI), designers have to use PHI's version of the Passive House Planning Package (PHPP), a complex spreadsheet developed in Germany. Designers pursuing certification through PHIUS, the U.S.-based Passive House offshoot, can use the PHIUS version of the PHPP for design calculations. But they also may use the new "WUFI Passive" modeling tool developed by Fraunhofer IBP, in Stuttgart, Germany. WUFI Passive includes a vapor-flow analysis capability

drawn from Fraunhofer's industry-leading WUFI moisture modeling software; designers using PHI's version of PHPP often use a stand-alone version of WUFI to analyze particular components when they see a moisture-management concern.

The Passive House world is full of opinions about which tools are best. But everyone agrees that the skill and experience of the designer or consultant matters as much as the power of the tool, or more. And no matter which flavor of Passive House designers may employ, there always seems to be some doubt about whether any computerized guesstimate is truly reliable when it comes to navigating the unknown. If you're building an assembly that has never been tried before—or never tried in your climate—how certain can you really be whether your ideas will work?

### THE THEORY

In 2013, Montpelier Construction, a custom builder located in Montpelier, Vt., constructed a unique accessory dwelling unit that was pre-certified through PHIUS as a Passive House and that connected via a breezeway to an existing high-performance owner-built rural homestead.

One of the addition's unusual elements was an unvented low-slope roof system insulated with 22 inches of dense-blown cellulose and topped with black EPDM membrane roofing. With no way for moisture to escape upward, the roof's moisture-management concept relied on a "smart membrane" on its underside, just above the finish ceiling facing the conditioned space. In theory, the ProClima Intello membrane at the ceiling plane would limit vapor diffusion into the roof from below during winter, but permit downward drying by diffusion during summer. That roof has turned out to be something of a test case—for the materials and methods employed in its construction, and also for the planning and modeling tools employed in its design.

The choice of the unvented flat roof was driven by the homeowner, not the builder. Owner Greg Whitchurch is a long-time Vermont homesteader, a self-described "energy nerd" who majored in physics in college, and an owner-builder who has built two energy-efficient homes before. In planning this annex to house his elderly parents, Whitchurch had his own reasons for wanting a



The Whitchurch "in-law" annex in Vermont has an unvented flat roof that relies on a ProClima Intello variable-permeability membrane to limit moisture accumulation in winter and allow drying in summer.

Photos by Greg Whitchurch

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## Energy / Unvented Flat Roofs: Theory Meets Practice



Builder Chris Miksic, of Montpelier Construction, inserts a moisture sensor probe into the Homasote underlayment for the flat roof's EPDM membrane weather surface. Additional probes attached to long wires allow wood I-joint framing-member moisture content to be recorded using a Delmhorst moisture meter.

flat roof—not the least of which was to keep his wife's flower gardens from being buried by snow falling off a pitched roof in winter. And Whitchurch reasoned that venting the flat roof would be problematic—because with no pitch to speak of, there would be no “stack effect” air movement through the vents to carry moisture out of the assembly. “I didn't see venting as an automatic safe way to do it,” he said.

After extensive research, Whitchurch had what he considered to be reasonable hope that his unvented flat roof would perform well. But experts on the pre-certification committee at PHIUS were not sure—and they agreed to pre-certify the Whitchurch project only after Whitchurch and Montpelier Construction partners Chris Miksic and Indigo Ruth-Davis took extraordinary measures to address their worries. Not only did the owner and builder supply PHIUS with WUFI modeling data—worked up by Floris Buisman, of 475 High Performance Building Supply, in New York City—they also commissioned an independent review by Charlotte, Vt., engineer Bill Root, an ASHRAE High-Performance Building Design Certified Professional.

Root based his assessment on comparisons with similar designs carried out in a similar climate. Buisman and Root both concluded that the unvented roof should perform reliably.

Root, and PHIUS, also took into account the measures Miksic and Whitchurch took to verify the theory: They installed three different kinds of moisture and temperature sensors at key locations in the building assembly, and they've been monitoring the building to observe whether its performance met their expectations.

But that's not all. Whitchurch and Miksic also drew up a remediation and repair plan, in case the roof failed despite their predictions. Whitchurch said: “We figured it would cost us four grand to tear that EPDM off and put in a vent, and put it back down.” So if the roof had failed—or even if it had started to move in the direction of failure, which the sensors would have detected early on—Montpelier Construction stood ready to fix the problem.

### IN PRACTICE

But the roof hasn't failed yet. In fact, so far, Whitchurch's granny-annex roof is an

exemplary success: Any wintertime increase in lumber moisture content is more than balanced out by summertime drying, and the overall trend after almost two years of data collection is toward the dry direction. Like a well-built conventional attic, this roof is drying out over time.

Before anybody gets excited, however, let's be clear: Neither homeowner Greg Whitchurch nor builder Chris Miksic is inclined to draw any general conclusions about the reliability of WUFI modeling, or even about the appropriateness of the construction methods, based on the data from the Whitchurch house—at least not yet.

The data from the sensors on Whitchurch's roof are broadly consistent with WUFI's predictions for the roof. But would Whitchurch himself conclude that his roof's experience validates WUFI? "Oh, no," he said. "No matter what my outcomes are, I would never say that. Because it could be just chance." WUFI has limitations, Whitchurch said: "Like any other simulation, it can give you some information, and it can give some comparisons, but I don't think it gives absolute answers."

And builder Miksic said this roof has a number of specific details that, if changed, could alter the assembly's performance. For one thing, the small, 24-foot-square roof is vapor-open at the edges, with a permeable membrane on all four sides allowing vapor to escape into soffit vents. Second, during the summer, the dark EPDM roofing heats up in the sun, which helps to drive moisture through the smart membrane underside into the indoors. A white roof, a vegetated roof, or even shading from solar panels would change the roof's performance. A third factor is lumber choice: The roof is sheathed with solid-sawn pine, not with OSB or plywood, which are less vapor-permeable and more moisture-sensitive. "And there's a fourth, very important factor," said Miksic: "Quality of construction and airtightness. The vapor control layer, the Intello, is also the airtightness layer in this roof, and has to be meticulously air-sealed. You need a continuous vapor control layer and air barrier."

Ted Cushman is a senior editor at JLC.

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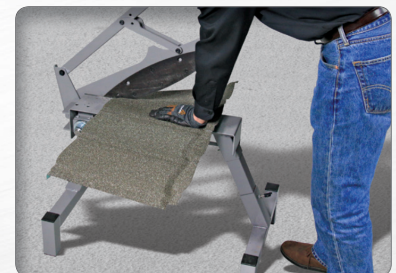
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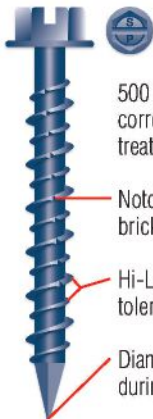
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# PIER FOUNDATIONS



## Retrofitting a Foundation for Problem Soils Helical piers and a grade beam form a solid foundation for attaching a large covered porch

BY NATHANIEL ELDON

Cape May County on the coast of New Jersey is a low place. Its highest point, in fact, may be the local landfill. Geologically, it was about as far south as the glaciers traveled in the last ice age. We don't have rock and clay, like they have in Pennsylvania to our north and west, and we don't have the stony glacial till that's found in New England. But we do have very nice beach sand and lots of it. This sand makes a pretty good base to build on—until it gets washed out.

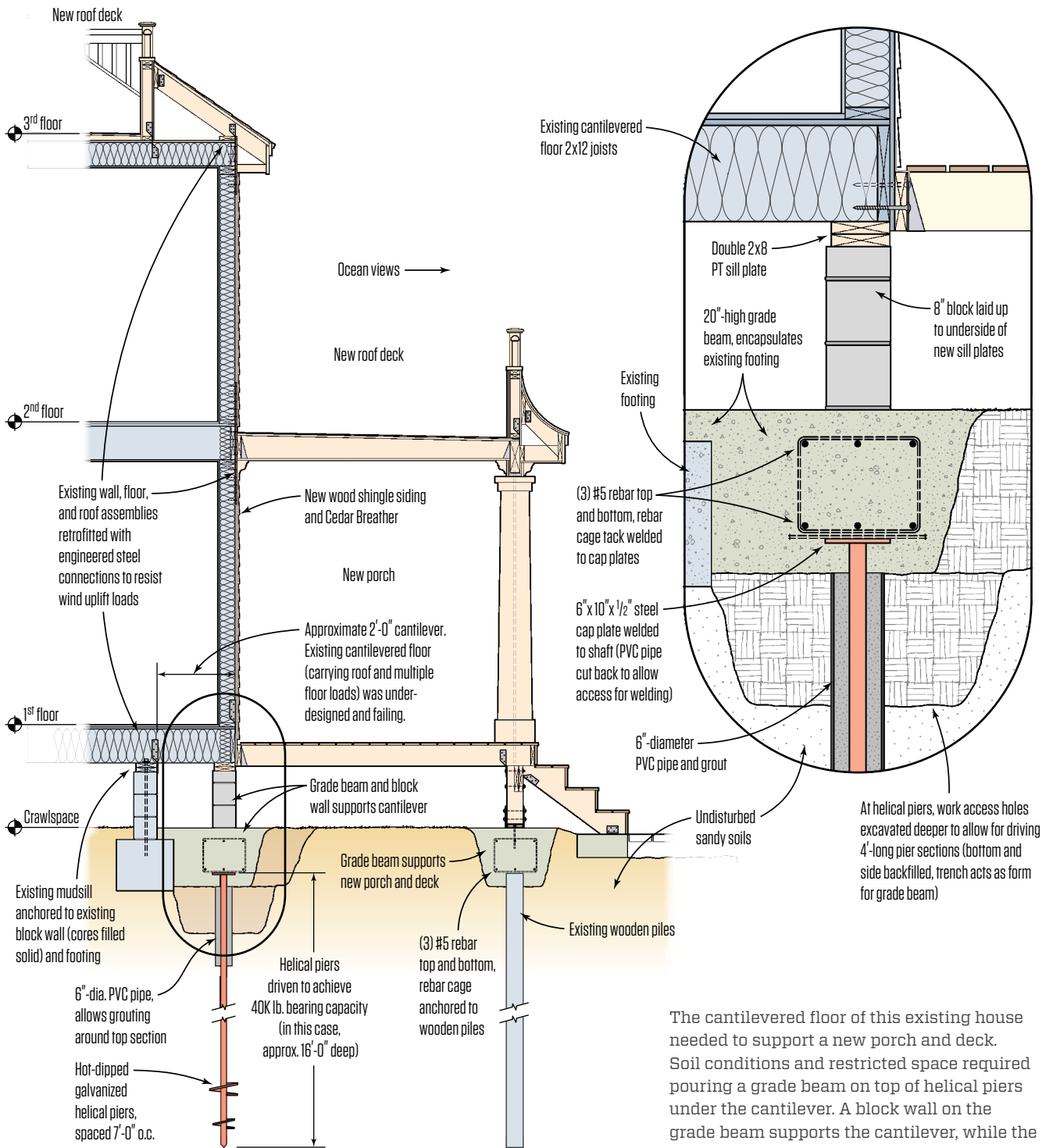
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Above: Starting by sections of helical piers wait to be driven (1). A mechanical bucket excavates holes at each of the helical piling locations (2). A rotating machine drives the piles into the ground, one section at a time (3).

## Retrofitting Support for a Cantilever



The cantilevered floor of this existing house needed to support a new porch and deck. Soil conditions and restricted space required pouring a grade beam on top of helical piers under the cantilever. A block wall on the grade beam supports the cantilever, while the existing foundation anchors the house.



Left: When the helical piles have been driven to the required depth, the crew pushes a PVC grouting tube into the ground around the shaft. The top of the pipe is then cut off 4 to 6 inches below the top of the pile shaft (4). After the sand is cleaned out of the tube with a high-pressure water jet, the pipe is filled with cementitious grout (5).



wood. They're augured into the ground to a certain point and then driven down the rest of the way with a pile-driving hammer hung from a crane. Installing wood pilings can be done pretty quickly and easily when they're put in before a structure is built.

But wood pilings can be problematic with renovation work. To begin with, they're long—the shortest are 12 footers, and some are as long as 30 feet. Their installation requires large equipment with plenty of overhead clearance, and the process is so noisy and jarring that some municipalities ban pile driving in the tourist season.

When pilings are required for a renovation in our area—or in any area that has soil with questionable bearing capacity—helical pilings can be a better option. Helical pilings are twisted, or “screwed,” into the earth with hydraulic equipment. The “threads” of the pilings are spiral-shaped plates, called “helices,” that are welded to a steel shaft (1). The diameter of the plates used varies according to the bearing capacity that is needed, and as with wood pilings, the total length and width of the helical pile varies depending on soil conditions and desired bearing capacity of the pilings. But unlike wooden pilings, helical piles can be installed in more confined spaces. They come in shorter sections, and once the initial section with

the helices is driven, additional lengths of shaft are simply bolted on and driven in one at a time.

### THE PROJECT FOR HELICALS

This past summer, I was hired to rebuild a porch on a house that had been built in the early 1960s. The framing of the first-floor deck cantilevered past the foundation a couple of feet on the front and rear of the home, and in a 1980s renovation, a two-story porch was rebuilt with its frame attached to the cantilevered floor. The cantilever had begun to fail—the 2x12 joists had developed a downward hook where they hung past the foundation wall.

Rather than using the cantilever to support the loads of the new porch, I recommended to the owner and architect that we build a foundation wall to support the overhang from underneath. Essentially, we would be getting rid of the cantilever and creating a straight load path down the exterior wall. The most practical way to support this wall would be to build a block wall on top of a reinforced-concrete grade beam. And the most practical way to support the grade beam would be with a series of helical piles (see Retrofitting Support for a Cantilever, facing page).



### SCREWING IN THE PILES

The first step was removing the original deck that had been added to the house. It turned out that the deck framing had been notched into treated-wood piles that were still in good shape. We decided we could use them to support the outer edge of the two-story porch.

Per the engineer's recommendations, I laid out the eight locations for the pilings along the edge of the house at around 7 feet on-center. The cantilever was about 2 feet above grade, and the helical-piling sections were 4 feet long. So to deal with the tight space under the cantilever, we used a small skid-steer machine equipped with a bucket to excavate a hole at each of the pile locations (2). This gave us more room and let the installers start the pilings a little lower. After the excavation, crew members had more than 5 feet of clearance from the underside of the cantilever to the bottom of the hole.

Although I was familiar with helical piles, this was the first time I'd had the chance to use them. To install the helical pilings, we hired Audubon Environmental, a local company with more than 25 years of experience with this type of operation. Its crew used a second

skid steer outfitted with a rotating hydraulic head that turned the shaft of the piling and screwed it into the ground (3). The small-size machine worked well for driving the piles in the tight confines under the edge of the house.

For this project, each starting section of pile had an 8-inch-diameter helix near the bottom of the shaft and a 10-inch helix about 2 feet above that. Each piling was driven directly below the outer edge of the cantilevered wall in the excavated hole. As the shaft rotated, the helices pulled the piling into the soil. When just the end of the shaft was left exposed at the bottom of the hole, an additional 4-foot section was bolted to the shaft and the driving continued. This process was repeated until the bottom of the shaft reached a depth of 16 feet, the depth of the test pile.

Because the new grade beam would encapsulate the tops of the piles, it wasn't critical to drive them to a precise depth. The installers simply measured off the underside of the house to set the depth.

Next, they inserted a 6-inch-diameter PVC pipe as a grouting tube around the shaft of the helical pile (4), pushing the pipe into the soil about 18 inches past the groundwater line (about 2 feet below the bottom of the hole). The top of the pipe was cut off 4 to 6 inches



Facing page: Trenches are excavated for the grade beams that support the edge of the house as well as the future porch (6). Rebar cages are constructed and attach to the tops of the pilings (7). The trenches are then filled with concrete to form the grade beams (8).

Left: Crew members attach sill stock to the underside of the cantilever (9). Concrete block is laid up to the sills to support the cantilever and the inside edge of the new porch (10).



below the top of the shaft. The crew cleaned out the sand from inside the pipe with a high-pressure water jet, and then they filled the pipe with cementitious grout (5). Once the grout had cured, they welded 8-inch-by-10-inch horizontal steel plates to the tops of each helical shaft.

### BUILDING THE GRADE BEAM

After all the pilings were installed, the mason, Mark McPherson, arrived to excavate a trench for the grade beam. The skid steer with the bucket made quick work of this step. The soil on the site was stiff enough to act as a form for the beam, so no additional form work was needed (6). And under the house, the excavation extended over to the original footing, which acted as a form for that side of the beam. The original foundation was three blocks high, but Mark opted to set the top of the grade beam at two-and-a-half blocks so that he could adjust the beam to conform to the settlement and bow of the cantilever. As a result, the grade beam encapsulated the original footing.

We also dug a trench for the grade beam that would support the new porch, and we connected the two trenches at the ends of the

house. After digging the trench for the porch, we cut off the wooden piles a few inches above the bottom of the trench.

Mark fashioned a continuous rebar cage that extended the full length of both beams (7). The cage was tack welded to the steel plates on top of the helical piles and strapped to the tops of the wood piles. The pour was straightforward with the trenches easily accessible (8).

After the concrete cured and before Mark came back to do the block work, the crew installed new sill plates on the underside of the cantilevered joists (9). Mark then finished the project by laying block up to the underside of the sill plates (10).

We didn't try to fix the bow in the joists that had been in the works for more than 50 years. Instead, Mark set his block to the underside of the sill plates, which supported the cantilever and kept the bowing from getting worse. We attached the porch ledger to the original band joist, but this time the porch was solidly supported by a foundation wall and would not pull the floor joists down with it.

*Nathaniel Eldon owns Eldon Builders (eldonbuilders.com), a custom home-building and remodeling company in Cape May, N.J.*



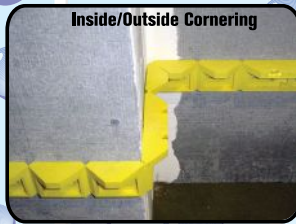
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# FRAMING



## Efficient Framing

### Notes on how one crew chief organizes the framing process

BY TIM UHLER

I am the lead framer on my crew, and one of my primary goals is to “make things click.” You know the feeling: It’s the gratification you feel when the framing goes together quickly and cleanly. This doesn’t happen by accident. High-quality framing and production comes from good organization and planning and a crew that wants to work hard and do a good job.

Over the last 10 years, we have tried just about everything in an effort to increase quality and increase production. I’ve read every article I could get my hands on about production, production tools, and crew management, and continually discuss these issues with my crew. My crew has changed quite a bit over the last few years, but regardless of the experience level of the people involved, we’ve

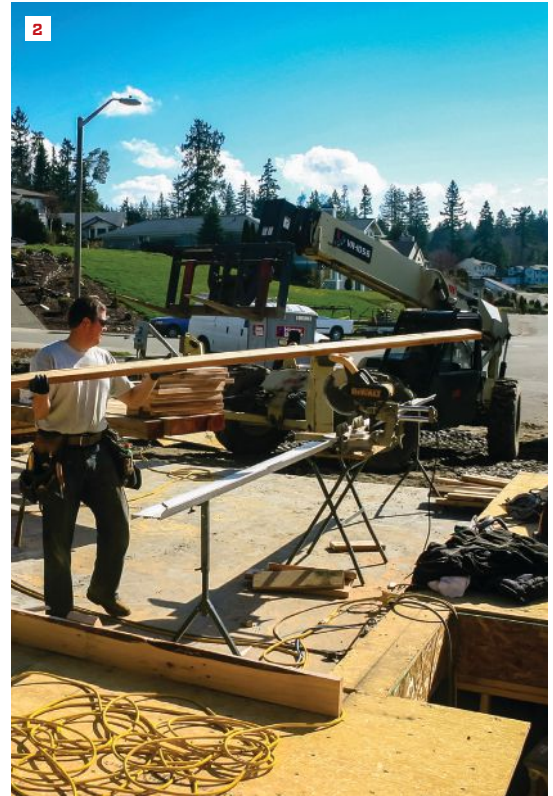
been able to maintain, and even increase, production.

This article will describe how we approach the framing process to be as productive as possible, without sacrificing quality.

#### THE CREW CHIEF

There needs to be one person who is in charge of a job. I’ve worked on crews where two or more of us had similar experience—in a case like that, it is still important to decide who is responsible for what. Otherwise, you can spend too much time standing around discussing things. Production plummets when every decision is made democratically.

Being in charge is not the glamorous job that it might seem to be



An all-terrain forklift has revolutionized the framing process for the author. With it, he can keep the area relatively free of lumber, and just serve it up when and where he needs it (1). The crew typically sets up a cut station in the garage, placing all the plate stock and window and door material on sawhorses at the same height. That way, the framer doesn't have to bend over when cutting stock (2).

to some people. You are responsible for knowing how to frame the house, install the hardware, pass inspection, and schedule lumber—and sometimes you also have to be the crew psychologist. In order to frame cleanly and productively, you absolutely must have the respect of your crew and know how to handle each crew member's personality. This includes knowing each of their strengths and weaknesses and where to best use them.

## NO SUBSTITUTE FOR PLANNING

I've been on crews where everyone just jumps into a project without much forethought, and it doesn't usually work out well. Without good planning, it's nearly impossible to be productive.

**Sets of plans for everyone.** We give each member of the crew a set of the plans, as well as the engineering reports and lumber takeoffs. This has dramatically cut down on the time we spend ex-

plaining how things will proceed on the jobsite. We have found this to be true regardless of the experience level of the crew. As an incentive, we allow framers to count time for studying the plans, and it noticeably shows when we start framing. We also make sure to switch things up so no one person has to be a laborer all the time. No one feels slighted, and everyone becomes a team player.

There is a great deal of complexity to framing a house, even a simple one. In our area, this is especially true now owing to seismic requirements that call for a lot of hardware, most of which cannot be installed until after the framing is in place. So part of the planning challenge now has to include making sure we leave enough room to manipulate tools for installing hardware and to allow the inspector to see what he or she needs to inspect.

**Distributing materials.** We have the lumberyard do a materials takeoff, except for the roof. (We typically stick frame roofs and

**3**

While one framer works at the saw station cutting cripples and plates, another framer uses a 10-inch Big Foot saw to cut the header list (3). The person cutting header stock will finish first. After he's done, it's his responsibility to jump in where he can. Most likely, he will move to tacking plates to the line, and to scattering materials in preparation for nailing walls together.

have found we have a better understanding of the specific requirements than anyone at the lumberyard.) Those takeoffs are key to establishing a schedule of deliveries so material gets dropped on time. We no longer have the lumber load for the entire house dropped at the same time. Instead, we order by task—for example, first-floor framing, then first-floor walls, then second-floor framing, then second-floor walls, then the roof—and have these delivered separately. This keeps the lumber organized, and leaves us with more room to move around the site.

For most houses, we have the first-floor framing delivered before we get to the jobsite, and we rely on a forklift—that we own—to move the packages where we need them. When we didn't have a forklift, we made sure that the lumber was dropped as close to the foundation as possible, but that sometimes created an obstacle we had to work around.

Typically, we schedule the first-floor wall framing package for delivery later on our first day. This way if we finish framing the floor and the inspector hasn't arrived yet, we can start to cut window and door packages for the wall framing.

### **JOBSITE ORGANIZATION**

Buying a forklift totally changed the way I look at a framing job. Now it really is just a giant spread-out assembly line that we can set up and maintain as materials are delivered. To make the assembly line as efficient as possible, I break the framing process down into basic tasks, and then group materials, tools, and framers into units for each task.

We typically put stud material in the middle of the floor deck so it is easy to get to it from all sides.

With a four-man crew, we typically set up a cut station in the



After cutting all the trimmers, a framer nails them to king studs and stacks them next to the pile of stud material in the middle of the floor (4). The author uses a layout stick to mark out plates (5). He splits all plates longer than 16 feet on a stud, pulling the layout from a corner, cutting the plates right at 16 feet, then pulling 16 feet to the next stud. To avoid problems with top plate overlaps, the author simplifies this for the crew and relies on Simpson TP-37 plates at intersections (6).

garage area with a sliding compound miter saw (SCMS) and table. We place the framing stock that is both our plate material and window and door package on sawhorses behind the cut station. That way, the material is at the same height as the saw, and all the framer has to do is turn around to grab materials. It wastes time if a framer has to leave the cut station to get material, so setting this up in advance is time well spent. For sheathing the walls, either we'll place a unit of sheathing next to the studs if there is room on the deck or we will leave it on the forklift at the edge of the deck where we can easily access it.

### FRAMING CREW AS AN ASSEMBLY LINE

A four-person framing crew can usually frame all the outside and inside walls on the same day (not including rake walls) for a normal 2,500-square-foot home.

This is how I typically break down the task for exterior wall framing:

- One framer cuts all cripples and sills, and groups by window. He cuts scrap into 14 7/16-inch blocks so we can install ladder blocking for the drywaller or backing for the finish carpenter.
- One framer takes a Big Foot 10-inch saw and cuts the header list. This doesn't take very long because on the houses we frame, there are usually fewer than 20 headers that need to be cut. He labels the size of the header and stacks the headers close by on the floor. If he gets done early, he can help nail together king stud/trimmer combinations or corners.
- One framer cuts all the trimmers, nails them to king studs, and then stacks them next to the pile of stud material in the middle of the floor.
- One framer starts plating and detailing. I prefer that the most



To increase productivity with a two-person crew, the author builds closed soffits on the wall before lifting (7). It's faster, keeps the wall straight, and is safer than working off ladders or staging. But it does require temporary bracing to keep the soffit from sagging before the roof is framed. Every gable wall is built as a rake wall and is lifted into place. Each end will be built and placed before the side walls, but it is helpful to frame up a short section of the side wall early, to brace the gable (8).

experienced guy on the crew do the layout—because he is most accurate and the fastest. However, I want every guy I work with to be able to progress as fast as he is able, so I am not always the guy doing the layout. Plating goes quickly because we use a Big Foot 10-inch saw to cut two plates at a time, and a layout stick to speed up layout.

- We don't overlap all our top plates at corners or overlap intersecting walls. Instead, we use Simpson TP-37 plates to connect walls to eliminate errors relating to overlaps.
- Whoever is in charge should also keep an eye on how things are progressing, but it's each framer's responsibility to figure out how to fit in and keep things moving. Oftentimes, the framers cutting headers and those nailing king studs and trimmers together are done first, then the framer cutting window packages, and then the framer doing layout. So as soon as someone is done, he can tack

plates to the line, and start scattering materials in preparation for nailing walls together.

We try to have two framers do nothing but nail walls together, while one or two framers pack and scatter materials so that the ones who are nailing never have to stop. The framers scattering material split this duty with squaring up the walls that have been framed and sheathing them.

There is a lot of overlap and flexibility in this because no two jobs are the same and some walls are bigger than others. The bottom line is that I want each guy doing as much as he can of a task before he has to stop and switch to a new task. We want as many walls nailed and sheathed before we start lifting them. We usually frame parallel walls at the same time—for example, we frame and sheathe all the front walls and all the back walls, then the sides.

For interior walls, the process is basically the same: One framer



Shown above are two preassembly tricks that save time: A framer preattaches a rim joist to a girder before it is lifted into place with the forklift (9). On ledgers and rims, it also saves time to preinstall joist hangers (10). It's much easier and faster to do this on sawhorses than while balancing at the top of a ladder.

lays out, one cuts headers, and one cuts trimmers and nails them to king studs. While the interior framing gets started, the fourth framer fills in any exterior sheathing we couldn't install before raising walls, and tapes the seams (we use Zip Wall).

## TWO-MAN CREW

The last few years, I've been on a two-man crew plus forklift. We've had to change the way we do some things to keep production up, with fewer guys. While most of the principles discussed above for a four-person crew apply to my two-man crew, we've found there are some modifications that needed to be made.

**Beam saws.** Instead of using the SCMS, we use our 10-inch Big Foot and 10-inch Sawsquatch saws. We can bring the saw to the material instead of the material to the saw. This saves time on setup and rolling out tools. We keep our scrap and whenever possible, cut

it into 14 7/16-inch blocks or 22 7/16-inch blocks as we go.

**Preassembly.** One of the biggest savings in labor is building every gable wall we can as a rake wall with as much trim on it as possible before lifting it. This is safer and much faster. It is also a lot easier on the body.

Other preassembly tips that make us more efficient include:

- We build closed soffits on the wall before lifting. It is very fast, helps keep the wall straight, and is safer than working off ladders and staging.
- Whenever possible, we build walls on the floor deck. This is better (and faster) than working in the dirt or mud.
- We typically preattach hardware like joist hangers before we install a ledger or rim board.

*Tim Uhler is lead framer for Pioneer Builders, in Port Orchard, Wash.*

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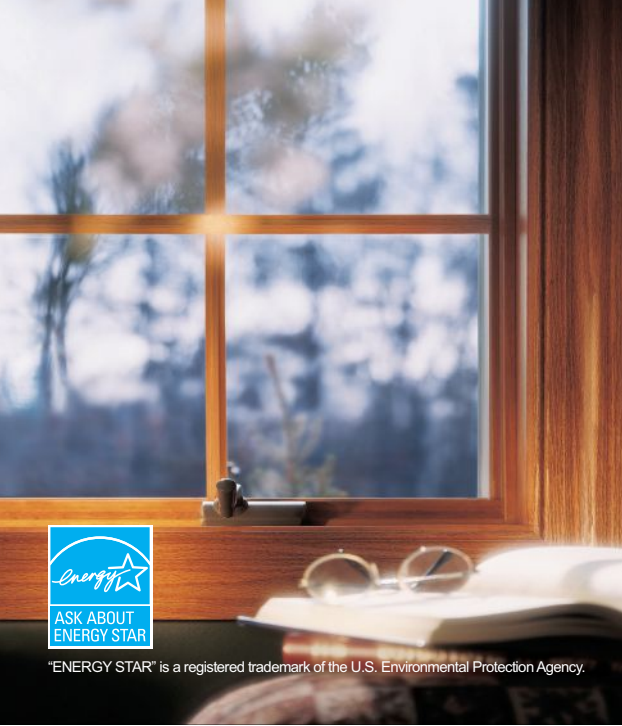
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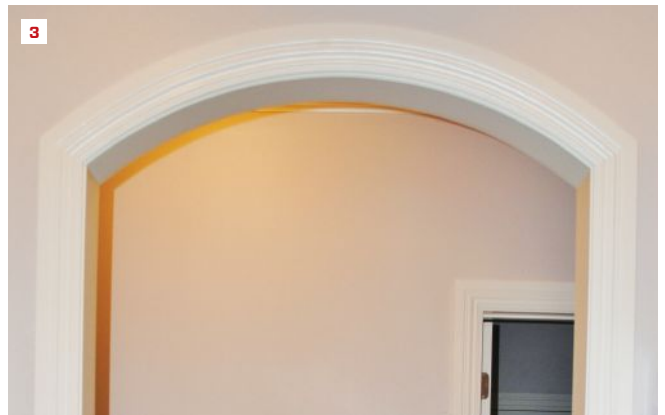
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# FINISH CARPENTRY



## Installing Arched Casing How to make three different arched trim details look like they grew there

BY GARY STRIEGLER

I love the challenge of trimming arched openings. It's a great way to showcase my finish work, and once prospective clients see that I can trim out an arched opening, no one asks if I know how to hang a door. I've seen many house plans online or in magazines that feature circle-top windows, doors with elliptical transoms, or interior archways. To save money, these elements are often finished with drywall returns, but adding arched trim accentuates and complements the look of any opening with an arched top in a house.

I make much of my own trim—both straight and curved—on a Woodmaster planer/molder, but whether you mill your trim or buy it, creating a smooth transition between an arched top and straight

side-jamb pieces is critical. A poorly executed installation can ruin the look of what should be the trim highlight in a home.

### TIPS FOR WORKING WITH ARCHED TRIM

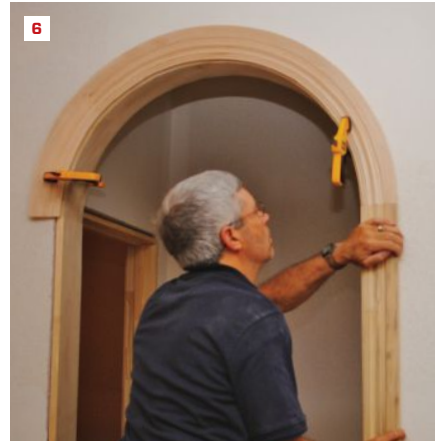
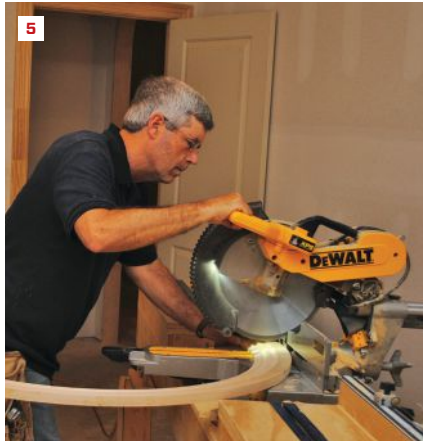
With any arched molding project, there are a few general rules to keep in mind.

The first thing is not to hurry. Arched molding is expensive, so it pays to take your time locating, marking, and making your cuts.

Using sharp, high-quality blades is especially important when working with arched trim. Crisp cuts are a huge help for making seamless transitions between the arch and the straight jambs.

If milling your own molding, make the straight side pieces at the

## INSTALLING ARCHED CASING



same time you make the arched molding. That way, the profile and thickness will most closely match.

As you fit each joint, always make your final cuts on the straight trim. If you do make a mistake, it's much easier and less expensive to replace a straight piece of trim than an arched piece.

Finally, don't panic. If things don't line up perfectly (they seldom do), a little hand work with sandpaper and a sharp chisel or plane can get things back in line.

### THREE TYPES OF ARCHES

There are three basic kinds of arched casing: circle tops **(1)**, elliptical tops **(2)**, and eyebrow or segmented tops **(3)**. On a recent project, I made and installed trim for all three types of openings, each with its own characteristics and layout. Here is a quick look at the three types of arches.

**Circle tops.** These arches are actually half of a complete circle and are most commonly seen on circle-top windows. Of the three types of arches, circle tops add the most height to an opening. Above a 4-foot-wide opening, for instance, a circle top requires another 2 feet of height; so to accommodate one—unless the ceilings are really tall—openings must be less than 3 feet wide.

The joint between the circle-top arched trim and the straight side pieces is a square cut, parallel to the floor. The arched trim piece must be a perfect half circle—any more than half and the trim will toe in at the joint; any less and the joint will angle out slightly, or the profiles won't quite line up with the square cut on the legs.

**Elliptical tops.** Ellipses are probably my favorite arches to work with, but they can also be the most challenging. As with a circle top, the joint between the arched top and the straight sides is a square cut. But with other arches, you can rotate the trim a little to the left



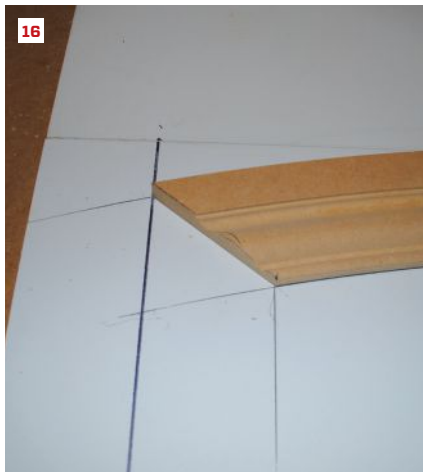
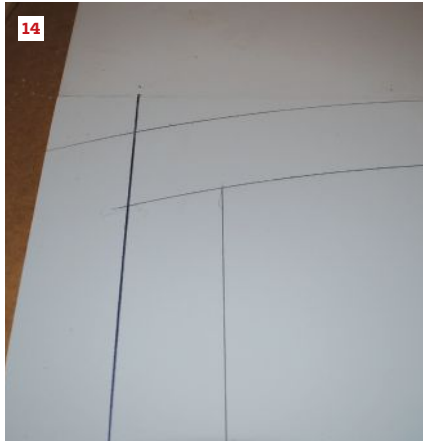
or right to find just the right place to cut the joint. With an ellipse, there is only one place to make the joint. Any small shift in position and the arch won't line up with the jamb. Most elliptical arches can be used with 8-foot ceilings.

**Eyebrow or segmented tops:** These arches are portions, or segments, of a circle, and are probably the easiest to work with. As a general rule, the width of an opening with an eyebrow arch is the radius that the trim is made from. For a 4-foot-wide opening, for instance, the radius of the arch would also be 48 inches. Unlike with the other two types of arches, the joints between the eyebrow top and the straight legs are mitered cuts; most of the miter angles fall between 25 and 35 degrees. As the radius of the trim increases, the degree of the miter cut decreases. Eyebrow openings can be used with almost any ceiling height, because they don't add as much height as the other types of arches.

### CUTTING AND FITTING CIRCLE-TOP ARCHES

Circle-top arches can be laid out on a work table or on the floor by either tracing the molding or marking the radius with a trammel, but I find it easier just to set the arched piece directly on the jamb (a couple of small finish nails temporarily tacked at the reveal line can help hold the piece in the proper position). After clamping the arched trim in position, I mark the points on the left and right inside edge where the arch will transition to the straight side jambs. Those points usually correspond with the joints in the jambs.

I line up a straightedge with the marks and draw a straight line across both sides for the cut (4). I make the cuts on a miter saw with the other end of the half circle supported in back of me (5). After cutting both sides, I clamp the half circle in position and fit the straight pieces (6). If I've done everything correctly, the tops of the side jambs should be square cuts.



## CUTTING AND FITTING ELLIPTICAL ARCHES

For ellipses, I also have to find the inside points where the curved trim meets the straight leg—just like I did for the circle-top trim—but it’s a little trickier. (For more on laying out ellipses, see “Building an Arched Passageway,” Dec/07). I start by holding the elliptical piece on the jamb and rotating it to the left and right until the reveal comes closest to being even along the jamb. Elliptical arches never seem to line up perfectly with the jambs, but I can adjust the fit when I install the trim. When I find the best position, I clamp the arch to the jamb.

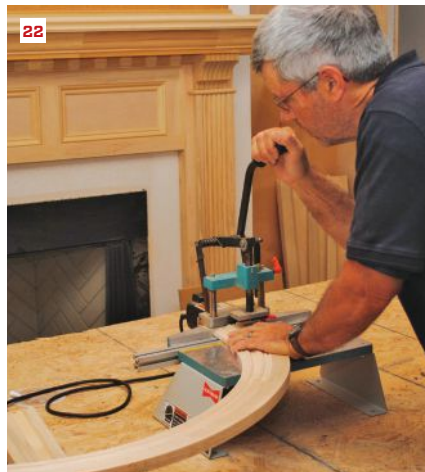
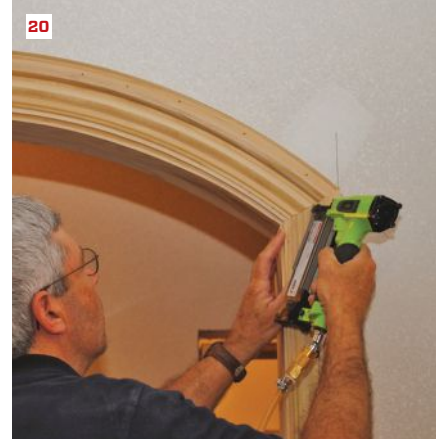
Next, I mark the point on each side where the trim starts to turn in from the jamb edge (7). Both of these marks should be pretty close to the same distance from the floor, so I double-check the measurements—hopefully, they are within ¼ inch—before I mark the cut lines. When I’m happy with the marks, I line them up along a

straightedge and mark the lines for the cuts, similar to what I did with the circle top (8). After cutting the sides of the ellipse, I make the square cuts on the tops of the side jambs where they meet the arch. I like to do a test fit on a flat work bench. If I need to tweak the edges with a little sanding for a better fit, it’s much easier to do before the piece is installed (9).

## CUTTING AND FITTING EYEBROW ARCHES

For the first two types of arches, the joints were square cuts (parallel to the floor). For eyebrow or segmented arches, these transition joints are miters, the angle of which changes depending on the radius of the trim.

If the finished floor hasn’t been installed yet, I have more wiggle room for adjusting the cut, and I fit the pieces directly to the jamb. Holding the trim in position, I trace along both vertical edges of both



the right and left jambs. Then, starting on the right side, I hold the arch trim against the jamb at the proper reveal and trace a line along the inside and outside edges where the arch intersects the sides (10).

With the arched trim clamped in place, I mark the miter line between the inside and outside intersection points (11) and then make the cut on a miter saw. Next, I set the side jamb piece in place, marking and cutting the miter angle on that piece as well (12).

If my layout is perfect, the joint is tight and the profiles line up. But that rarely happens on the first try, so I adjust the cuts to get a perfect fit. When I'm happy with the right side, I trace the top and bottom edges of the arched trim on the left side. Then I set the right jamb piece aside and rotate the arch about 1/8 inch to the right before cutting and fitting the left side. Moving the piece a little gives me extra room to adjust the miter as I fit the left side of the trim.

If the finished floor has been installed, I do a full-scale layout on

a table or on the floor so the jamb trim can run long while I tweak the miters to fit. To create the layout, I draw the correct radius with a trammel (remembering to add 1/4 inch for the reveal), or if I've made the molding section, I just trace it on the table (13). I also trace the jamb legs, set at the width of the opening plus the reveals for both sides (14). With the arched trim set back in place on the layout, I transfer the intersection marks onto the arch (15). As before, I draw a straight line between the two marks and make the miter cut (16). Then I do the same for the jamb legs and make those cuts (17). When I'm satisfied with the joints, I cut the jambs to length for the finished floor.

### ASSEMBLING THE PIECES

For securing the joints, the most basic method is gluing and nailing with headless pins. This is my last choice because the joint is

## INSTALLING ARCHED CASING



not reinforced, and it doesn't work well with large profiles.

A second method is to remove a small section of drywall from directly behind the joint, then glue and pin a ½-inch-thick plywood gusset to the back of the arched piece at each of the ends (18). I install the arch first, with the gussets sitting in the spaces I created in the drywall (19). Then I glue and pin the jamb legs, letting the gusset reinforce the joint (20). This method works best when I'm fitting the trim on the wall piece by piece, but with adequate glue and enough drying time, it's possible to pre-assemble the trim this way.

I sometimes use biscuits or dominoes to reinforce the joints if the trim profile is thick enough to accept the tenons (21). Biscuits and dominoes are a great way to make preassembled trim; give the glue plenty of time to set up before installing the trim. You can also assemble the pieces on the jambs with biscuits or dominoes if you're sure to install the jamb legs first.

My favorite joining method is using dovetail keys to hold the joints together. This method works great for preassembling or for fitting in the pieces in place, and it eliminates the need to wait for glue to dry. The only down side is that it takes a specialized machine called the "Hoffman Dovetail Joining machine" that makes matching dovetail cuts in the backs of each piece of trim (22). A plastic fastener called a "key" fits into those cuts and pulls the joint together instantly (23). I mate the cuts in the arch and the jamb by indexing them from the outside edge of the trim. The keys come in many different lengths, so by adjusting the depth of cut, I can fit three keys into just about any profile to create a super-strong joint.

### FINISHING UP

Almost every arched trim project requires a little extra effort to achieve the finished quality that I am looking for. First, I usually need to move the jamb slightly for a perfectly even reveal. Sometimes that operation is as simple as using a clamp between the arched trim and the jamb (24) and then shooting a few extra nails through the arch to lock the jamb in place. Other times I need to sand a little off the inside edge of the trim to widen the reveal, and on occasion I've even sanded a little off the jamb to decrease the amount of reveal.

On most arched trim projects, there are places where the profiles don't align perfectly. In these cases, I blend the two sides together using sandpaper (25). In extreme cases, I've used a sharp ¼-inch chisel or my miniature rabbit plane to shave part of the profile of the straight trim (26). It's not unlike blending a splice joint in crown molding or baseboard. Again, the most important advice I can give is not to panic if the joint isn't perfect on the first try—remember you can make adjustments and there's no need to rush. Working with curved trim can be really challenging, but the finished project is something to be really proud of.

*Gary Striegler owns Craftsman Builders, in Fayetteville, Ark., and teaches workshops at the Marc Adams School of Woodworking. His website is [craftsmanbuildersnwa.com](http://craftsmanbuildersnwa.com).*

BY LAUREN HUNTER



1

### 1. Seamless Window Frames

Available in arched or gable styles with matching picture windows, the Essence Radius Casement window has concealed hinges and no visible fasteners. The exterior frame is fabricated with a CNC water jet from a single sheet of a durable phenolic material for seamless construction. Options include three solid wood interiors that match Essence Series windows and doors, 16 powder-coated exterior colors, numerous window grids, and five finishes for the handle. Operable casements range in heights from 20 to 84 inches. Pricing varies, as each window is custom-made. [milgard.com](http://milgard.com)

### 2. Sound Decision

Delta's BreezIntegrity ventilation fan features a Bluetooth speaker alongside a 70-cfm fan, so users can enjoy music, podcasts, and other entertainment as they start and end their days. Its compact size makes the fan suitable for retrofits and for replacement of older bath fans, and even with the integrated speaker, the unit is Energy Star-qualified. The Breez line also includes a 70-cfm bath fan with a dimmable LED light. Pricing will be finalized when the fan is available in April. [deltabreez.com](http://deltabreez.com)



2



3

### 3. Modern Finish

Danze introduced its Satin Black finish on traditional styles a few years ago, and now brings that finish to its more contemporary Mid-town bath collection and Mid-town and Parma pull-out kitchen faucets. The matte finish is a stylish contrast to white tile or cabinets, and a complement to dark appliances or grout. The Mid-town single-handle lavatory faucet (shown) is a single-hole design with a laminar flow, and is available in a water-saving 1-gpm model. Pricing ranges from \$300 to \$450. [danze.com](http://danze.com)



4

### 4. Slim Chance

Installation of SlimLine railing is made easier with a template for a measurement-free bracket-to-post connection. The railing assembly is secured by notched balusters that join the bottom rail and top subrail; space between the top caprail and subrail accommodates in-rail LED lighting. Railing kits come in 6- and 8-foot lengths, and in an 8-foot stair kit. Choose from textured bronze or textured black, with a white finish forthcoming. Check with your dealer for pricing. [fairwaybp.com](http://fairwaybp.com)

## Products

### 5. Square Off

The Razionale above-counter vessel lavatory sink has a minimalist contemporary shape, in keeping with a growing trend toward square styles. It measures 18<sup>3</sup>/<sub>8</sub> inches by 18<sup>1</sup>/<sub>2</sub> inches, and the basin itself is 17 by 17 inches square. An integral rear overflow has a chrome-finished overflow cover. Look for pricing around \$215. mansfieldplumbing.com

### 6. Out of Africa

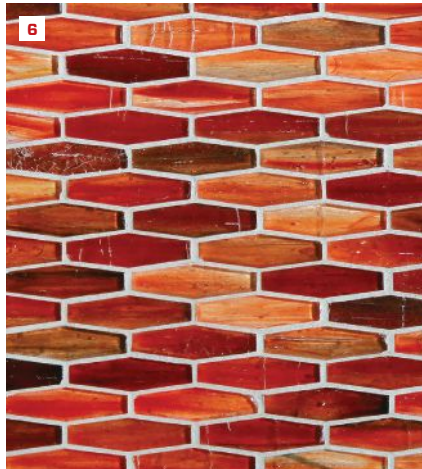
Add a bold accent to backsplashes, shower walls, and other tile applications with Lunada Bay Tile's new Marrakech Red selections. Part of the Tozen glass tile collection, the translucent red-glass tiles recall the exotic spices, vivid fabrics, and famous tiled roofs of their Moroccan namesake. Choose from "Martini" elongated hexagons (shown), 1/2-inch-by-1-inch mini bricks, and 1/2-inch-by-4-inch or 1-inch-by-4-inch bricks, in natural or silk finishes. Tozen glass tiles contain 70% post-consumer recycled glass. lunadabaytile.com

### 7. Smart Integration

Rheem is expanding its EcoNet product line (introduced in 2015) by offering integration with the Nest Learning Thermostat. On the "Works with Nest" platform, the thermostat can communicate with EcoNet-enabled electric and hybrid heat-pump water heaters, lowering temperature settings when users are away from home. Gas-enabled water heaters will be added to the program later in the year. The maker says that the Prestige heat-pump water heater with EcoNet and Works with Nest technology offers a 2.45 energy factor and an average 2-year ROI with \$4,000 in savings over the life of the unit. rheem.com

### 8. High-End Wood Flooring

Smokehouse Oak is part of Mannington's top-of-the-line Maison Collection of hardwood floors. The European design features 7-inch-wide planks that measure 9/16 inch thick and run up to 7 feet long. Detailed with hand-staining and distressed for a time-worn look, Smokehouse Oak has a contemporary matte finish, with three hues to provide variety and visual interest among boards. The maker says that the engineered hardwood flooring won't buckle, gap, cup, or twist, and that unlike solid wood, it can be installed below grade and direct to concrete. Average price is \$10 per square foot. mannington.com



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## Products

### 9. Panels of Protection

GP has combined sheathing with a moisture barrier in its ForceField Air and Water Barrier System. The 7/16-inch-thick panels are laminated with a material that eliminates the need for housewrap. Specially-formulated seam tape seals the system to prevent air infiltration and leaks, the maker says, and can be applied to the panels at temperatures as low as 0°F. At \$3 to \$4 more per panel than OSB, ForceField is more expensive, but the maker says ForceField saves up to 37% on labor compared with standard sheathing-plus-housewrap installation. [gpforcefield.com](http://gpforcefield.com)

### 10. Take Time to Vent

Guard against roof degradation, ice damming, and mildew growth with the Cobra IntakePro Rooftop Intake Vent. The vent also helps improve attic ventilation and airflow when installed with existing soffit or under-eave vents in a balanced ventilation system, the maker says, and eliminates the need for time-consuming alterations at the soffit. Instead, the vent rolls out and fastens with 1 3/4-inch coil nails (included). The vent is tested to withstand wind-driven rain, snow, and ice-dam infiltration. Check with your distributor for pricing. [gaf.com](http://gaf.com)

### 11. Get Up and Go

Available in a 1/4-inch thickness for floors and a 1/2-inch thickness for walls, GoBoard is Johns Manville's new ultra-lightweight waterproof tile backerboard. The maker looked to its polyisocyanurate commercial roofing panels as the basis for the new product, which is lighter than cement board and can be installed in residential and light-commercial tile applications. GoBoard can be scored and cut on-site with a utility knife, and only needs to be sealed at the joints and fastener locations upon installation. Panels are priced between \$25 and \$28. [jm.com](http://jm.com)

### 12. Light Selections

Shine the right light on the job with Klein Tool's new illumination line. The collection's water- and impact-resistant headlamp, for instance, is designed for electricians and has a 45-degree tilt, spotlight and floodlight modes, and an anti-slip silicone strap pre-adjusted to fit a hardhat. Other products in the line include a slide-focus flashlight, a penlight, and a clip light. All run on AAA batteries—for at least five hours on high mode and up to 10 hours on low, the maker says. [kleintools.com](http://kleintools.com)



9



10



11



12

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BY CHRIS ERMIDES



## Connect and Protect Cords

**Some of the most practical** tool inventions come straight from the jobsite by innovative contractors. Woodworker Brooks Lawrence is one such innovator. Lawrence became frustrated by cord disconnects, wear-and-tear, and the occasional arc flash on his jobsites. Dissatisfied with taping cord ends together (doesn't last) or tying them (bulky knot snags on corners), he decided to devise a better alternative.

After several variations and his own personal investment, Lawrence came up

with the cord connector system shown in the photos above. His system consists of three parts: a hardened plastic shell, a rubber cord stop that attaches to the extension cord, and another rubber stop that attaches to the tool's cord. The rubber stops are available in cord sizes #10 to #16. Once attached to the cord end, the stop stays there until the next use. With the tool plugged into the extension cord, the shell wraps around the stops, and Velcro straps lock everything together. The stops interlock

with the shell so once the shell is in place, the cords cannot be pulled apart, protecting the joint that typically is a failure point on electrical cords. The system is compatible with after-market cord plug ends, as well. In addition to keeping the cords together, the outer shell will protect from the elements and won't mar most finished surfaces.

Cost: \$25 for a set, which includes one #14 and one #16 stop; \$7 for each additional stop. [industrialcordconnector.com](http://industrialcordconnector.com)

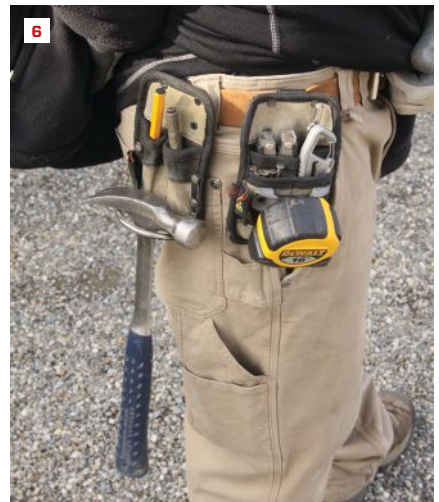
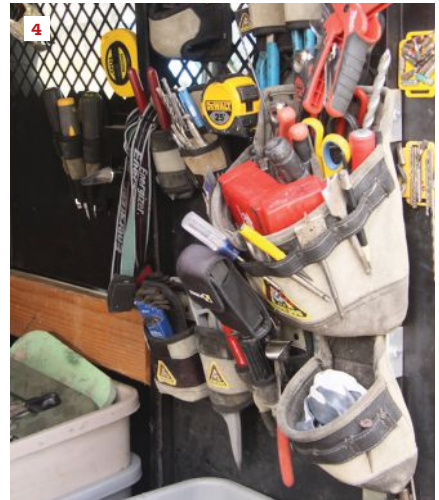
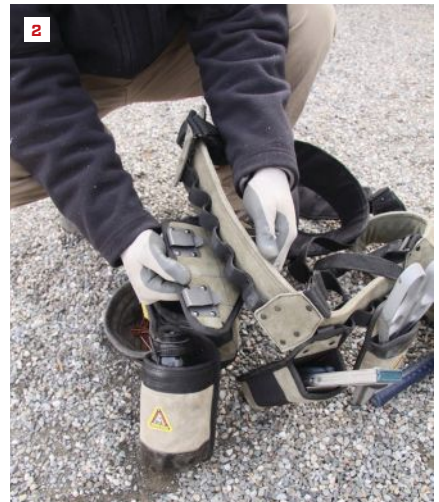
## Modular and Customizable Tool-Pouch Rig

While visiting a jobsite of New Dimensions Construction, in Millbrook, N.Y., I struck up a conversation with the lead carpenter, Ryan Labrenz, about the tool-pouch rig he was wearing (1). He was equipped with pouches of varying sizes and a suspender system that looked like it worked better than most other suspenders I'd seen, and I couldn't help but ask him what it was. His reply was enthusiastic: "Iron Dog, and I love it because it's fully customizable."

With so many tools to organize and job needs that vary weekly, daily, and sometimes multiple times within the same day, Labrenz has gotten the most out of this system. It all starts with the waist strap, which is secured via Velcro and a nylon band that can be cinched down for a tighter fit. Then, each pouch connects to the waist strap, and to each other, via loops and clips (2). Once attached to nylon loops, the pouches—like this nail bag that he modified by adding a magnetic bit holder (3)—can cascade in any order and manner as the job demands.

A handy feature of this system is that it has pouches that are designed specifically for certain tools, like a layout square or a bottle. Labrenz has put to use the many pouch styles to hold tools for specific tasks—like electrical, plumbing, metal work, and so on—and keeps them stocked and at the ready clipped inside his van (4). When the task at hand changes, all he does is swap one pouch out for the other. He even keeps multiple screws and nail sizes stocked in their own pouches.

Adding aluminum straps to the van doors offered Labrenz another place to clip the Iron Dog Tool Gear (5). Here, specialty bits, layout tools, hand saws, and other items are easy to access whenever needed. His last point was that when smaller jobs require only a few tools, the pouches can be clipped to a standard belt, for a lighter load (6). [irondogtoolgear.com](http://irondogtoolgear.com)



Photos on this page: Chris Erndes

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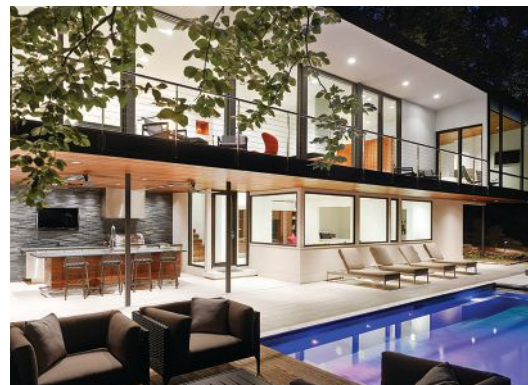
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Grabber Construction Products	33	grabberman.com	SoftPlan Systems, Inc.	80	softplan.com
Grace Construction Products	IFC	gcpat.com/performance	Tamlyn	44	tamlynisbetter.com
GRK Fasteners	38	grkfasteners.com	The Tapco Group/Kleer	42	KleerLumber.com
Gypsum Management & Supply, Inc.	12	gms.com	Tjernlund Products, Inc.	87	tjernlund.com
Hitachi	77	cpsc.gov	Velux-America, Inc.	25	skylightoffers.com/roeroing
Huber Engineered Woods, AdvanTech	48	AdvanTechBuildStrong.com/JLC37	WD-40	43, 45, 47	
Husqvarna Construction Products	10	husqvarnacp.com	ZipWall	33	zipwall.com
Integrity from Marvin Windows and Doors	18	IntegrityWindows.com/BigTrip			

BY CLAYTON DEKORNE



First Unitarian Church at 1 Benevolent Street, in Providence, R.I., is an amalgam of Classical and Gothic architectural features.

## A Study in Classical Orders

**If you find yourself in Providence, R.I.**, for JLC Live later this month (March 16 to 19), take a stroll after hours across the Providence River to College Hill—site of one of the most extensive and authentic collections of historic architecture on the East Coast. On just about any street in the College Hill neighborhood, the houses look like the pages of Ascher Benjamin's *The Architect, or Practical House Carpenter* come to life.

Begin your tour at 1 Benevolent Street, at the First Unitarian Church (1816). Its facade is a study unto itself of the Classical orders that Benjamin illuminates in the first pages of his treatise; at each level, the columns step up (in order from bottom to top) from Doric to Ionic to Corinthian. Designed and built by master-builder/architect John Holden Greene—back when there was no distinction between the professions—the church resembled New South Church in Boston (1814), which was modeled after London's St. Martin in the Fields (1726). What Greene brought that was unique—and appropriate for a congregation that embraced the idea of “universalism”—was a blending of architectural styles, not only in the ascending columns and pediments, but in the windows' Gothic tracery combined with ancient Roman arches.

While I'm in Providence to attend JLC Live, I'm hoping to also talk my way into a tour of the clock tower. I'm told the trusses up there are as impressive as the exterior detailing of the facade.



Doric



Ionic



Corinthian

Photos: Clayton Dekorne

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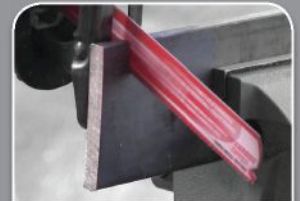
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