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On the cover: Kyle Diamond, of New Dimension Construction, solders seams on an entry portico's flat-seam copper roof, in Duchess County, N.Y. See the story on page 23. Photo by Ryan Labrenz.

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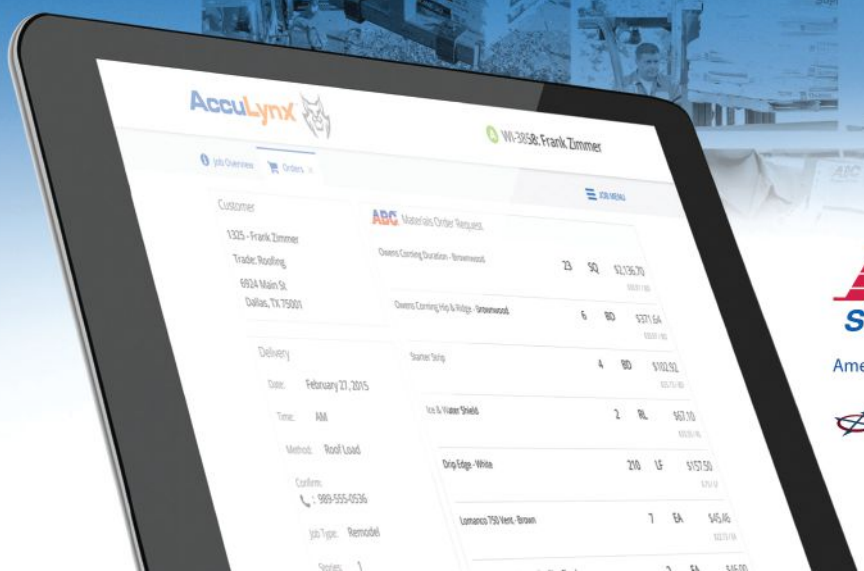

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BY GREG BURNET

Contractor Licensing=Respect

We received the following letter in response to our inaugural *Training the Trades* column in the March issue:

"I appreciated your column. We do need further discussion about developing a skilled and, ultimately, resilient labor pool in the construction industry.

"I apprenticed under a master carpenter (Jack) for four years and went to CITC (Construction Industry Training Council) in Bellevue, Wash.—a non-union training facility. That was a four-year, nights and weekends, apprenticeship program. It served me fairly well as an introduction to the trades, though any mastery of my craft that I may have achieved is certainly attributed to Jack's teaching and guidance.

"I might have also attended Seattle Central's wood construction program in carpentry, cabinet making, or boat building, which is widely popular—but the program was full time and the company I was working for paid half of my tuition at CITC.

"Shortly after I graduated from the program in 2010, I went into business for myself because of the drop off in available work from my employer. I have since been building my own remodeling business here in Seattle. I keep in close contact with my mentor and teacher, Jack, who quit working with our previous employer and now works with me again. After 10 years of practicing carpentry, I depend on him an enormous amount for his deep knowledge of construction and contracting.

"It is my impression that those who have lobbied to limit required education for carpenters and contractors have succeeded to an alarming rate in Washington state—all that is required to have a construction license is the wherewithal to purchase insurance and a bond. What if contractors were held to the same standards as plumbers and electricians to keep their licenses? Would the ramifications of this not be more beneficial than detrimental? Have we limited the pride and professionalism we both feel and project to our community by keeping these requirements to bare minimums or nothing at all? Surely this is a dynamic to add to your list of causes for the diminishment of our trade!

"I spend an inordinate amount of time apologizing for the tradespeople who were met by my clients before I arrive on a project and it deeply saddens me.

"We must require education if we are going to expect to see its benefits in our field." —*Josh Coberly*

This letter resonated with me. I've long held the position that the building industry must work collectively to reverse the stigma and unfavorable impression it seems to have in the public eye.

The bad press and mistaken beliefs that professional skills can be replicated by DIYers have taken years to evolve, thanks in part to a lack of self-policing in the trades.

I believe that the building industry is nearing the tipping point: Either we can strive to present a more professional image, or we can stand by as our skills and integrity are called into question, our industry is ridiculed, and prospective customers become further convinced that they're better served following the "Do It Yourself" mantras from big-box stores than by hiring a pro.

The bad press and mistaken beliefs that professional skills are easily replicated by DIYers have taken years to evolve, thanks in part to a lack of self-policing in the trades. The lack of respect for professionals often feels like the 600-pound gorilla in the room at many of our

client meetings, and I suspect the same is true for many of my colleagues. And that gorilla isn't likely to go away quietly—at least not until many more in the trades take the responsibility to conduct themselves as professionals.

I generally have pretty strong opinions regarding the state of our industry, yet contractor licensing is one issue I'm on the fence about. While I'd like to believe that comprehensive licensing requirements would truly help increase the knowledge, quality, and competence of contractors, such licensing often depends directly upon the governing body overseeing the program. And, given that I live in Illinois, a state where dysfunctional government seems to be the norm, I question whether a rational licensing program could be effectively implemented and managed, and I suspect contractors from other states have similar opinions about their state or local governing bodies.

I also think that licensing without requiring regular CEUs or some other form of recurring education would probably not be very effective at increasing the number of "good guys" in the trades. To put this in perspective, think for a moment about the tradespeople you hold in high regard and ask yourself what most—if not all—have in common. In most cases, the answer will be that they take their job seriously and strive to learn more about their craft, trade, or business. These types of individuals generally excel because they're motivated not by outside forces or requirements, but by a desire for improvement. I simply don't believe that we can legislate away apathy.

I think Josh raises many valid points regarding licensing requirements, but we'd like to hear your perspective on the state of our industry and what steps should be taken to ensure a competent, qualified labor force is adequately representing us. With that in mind, we are asking readers to chime in online. Do you think that general contractors should be required to carry a state license? Select the answer that best describes your opinion, at jlconline.com/training-the-trades:

A. All GCs should carry a state license that requires a test and annual CEU credits
B. All GCs should carry a state license that requires an initial test
C. The current municipal licensing is sufficient
D. GC licensing should not be regulated at all
E. Other

Greg Burnet and his wife, Sue, own Toolbelt Productions (toolbeltproductions.com).

MORE LETTERS FROM THE FIELD

Training vs. Education

First off, we shouldn't call [these courses] "training" programs. "Educational" or "learning" is far less offensive to the ego of a seasoned tradesman doing things as he's always done for years and years. I myself have experienced that uncomfortable feeling of realizing one day that I didn't know what I didn't know, learning that the way I had done it forever was wrong.

Knowledge is not always an easy thing to communicate. Some people (20% to 30%) learn by reading or hearing; others (upwards of 40%) learn by watching; and the majority, especially adult males in the trades, learn by touching, doing, and being engaged in the process of learning. Think about how most of us learned the majority of what we know today. I like to call it "The BISS system" (Because I Said So). We were shown how to do something with little to no explanation as to why—it just worked.

At our company (Ring's End, a full-service building material supplier with numerous locations throughout Connecticut and Westchester County, N.Y.), we became involved with an RRP training provider and started putting classes together for the interested trades. We were so busy with RRP that there were times when we would conduct three to five eight-hour classes per week. We were able to share valuable time networking with our customers, as well as having the added bonus of meeting many new prospects in need of the training, but who didn't necessarily do business with us.

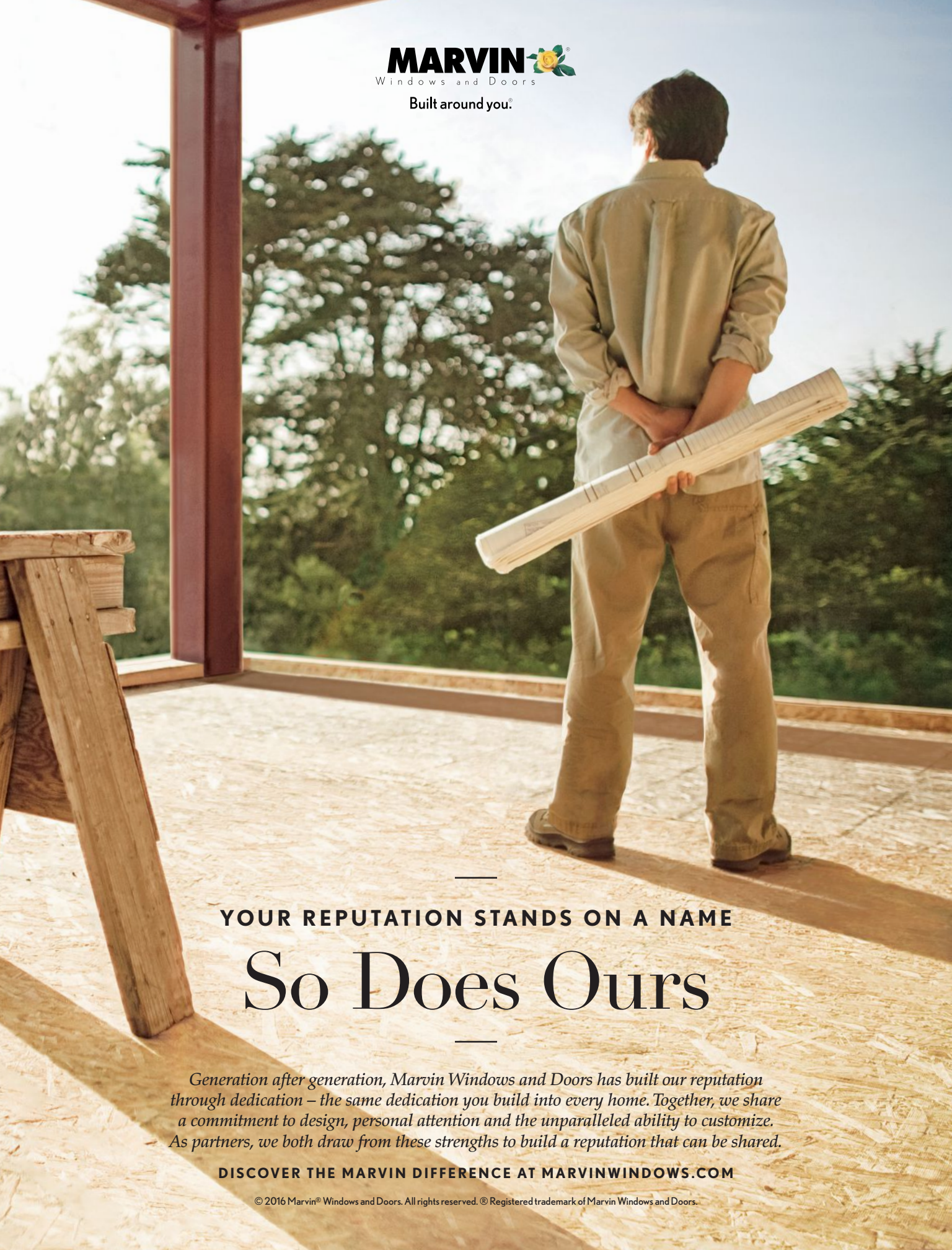
This was when one of the attendees said to me that he didn't like the word "training." He said, "We 'train' dogs. We 'educate' people."

Being the good listener that I am, I took his comment to heart and have called our facility a "learning center" ever since. But I digress. Suggestions from attendees for additional learning subjects began to come in strong. We got together with our vendors and began a cooperative series of learning events. These events attracted not only builders and remodelers, but architects and building officials as well.

Relationships flourished and it wasn't long before we were offering accredited continuing-education programs (CEUs) at our facility. The best part was that architects, building officials, and tradespeople were all in one room, learning the same things, engaging with each other, and building lasting relationships that are so much needed in these related occupations.

—Tony Calistro

Knowledge is not always an easy thing to communicate.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Preservation Training Opportunities

Your *Training the Trades* article struck a chord with me. We work solely in the historic restoration business, but [training] has definitely become a hot topic for the preservation trades and is a tremendous hurdle to restoring traditional building trades properly. I wanted to commiserate with the pain of finding people in the trades when many high-school trade courses are disappearing.

Fortunately, in the area of historic preservation, there are a number of networks active in building professionalism: The Preservation Trades Network, the Association for Preservation Technology, and the National Trust for Historic Preservation. Clem Labine's *Traditional Building* magazine is an important resource, as well.

And there is a wide array of university and historic trade school programs, including the North Bennet Street School (Boston), National Preservation Institute (NYC), Campbell Center for Historic Preservation (Illinois), the Preservation Education Institute (Vermont), Traditional Building Skills Institute at Snow College (Utah), Belmont College Building Preservation/ Restoration Program (Ohio), College of Charleston Historic Preservation program (Ohio), and the Iron and Steel Preservation Conference at Lansing Community College (Michigan), among others.

—Neal A. Vogel

Unions Offer One Solution

I began my carpentry career at age 19, carrying wet pressure-treated lumber into a backyard as a helper for a deck-building contractor for $10 per hour cash and no benefits. Still, I fell in love with the trade. Now at age 34, I earned more than $100,000 last year as a project supervisor and lead carpenter for a commercial construction company that specializes in building healthcare and education facilities.

How did it happen? After five years of working in residential construction—from framing houses to installing crown molding on coffered ceilings, to digging deck footings with a shovel and mixing concrete in wheelbarrows—I realized I would never be able to support a family at the $25 per hour that I was told I could hope to earn someday, never mind the fact that there were no health benefits offered anywhere that I had worked.

Then someone introduced me to a union carpenter and life changed. I did a four-year apprenticeship (which has been changed to five years). I learned from lots of old-timers on jobsites and now run jobs myself. There are residential divisions in our union. Training is robust and immersive.

Want qualified, experienced labor on demand? Hire union labor. We're not dead and we're not going anywhere. We cost more because we are the best you can hire. There is no labor shortage. Not when you pay a union wage.

—Chuck Esposito

Economic Uncertainties for the Trades

I enjoyed your article in the March 2016 issue of *JLC*. I can't help with training issues, but I feel obligated to bring up what everyone seems to repeatedly ignore when the subject of the lack of skilled help comes up: the lack of social status for tradespeople.

You can educate, train, write, and connect, but until you get parents who want their daughter to marry a carpenter, it's all in vain. The worst offenders? The folks in the trades now. When recessions hit, we're the first to be laid off and the last to be hired [back]. Benefits are virtually unheard of with the exception of union jobs. Pay is so-so and often uncertain. And you think we want our kids to follow? Young people aren't lazy or stupid either. They've seen the economic roller coaster and they don't want [to get] on the ride.

—Joseph Corlett

You can educate, train, write and connect, but until you get parents who want their daughters to marry a carpenter, it's all in vain.

On-Site Training School

My name is Paul Lewandowski, and along with my co-worker, Bill Tuchscherer, we teach Residential Building Construction at Fox Valley Technical College, in Oshkosh, Wisc. Our program was started a little more than 20 years ago by Bill when the local home builder association, as well as the local NARI chapter, saw a need for a program to train residential carpenters. Our program focuses mainly on the traditional carpentry trades and takes one year to complete.

During the school year, we typically build a spec house of around 2,000 square feet for our college's foundation to sell, with the proceeds going back to the foundation. However, on occasion, we have built a couple of custom houses, as well as done some extensive remodel projects.

The program consists of five nine-week blocks: Frame Construction, Exterior Finish, Interior Closure, Interior Finish: Basic, and Interior Finish: Intermediate. When students have completed our program, they will have worked on at least two different structures, because they complete their framing block on an entirely different house than the one that they finished.

—Paul Lewandowski

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Q Recently, a client asked me to look at her "leaking" gutters. The gutters seem to be positioned properly under the edge of the shingles, but in places it appears that water dripping off the roof follows the drip-edge back and then drips down the fascia behind the gutter. The edges of the shingles are almost flush with the drip-edge. What I can do at this point to cure the problem?

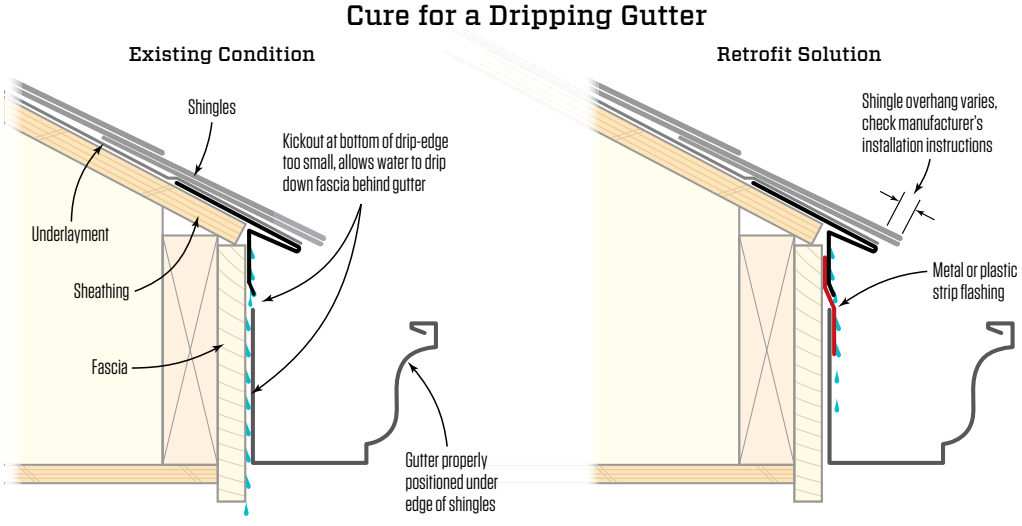

Illustration: Tim Healey

A Mike Guertin, a builder and remodeler in East Greenwich, R.I., and a presenter at JLC Live, responds: Just because that folded metal strip at the edge of a roof is called a "drip-edge" doesn't mean that water will always cooperate and drip off the edge of the roof and into the gutter like we want it to. At the bottom of the vertical fascia leg of the drip-edge, there's a small kickout. Ideally, any water that makes its way along the drip-edge will hit that little kickout and be diverted safely into the gutter. But water that does find its way behind the gutter and drip down the fascia usually doesn't cause problems other than annoying the client.

Having the shingles nearly flush with the drip-edge should not be a problem. The amount that shingles overhang the drip-edge should comply with the shingle manufacturer's recommendations. The *Residential Asphalt Roofing Manual* from ARMA (Asphalt Roofing Manufacturers Association) says that asphalt shingles may be cut flush with the drip-edge or extend 1/2 inch to 3/4 inch beyond the edge of the roof. Another factor in determining the overhang is whether strong winds are a problem in your area. If the house is in a high-wind zone, I would not let the shingles overhang more than 1/4 inch, to minimize the chance of them lifting up during a storm.

Check first to see if the kickout portion of the drip-edge extends over the back edge of the gutter. If the gutter is mounted too far below the drip-edge, or if the kickout doesn't extend far enough over the gutter, a retrofit solution would be to slip a strip of metal or rigid plastic flashing under the vertical fascia leg of the drip-edge and let the bottom edge of the strip overlap the back edge of the gutter. The success of this strategy depends on the shape of the gutter and the type of hangers. If the hangers are in the way, I'd insert the strips between the hangers.

Then, when the time comes to replace the shingles, a new drip-edge should be installed—one that has a fascia leg with a big enough kickout along the bottom edge to channel water directly into the gutter.

Q I read the *Q&A* on using treated cedar shingles in the March 2016 issue of *JLC*. Do pressure-washing and sealing a cedar roof also help to promote longevity?

A Chris Yerkes, a cedar-shingle installer certified by the Cedar Shake and Shingle Bureau (CSSB), and owner of Cedarworks, in Brewster, Mass., responds: Pressure-washing a cedar roof is generally a bad idea, and my company does not offer that service. I have two main problems with it: Pressure-washing forces water into the shingles, and it can cause surface damage and actually promote rot.

Pressure-washing effectively drives water into the wood while removing the top layer of material at the same time. The resulting dramatic increase in the moisture content of the shingles can lead to rot and mold, and the force behind pressure-washing can erode or "scallop" away the soft material between grain rings of the shingles, weakening them and potentially causing the shingles to crack and curl. Additionally, if the wrong spray angle or nozzle tip is used, the process can create leaks by forcing water underneath the shingles or shakes, or it can give the roof a streaked or uneven appearance.

An inexperienced pressure-washer operator will probably do more harm than good to a roof.

One of the biggest problems with pressure-washing is the easy accessibility of the machines. In trained and experienced hands, a pressure-washer might be effective in the most extreme cases. But there's always the danger that someone will go down to the local rental center and grab a pressure-washer without knowing exactly how to use it. An inexperienced pressure-washer operator will probably do more harm than good to a roof.

Instead, we've found that the best way to keep a roof clean is to passively maintain the roof from day one. This can be accomplished by using treated shingles (as was discussed in the *Q&A* referred to above); by installing copper, zinc, or lead strips along all the hips and ridges, which helps to prevent mold and moss from growing; and by keeping valleys and low-slope roofs free of debris. Don't forget to keep the gutters clean as well.

As far as the use of sealers is concerned, I do not advocate using any type of sealer on a wood roof. Sealers can trap moisture and prevent drying, which can lead to premature roof failure.

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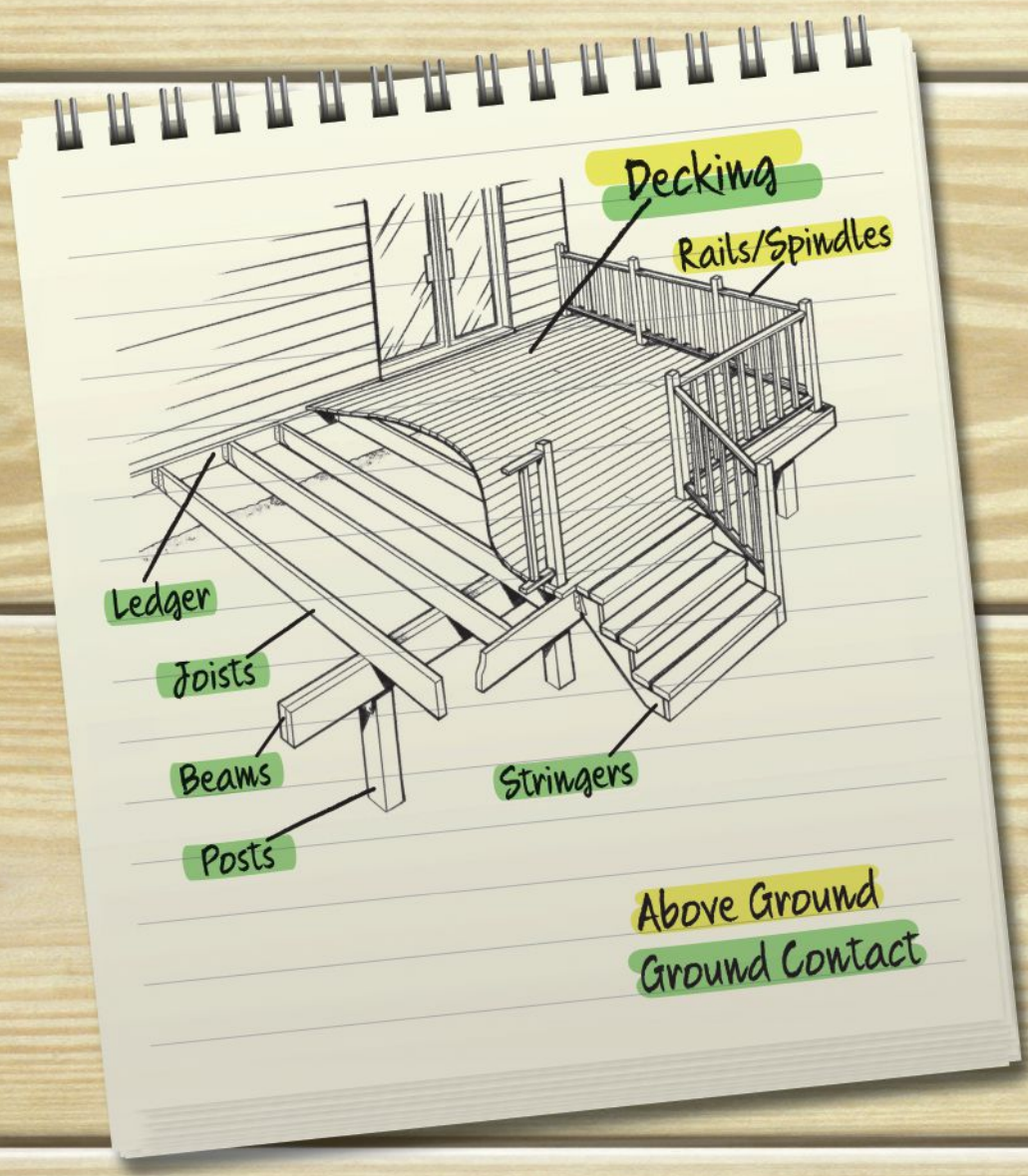

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BY KYLE DIAMOND


1


2


3

Copper was chosen for longevity and because the roof would be visible from the second floor **(1)**. At all the corners, a gap is required so the folded seams will fit together **(2)**. Four copper cleats secure each panel. The ends of these cleats must be bent over to cover the nail heads on the off-chance a nail were to work "free" and rub against the pan **(3)**.

Installing a Flat-Seam Copper Roof

A year ago, I was asked to install a flat-seam copper roof on a new entry portico. The homeowners chose to go with copper because the new roof would be visible from windows located in a second-story sitting room. My company, New Dimension Construction, was subcontracted only to do the copper work.

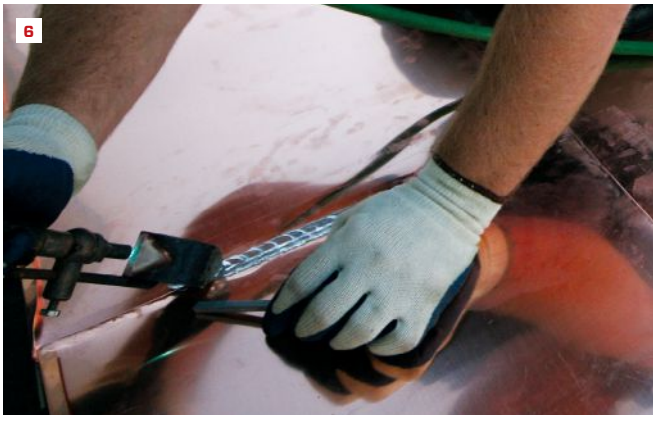
The project's GC built the new entry above an existing flight of stone entry steps, which helped dictate the overall roof size of 12 1/2 feet wide by 9 feet deep **(1)**. The GC's crew built the plywood deck with a slightly pitched hip roof (for drainage and to keep the crown molding at the same level), and then waterproofed the roof deck with Grace Ice and Water Shield. When we arrived on site to take measurements—before fabricating the roof's components back at our shop—the portico was pretty much done.

IN THE SHOP

For this job, we ended up with 20-inch-by-28-inch pans—six pans across the roof's width and six pans deep. We made them out of 16-gauge copper, cutting the pieces from 3-foot-by-8-foot sheets of copper using a metal brake with a cut-off wheel. Our goal was to show up on site with most of the pieces already made.

Before we bent any of the panel's interlocking seams on the "field" panels, we trimmed the corners to allow the sides to be bent properly. We clipped off the panel's corners at a 45-degree angle, and cut them so they would have a 3/16-inch gap when the edges were bent **(2)**. From there, we folded two of the field pan's edges up and two down, creating four 3/4-inch interlocking

Photos by Ryan Labrenz and Kyle Diamond



A weighted dead-blow hammer is used to flatten the seams **(4)**. Uphill pans overlap the edges of lower pans **(5)**. Only install as much copper as you can solder in a day **(6)**. The acid from the flux must be neutralized, or it could cause the copper to prematurely (and unevenly) patina **(7)**.

seams. For "starter" pans, we left the bottom edges unbent in order to fold them over the perimeter drip edge. For the "end" pans, we left either the right or left side unbent. We fabricated the drip-edge ourselves in the shop and left the roof-to-wall pieces to be site-bent.

ON SITE

We installed the perimeter drip-edge first and then began fitting the starter pans. We interlocked the side seams, then folded the pan's bottom edge over the drip's 3/4-inch overhang, clamping it tightly with a hand seamer.

On succeeding rows, we offset the seams in a staggered pattern, like a running bond. Each panel received four 2-inch by 4-inch-long cleats—two placed along the upturned top seam and two along the upturned side **(3)**. With the panel set in place, we then flattened the seams with a rubber dead-blow mallet **(4)**. A simple block of wood helped drive the panel up and over into position **(5)**. Once we had a few rows locked in and flattened, we began soldering the seams **(6)**. (For soldering tips, see the "Soldering Seams" slideshow at jlconline.com.)

We custom-fit the roof-to-wall pans, bending them on site. In order to make the 90-degree turn with the brake, we had to make V-cuts at the panel's side seams. We then fastened the vertical leg with a couple of nails at the top of the flashing before we soldered the seams. As a last step, we ran the solder up the vertical leg a few inches.

Before leaving the job, we rubbed the roof surface down with baking soda and water to help neutralize the acid from the soldering flux **(7)**. The roof was now ready for the GC's crew to integrate the new flashing with the WRB and siding over it.

Kyle Diamond is a partner with his father, Dale, in New Dimension Construction, in Millbrook, N.Y.

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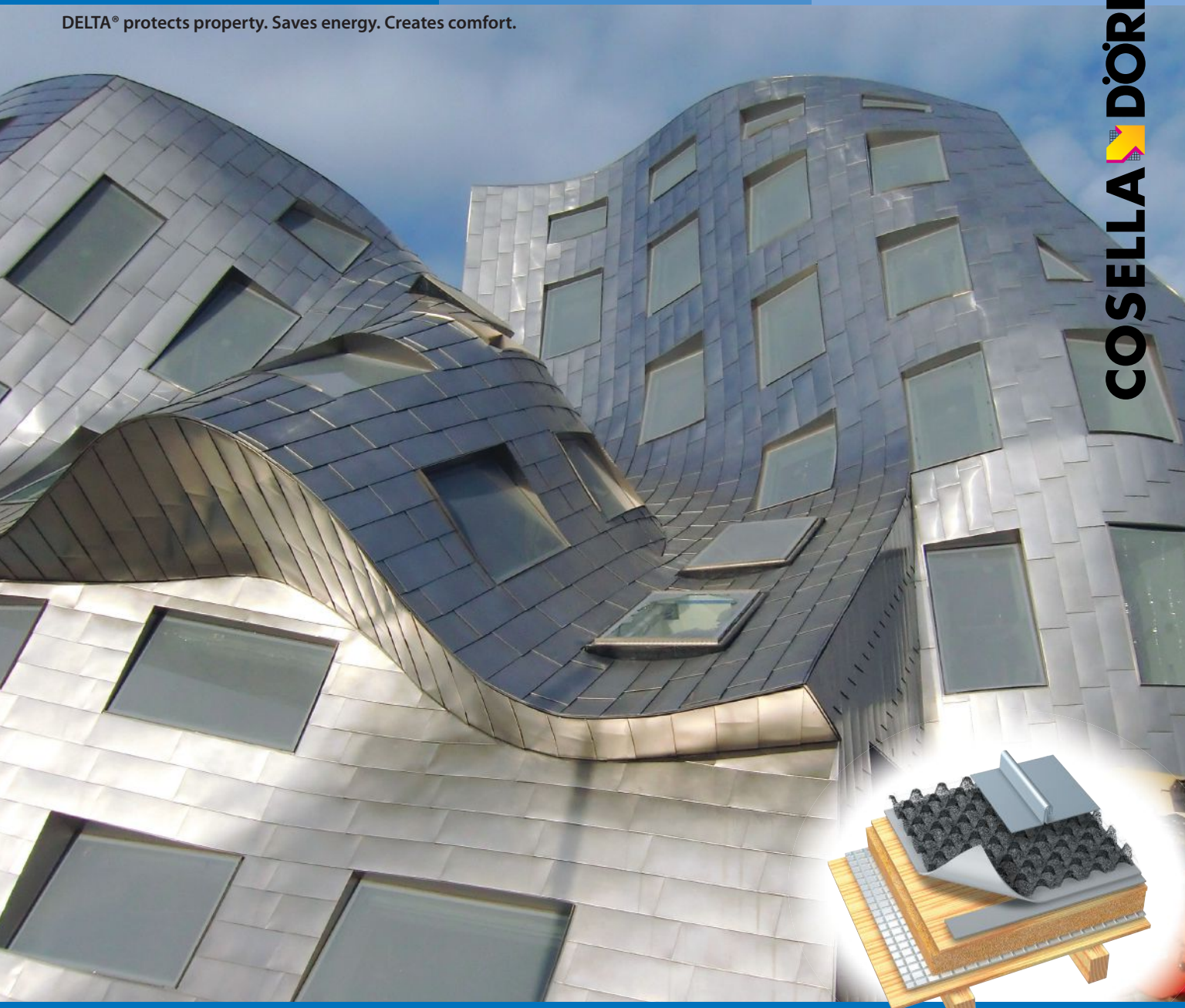

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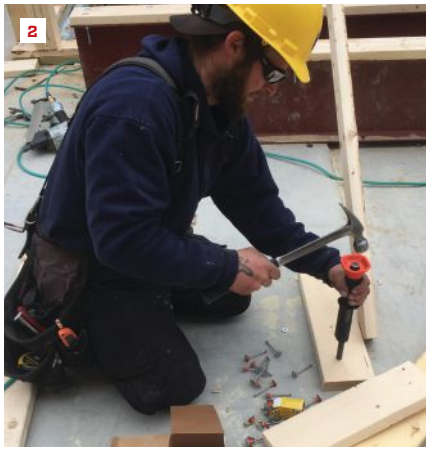

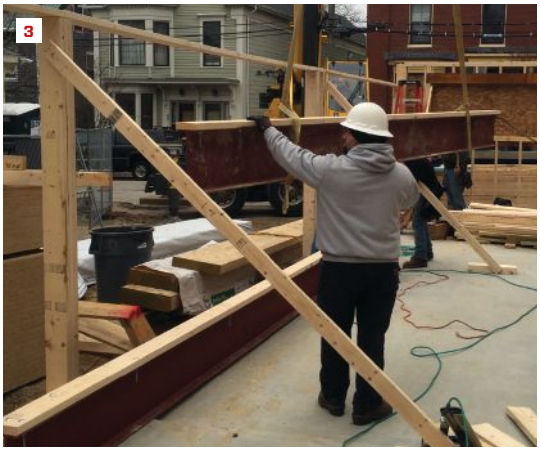

Framers muscle a long PSL beam off the delivery truck **(1)**.
A carpenter fastens a block to the garage slab to secure a wall brace **(2)**.
The crew starts to lift a steel I-beam garage header into place with the help of a crane **(3)**.

Cantilevered Balcony Beams

BY TED CUSHMAN

As the homebuilding industry slowly comes back from the "Great Recession" of 2007-2009, the urban infill market stands out as a bright spot. City living is attractive to singles, young families, and downsizing baby boomers. And in markets where undeveloped land is scarce, scattered infill lots offer some of the last available building sites around.

Portland, Maine, offers a good example. In the city's trendy East End, teardown and infill projects are sprouting up on almost every block. The project shown here, in the city's Munjoy Hill neighborhood, is a four-unit building squeezed into a tight lot between an older, existing wood-frame house and a brand-new four-story mixed-use condominium building.

THE DESIGN PROBLEM

Architect David Lloyd of Archetype Architects in Portland (archetype-architects.com) told *JLC* that a change in city zoning rules last year allowed his clients, who also own the old wood-frame house next door, to build a separate structure on the property. (The earlier rule would only have permitted a structure adjoining the existing house.) But the required setbacks still limited Lloyd's design options. The front setback from the street had to fall at the average of the setbacks of the existing buildings on either side. And required clearance on the sides and back of the long, narrow lot also applied a squeeze to Lloyd's vision.

Lloyd chose to place his new four-unit building as close as possible to the boundary with the new condo to its north and to leave space on the south side, to gain the benefit

Photos by Jeff Barker and Ted Cushman

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of sunshine on the new building's windows and balconies, facing due south. Lloyd located the balconies toward the front of the building, near the street, allowing a view over the open street toward the waterfront. A garage under the building, with doors facing south, provides four parking spaces—although the location's tight confines, Lloyd said, barely left room for a driveway.

A STRUCTURAL SOLUTION

With the form of the building tailored to the lot, the structural design was a secondary problem—which landed in the lap of Portland engineer Aaron Jones, of Structural Integrity Consulting Engineers (structuralinteg.com). Jones chose steel I-beams for garage headers, and parallel-strand lumber (PSL) beams running across the width of the building and cantilevering out to support the balconies.

The pair of two-car garage doors falls under a stepped overhang, in a profile similar to a garrison colonial house—a familiar concept to most builders. But with the overhanging upper-story walls carrying three levels of roof and floor loads down onto the cantilevered trusses of the first occupied floor above the garage, the loads involved are heavy. That's what drove the choice of steel I-beams for the garage headers, Jones explained. Engineered wood might have been able to make the spans, but steel offered better control of deflection across the wide garage door span.

The steel beams for the two garage-door openings were the same, even though one of the headers also has to carry one of the PSL balcony supports crossing the steel beam near mid-span. (Compared with the main floor loads, Jones explained, the balcony loads are relatively minor.)

PSL members can easily handle the weight of the balconies, Jones said. But he beefed up the PSLs in order to enhance the feeling of stiffness underfoot for building occupants. "Cantilevers are a big concern to all of us who are designers," Jones said, "because we're trying to make them not bounce. To make everybody happy with them at the end of the day is always a battle, because we can put so much structure in there trying to make that diving board

Controlling the heavy steel beam with a tag line, the crew gently lowers it into place across the garage door opening **(4)**. A carpenter marks the 2x6 plate for a bolt hole **(5)**; the plate is then drilled **(6)** and bolted down to the steel beam **(7)**. A crew member attaches a lifting strap to a PSL beam in preparation for lifting the beam onto the walls **(8)**.

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Working carefully on the tight site, the crew begins to lift a heavy PSL **(9)**. The crane lowers a PSL into place at mid-span on the steel I-beam **(10)**. At the north side of the building, a carpenter guides the end of a PSL down onto the framed wall **(11)**. The crew lowers a PSL onto the wall on the street end of the new building. PSLs in the foreground will support the balcony **(12)**. The steel I-beam shown here **(13)** is sized to carry floor loads from two occupied stories, plus the roof, transmitted through the walls onto these cantilevered floor trusses. The projecting PSL beams (and two more to come above) will support balconies.

feel less springy." In this case, the PSLs that were lined up with partition walls inside the buildings were only 3 ½ inches thick. But the beams that ran through the floor, away from any floor or wall loads that would stiffen the beams, were sized at 5 inches thick to maintain a stiffer feeling underfoot for people using the balconies.

PRACTICAL EXECUTION

Detailing the two stories of balconies will be interesting for contractor Shawn Geyer, of Geyer Construction, who is responsible for all the building's exterior details as well as the framing. The projecting PSL beams will have to be cut down with a taper to shed rain and equipped with outer beams and an infilled floor frame (also tapered for drainage). Then the deck structure will have to be waterproofed, tapered sleepers will be applied to restore a level plane, and finally, the decking and a railing system will be installed. The underside of the balconies will receive a tongue-and-groove board ceiling.

But Geyer's immediate task was just to get his materials off the delivery truck and onto the site—a task made easier by having a large crew of framers on the job. Setting the steel I-beams, however, required more than muscle power: After bracing off the wall, Geyer called for a crane to lift his beams into place. The crew bolted 2x6 plates onto the underside of the beams before setting them, then marked and fastened an upper plate to the beams in place, allowing wood-to-wood connections between the steel beams and the walls below and floor framing above.

With the steel headers in place, the next task was to set the first level of Parallams—again, a job for the crane, along with plenty of skilled hands. On the upper levels, the crane was even more useful, as it came in handy for booming bundles of floor trusses and clips of sheathing up onto the higher stories.

Ted Cushman is a senior editor at JLC.

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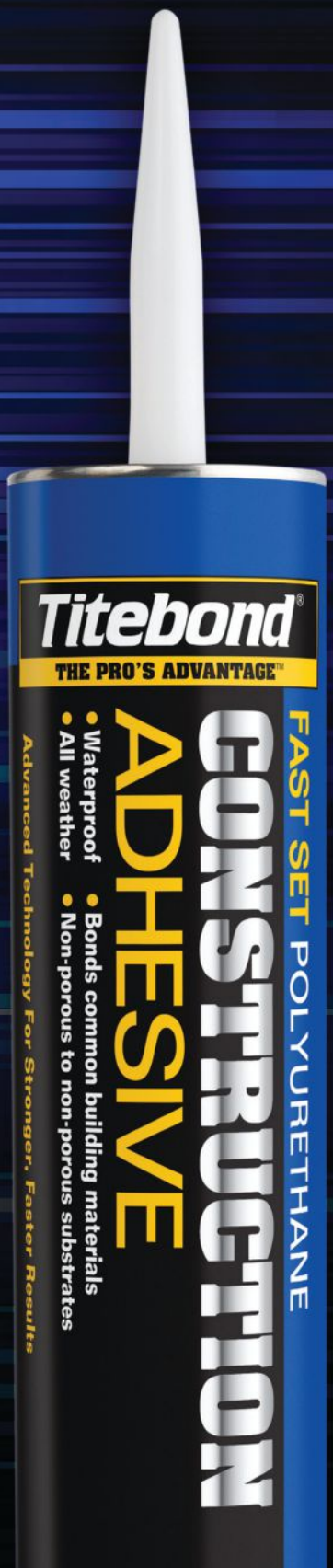


BY MELANIE HODGDON

Planning for Cost Increases

In any job, there's a certain "critical path" that must be followed. For example, no contractor would ever schedule the insulation subcontractor before the electrician. Otherwise, the job would move backward, as the insulation would have to be torn out before the electrical work could progress.

The planning required to see the critical path for taking on new business costs isn't quite as apparent. The main difference is that for a project, the cost (plus markup) will be covered by the customer if there is a change order, so the profitability of the project should be pretty constant despite the additional costs. But there is no equivalent "customer" when considering new costs to the company. The company's financial resources will need to cover those additional costs (change orders), and the company will need to plan far enough ahead to accommodate them.

WHAT KINDS OF COSTS?

If we look only at production-labor-related costs, the following are the kinds of changes that could inflate your production costs. These either add to your costs or introduce additional non-billable time to employees, so their cost per productive hour will increase.

- Having an increase in your workers' comp rate
- Having an increase in your state unemployment rate
- Adding health insurance
- Giving raises or performance bonuses
- Adding a retirement plan
- Reimbursing for use of personal vehicles
- Providing cellphones or tablets (with monthly subscriptions) to production personnel in order to implement a new time-tracking process
- Providing uniforms with weekly cleaning service
- Providing professional certification training (CR, CLC, CAPS, and the like) to production workers
- Providing more paid time off to personnel
- Initiating meetings that include production workers

HOW FAR IN ADVANCE?

Let's assume that all your new production-labor-related costs will be put into effect next year on January 1. Therefore, any job that will be in production next January 1 should be priced to cover the new costs. If jobs are sold with an outdated markup, then obviously the payments received won't cover the new costs, and the jobs will be less profitable than planned. In other words, the company will be subsidizing the new costs out of profit!

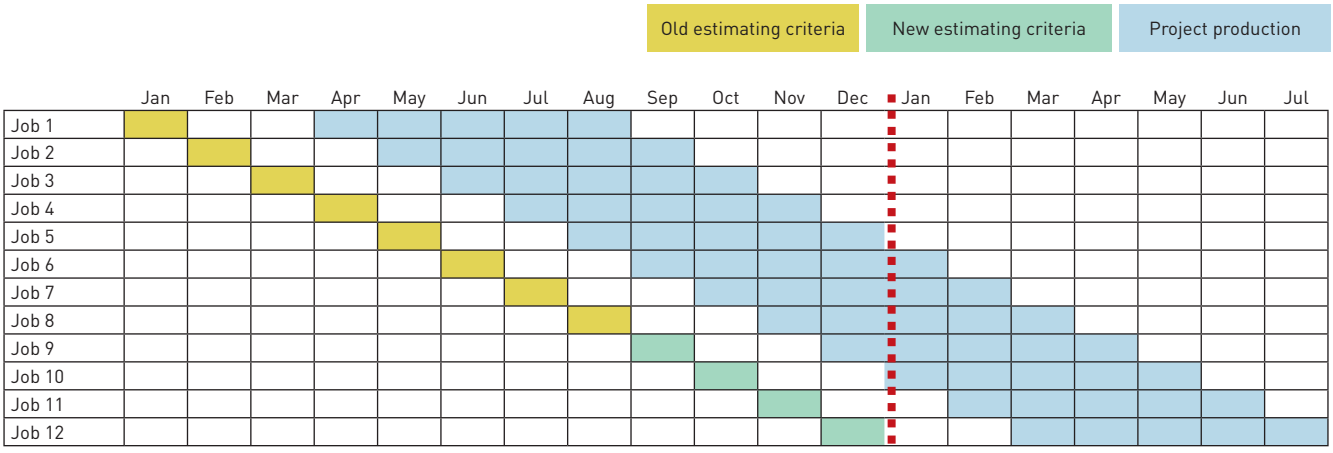
So, how far in advance should you revise your pricing to be sure that by the time your new costs hit, your

Sample Estimating → Producing → Analyzing → Estimating Timeline

# days between estimating and selling the job	30
# days between selling the job and starting the job	60
# days of production	150
Subtotal	**240**
# days between the production portion of the job ending and the final production-related costs being collected and reported	15
# days between completing the job and reviewing a completed job cost report for variance analysis	5
# days between reviewing the job cost report and modifing estimating assumptions for the next job	10
Subtotal	**30**
Total days between estimating a job and preparing to estimate the next job	270

Following your normal timeline for adjusting your estimating formulas may result in job prices that are too low to cover planned business cost increases.

Estimates and Future Business Costs



customers will be paying for them? This requires that you consider the timeline for your company's sale production process. Let's look at the example described in the chart on page 33.

In this case, it takes the company an average of 240 days to estimate and complete a job. To that must be added the time required to analyze the job and identify variance. Remember that for this initial job, the new costs haven't been included. But, they're coming. Therefore, in addition to the usual job of figuring out where the company lost (or made) money on a project, modifications must be made for the impending labor cost increases.

Let's assume that there's an average of 30 days from the day that production ends to the day that all the job costs come in (including those from your painting sub who takes forever to get you a bill) and your production staff can perform the job autopsy, identify slippage areas, and decide how to modify the estimating assumptions moving forward. That means that the entire process takes 270 days.

If the average project length is 150 days, and the first job of the year is sold on January 1, and the revisions to the estimate don't occur until day 270 (September 27), then the first estimate properly modified to meet the new labor cost requirements would be available no earlier than September 27. If the average job length is 150 days, then that job will be in progress on January 1 of the following year and therefore must be estimated using the new criteria.

If the next job you estimate incorporates the new production-labor-cost figures, you should be OK, right? After all, the job (above) that you estimated at the old rate is done, and you're now estimating at the new rate for jobs that will be in production January 1. You're good, right? Well, that depends.

If you work on only one job at a time, there's no problem. But what's been going on in the meantime, between that first estimate on January 1 and when you start using your new estimating criteria on September 27? Why, you've probably been estimating and selling more jobs at the old rate, right? If you sell one job a month (using the arbitrary project durations in the chart), then you might find yourself in the situation shown in the calendar above.

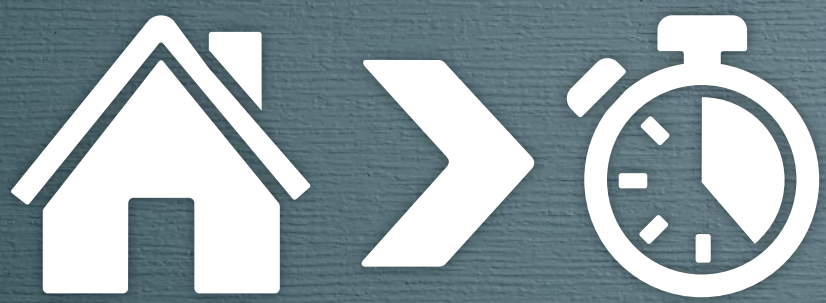
The red line represents the date on which the new costs go into effect, so ideally all projects that include that date would be estimated according to the new parameters. As you can see, Jobs 6 through 8 extend into this time period but were estimated according to the old criteria. Given the increase in labor costs, these jobs should produce lower-than-anticipated profit.

The key here is not to get hung up on your selling cycle, job length, or job-cost-analysis schedule, but to understand that if you want to cover costs that will occur at a predetermined date, you should be thinking farther ahead when setting prices. And, the longer the duration of a project, the more critical it is that the job be sold at a price that encompasses intended cost increases implemented within the scheduled duration of the project.

This example was extremely simple, because all cost increases were scheduled to go into effect on the same date (January 1). In reality, cost increases usually don't conform to such a simple or even predictable schedule. These increases could have been scattered throughout the year, which requires that companies constantly update labor costs in order to estimate with realistic cost information.

Be sure to review whatever calculator you use for figuring out your labor costs for the purpose of estimating. If you know in advance that a particular benefit or raise will be offered, incorporate that information immediately, even if it won't go into effect for a while. If you get unwelcome information about workers' comp or payroll tax increases, incorporate those immediately. Be sure you perform a job autopsy on every job as quickly as possible, to stay on top of your crew's performance. Don't risk subsidizing your customers' projects by not paying attention.

Melanie Hodgdon is owner of Business Systems Management (melaniehodgdon.com).



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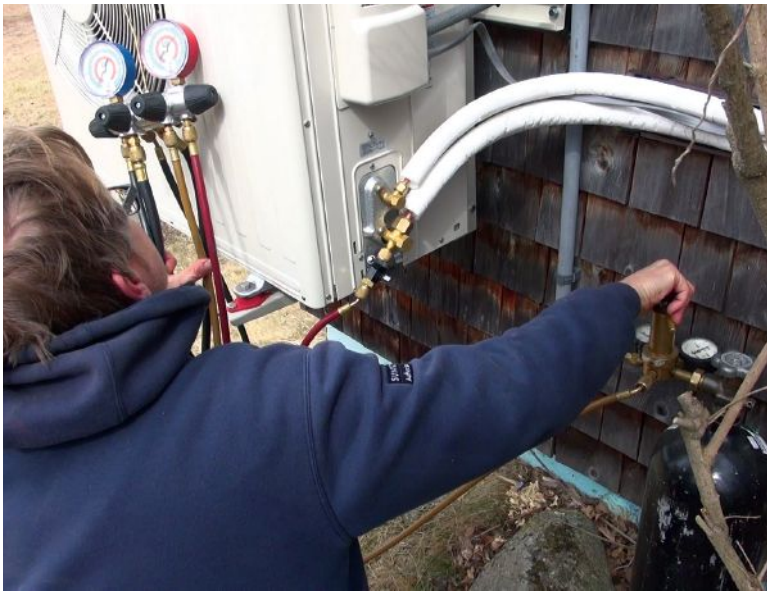
BY TED CUSHMAN

Commissioning Mini-Split Heat Pumps

Mini-split heat pumps are gaining ground in cold regions such as northern New England. Their growing popularity stems from two main strengths: First, with their low output and high coefficients of performance, mini-splits are a natural match for the low heating and cooling loads typical of high-performance homes. And second, mini-splits are a clever way to augment the heating systems of existing homes. When you add a mini-split to a moderately efficient house that already has oil or gas heat, you allow the fossil-fuel boiler or furnace to rest during the spring and fall, when heating loads are lowest and mini-splits perform at their best. But you can still call on that big burner in the basement if you need it on the coldest winter nights, when fossil-fuel heating appliances generally run at their top efficiency.

That's all great in theory. But in practice, your mileage may vary. Like any other technology, mini-splits work best when they're done right. And as their fame has spread, some HVAC contractors have been pitching mini-splits as a quick and cheap home improvement—and downplaying the quality-control measures that are important for good results. In that business environment, it's a challenge for non-expert builders, remodelers, or homeowners to be sure that the systems they're buying have been put in correctly or will perform as promised.



Photos by Ted Cushman

ReVision Energy tech Dave Ragsdale sets up equipment for the pressure test and triple-evacuation refrigerant-line-clearing procedure for a newly installed Mitsubishi mini-split at a rural home in Maine.

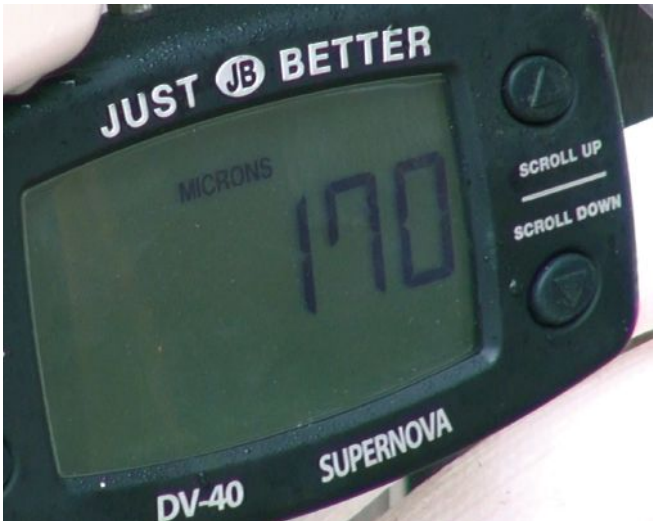
That's the concern that prompted a recent query by David Meiland, a *JLC* reader who owns Bailer Hill Construction, on San Juan Island near Seattle, Wash. Posting in a forum on the networking website LinkedIn, Meiland asked, "Some of the HVAC contractors in my market are trying hard to make their ductless heat pump installs into one-day deals, by skipping any testing or evacuation of the linesets. They install the indoor and outdoor units, connect the tubing, release the refrigerant, and they're done. The installer I have used charges the lines with nitrogen and then evacuates them with a vacuum pump, resulting in a couple of extra trips. What are you seeing in your area, and how much do you think it matters?"

Others on the forum responded, saying that it's standard operating procedure to pressure test refrigerant lines and to purge with nitrogen and vacuum. Pressure testing ensures a leak-free refrigerant line, and the nitrogen purge clears moisture contamination out of the system, an essential step to prevent corrosion of the compressor. Anything less, forum members emphasized, is less than professional. But even so, some commented, the process might not always take more than one day.

THE MANUFACTURER'S STORY

For a heat-pump supplier's view, *JLC* touched base with Maine and New Hampshire Mitsubishi sales manager Roger Willett. We caught up with Willett at an indoor air quality conference in Portland, Maine. "We have about 80 to 90 factory-trained contractors that specialize in our product, and then probably 300 or 400 other contractors that sell it as part of their mix," Willett said.

Willett helped develop the installation spec that Mitsubishi's U.S. installers follow. "The most important part of that is what we call the vacuuming process," Willett said. "Once we connect the lines, we use a triple evacuation, which is a process of pulling a vacuum, introducing nitrogen, pulling a vacuum a little bit deeper,



Technician David Ragsdale's pressure gauge shows the reading during a pressure test of the system at 600 psi (left) and during system evacuation at 170 microns (right) to purge moisture from the refrigerant lines.

reintroducing the nitrogen, and then pulling a vacuum as deep as 500 microns or less. That process eliminates all moisture, any air, any noncompressed gases from the copper lines before we introduce the refrigerant."

Omitting the evacuation process runs the risk of premature failure, Willett confirmed. "If there's water in the lines, it will take out the bearings of the compressor. It shortens the life of the system. If there's a warranty [claim] on a compressor within the first two or three years, we usually can tell that it wasn't installed properly."

Failures are rare, said Willett—less than .005% of systems fail every year, according to company statistics. And water in the refrigerant lines isn't the leading problem in New Hampshire and Maine, he said. More common is freeze damage that can happen if there's inadequate clearance underneath the outdoor compressor. Units come with a defrosting system for the outdoor coil, he explained, and a drain pan to direct melted frost onto the ground. "The No. 1 thing we see is improper mounting—people mounting the appliance right on the ground," said Willett. "That will cause catastrophic failure, because the defrost cycle causes the water to re-freeze underneath the unit, and it will usually crush the coil. So you lose all your refrigerant charge, and you can lose a compressor if it continues to run with no refrigerant."

Mitsubishi's service department investigates failures to determine the cause, Willett said. "We have a gentleman who works out of Dover, N.H. He'll make a site visit and make a determination on whether it was premature failure due to a defect in our manufacturing, or if it was neglect in the install process. We will usually warranty the equipment either way, because at the end of the day, that homeowner needs to be taken care of. But we will also do an on-site training with the contractor: 'Okay, here's what we think you probably did wrong, here's how you do it right going forward.'"

The installers also have skin in the game, Willett noted: Mitsubishi pays for the new equipment, but the installer has to do the work for free. "So most of them have an incentive to do it right," he said. "But there are always those ones that are out there doing work for less, so they cut corners."

AN INSTALLER'S VIEW

For the view from the field, *JLC* turned to Fortunat Mueller, a partner at solar-energy and HVAC contractor ReVision Energy, based in Portland, Maine. "We believe strongly in the importance of thorough commissioning to maximize system performance and system life," Mueller confirmed in an email. "I would agree this is where an awful lot of installers cut corners."

"We pressure test with nitrogen rather than air," Mueller explained, "because it helps limit impurities in the system. Because the N2 is dry, it minimizes the introduction of moisture into the lineset. Moisture is a compressor killer in the long run." Ideally, the lineset is left under pressure overnight, said Mueller—but not always. "Realistically," he said, "a lot of the simple one-to-one jobs [with just one outdoor compressor and one indoor condenser and fan] are one-day installs, and so we can't always do an overnight test. We plan our installation practice to get the lineset completed as quickly as possible, so we can get the pressure test and evacuation

started as soon as possible while we work on the rest of the project. Our goal is to get the system on pressure test before lunch."

"After the N2 pressure test," Mueller went on, "we follow Mitsubishi's specifications for a triple-evacuation procedure, breaking the vacuum only with dry nitrogen between steps. The final evacuation needs to be able to pull a vac down to below 500 microns, and we often shoot for much lower if we can. This is important not only because it may expose pinhole leaks in the lineset, but also because getting all the moisture and contaminants out of the lineset before charging it with refrigerant is critical to maximizing performance and system longevity."

"If you're in a rush (or you are determined to be the cheapest heat-pump installer in the county)," Mueller noted, "you can skip the pressure test, evacuate for 10 minutes, and charge the heat pump, and chances are it will blow hot and cold as is. I've even heard of do-it-yourselfers who skip the evacuation completely because they don't have the tools. But the customer will certainly be spending more in electricity than they should, and the equipment will fail prematurely when the moisture gets in the compressor oil and the compressor fails."

The quality-control measures are important not only for system performance, but for environmental reasons, ReVision Energy project engineer Joseph Maisonave pointed out. "The most common service call for heat pumps is a refrigerant leak within the first year of service," Maisonave explained. "R410a refrigerant, though more environmentally friendly than most refrigerants, has a Global Warming Potential of 1,725. This means that every pound of refrigerant released to the atmosphere is equivalent to 1,725 pounds of CO_2 released. The average mini-split heat pump has three to four pounds of refrigerant in the system. Releasing four pounds of refrigerant is equivalent to the carbon dioxide emissions from burning approximately 300 gallons of oil or 350 gallons of gasoline. ReVision's core mission is to reduce carbon emissions, so ensuring system tightness and preventing the release of refrigerant is critical for accomplishing that mission."

Ted Cushman is a senior editor at JLC.

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Photos by Mark Parlee

Common Roofing Errors
Details that matter on asphalt shingle roofs

BY MARK PARLEE

I was recently called to consult on an Iowa home that had extensive roof leaks into the finished space. According to the homeowner, the leaks began showing up as water stains on the ceiling in several rooms throughout the house shortly after the roof had been replaced.

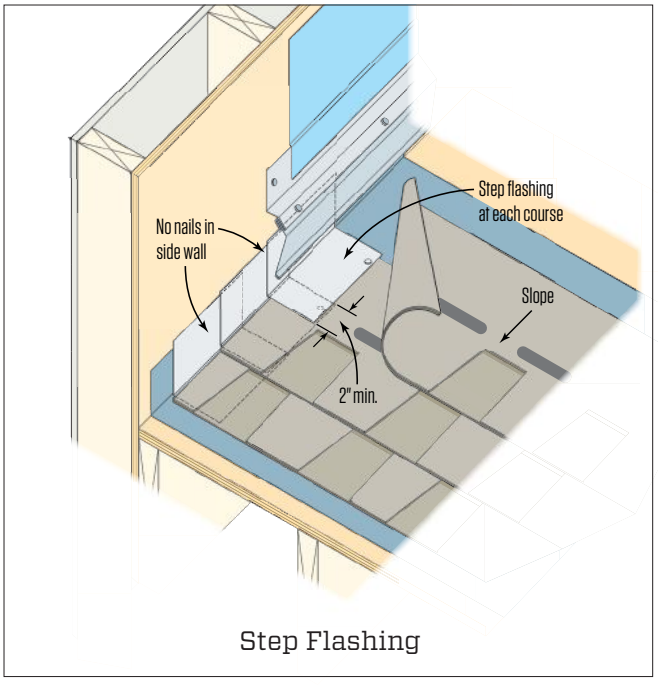
The photos on the following pages show the condition of the roof when I saw it three years after it had been installed, and it was immediately evident to me that the roofer had done an exceptionally poor job. The shingles themselves were a decent-quality laminated product, as is usually the case with the roofs I see; however, it's not the shingles but the detailing—namely of the flashings—that determines the quality of an asphalt shingle roof.

All of the leaks stemmed from poor attention to detail when the shingles were being installed and flashed. These problems included the following:

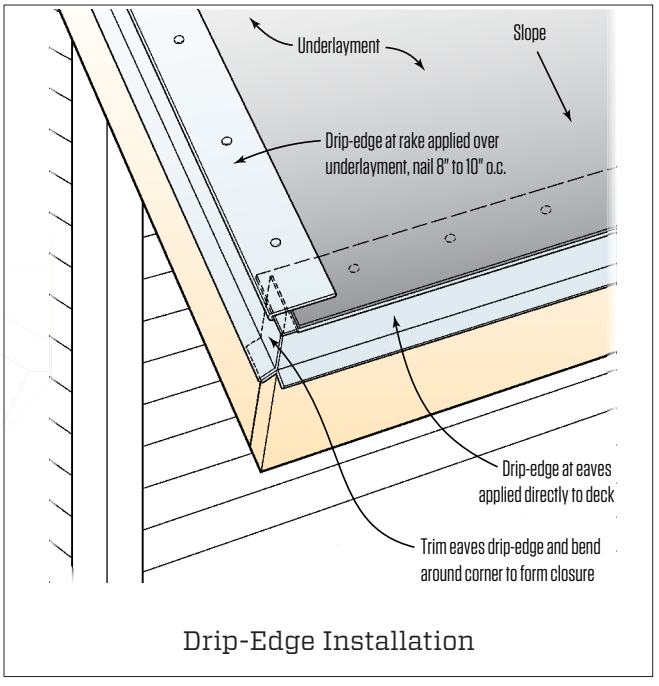
- There had been a complete failure to install a new step flashing or even to integrate the new shingles with the existing step flashing.
- Shingles had been laid without an adequate offset between courses.
- Shingles had been nailed haphazardly. In many cases, no nails were evident at all, and in others, nails were overdriven or crooked.
- Shingles had not been accurately cut to fit around the roof vents.
- No drip-edge had been installed along any of the roof edges.
- No plumbing vent boots had been installed. Instead, these penetrations had been "black jacked"—asphalt roof cement had simply been smeared around the bases of the vent pipes.

With so many problems, the only solution I could recommend was a complete replacement of the entire roof. What a terrible waste of a three-year-old roof.

While this particular job provided a good opportunity to look at a number of problems all at once, not all asphalt shingle roofs are done this poorly. However, in my experience, many reroofs suffer from at least one or two of these mistakes—and it only takes one to cause a leak.



Step Flashing



Drip-Edge Installation

STEP FLASHING AND KICKOUTS

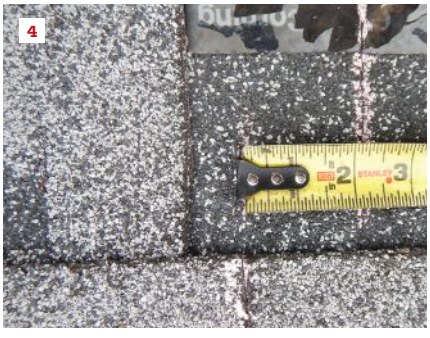
On this job, the roofer completely ignored the existing step flashing and merely tucked the new shingles beneath both the step flashing and the counterflashing **(1)**. These existing flashings were in rough shape and should have been replaced. If the roofer had even made an effort to interlace the shingles between the steps, at least there would not have been a direct leakage path between the shingle surface and the old flashing. As it was, the ceiling areas below this intersection suffered the most damage from water leaks.

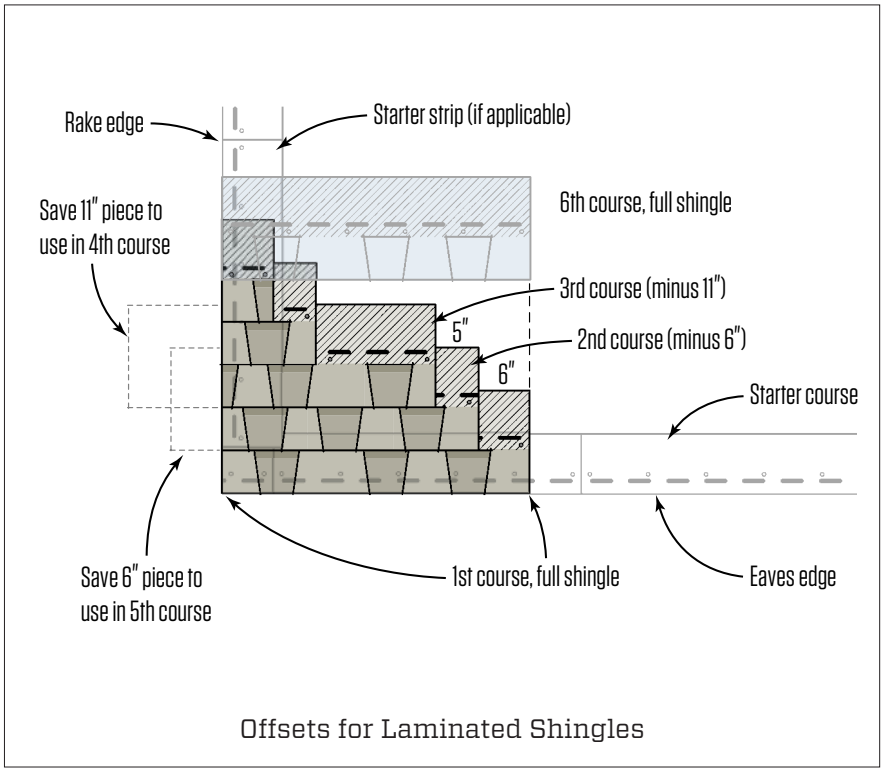
It was obvious that the roofer did not want to deal with the stucco that came down over the sidewall flashing. Had the original counterflashing been addressed more like the counterflashing shown in the "Step Flashing" illustration (above left), destruction of the stucco cladding would not have been necessary to replace the flashings.

Kickouts, which direct water into a gutter at the lower end of the roof-wall intersection, are critical for preventing leaks. I covered them in detail in the previous issue of *JLC* (see "Getting Kickout Flashings Right," Apr/16). At the bottom of the roof, large kickouts are essential to deflect the volume of water away from the siding.

DRIP-EDGE

Metal D flashing, or drip-edge, is sometimes installed only along the eaves edge, but it is actually required by the 2012 International Residential Code (IRC) "at eaves *and gables* of shingle roofs." At





Offsets for Laminated Shingles

Shingle offsets. Chalk lines on the roof indicate the breaks in each course of shingles, showing clearly that some of the offsets are less than the required 4-inch minimum **(3)**, which is set by the shingle manufacturer. And in some cases, the offset was only about 2 inches **(4)**. Since most roof dimensions are not an even multiple of standard shingle sizes, fractional shingles—preferably of equal size—are needed to fill out courses. Provided the fraction isn't smaller than the minimum offset (as it is on this roof), this is an aesthetic issue and is much less noticeable with laminated shingles, because of the random appearance of the overlaid pieces, than it is with three-tab shingles.

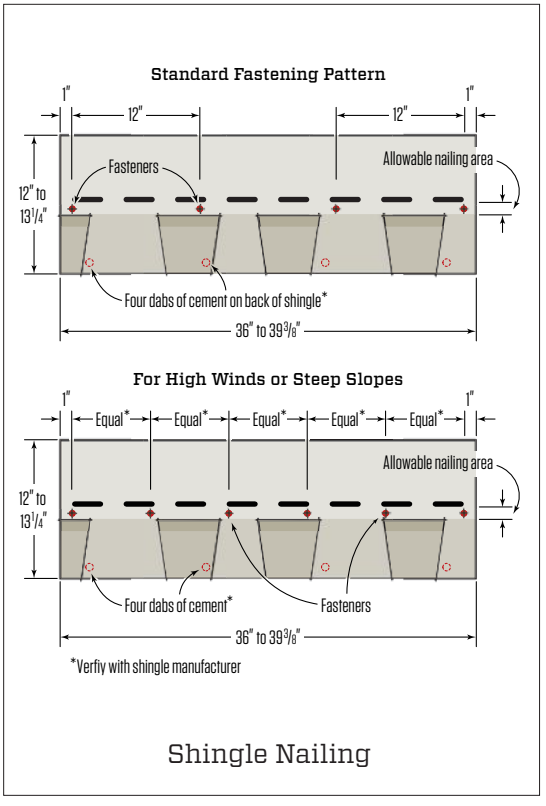
"gables," of course, means along rake edges. The purpose here is to help prevent wind-blown rain and capillary action from directing rainwater and snow melt underneath the underlayment and shingles.

This particular home had a metal fascia. The metal D flashing should overlap the top edge of this fascia; this is important because it helps keep water from getting down behind the fascia and rotting out the subfascia. At the eaves edge, a drip-edge also helps direct runoff into gutters (although additional help may be required; see *Q&A*, page 19).

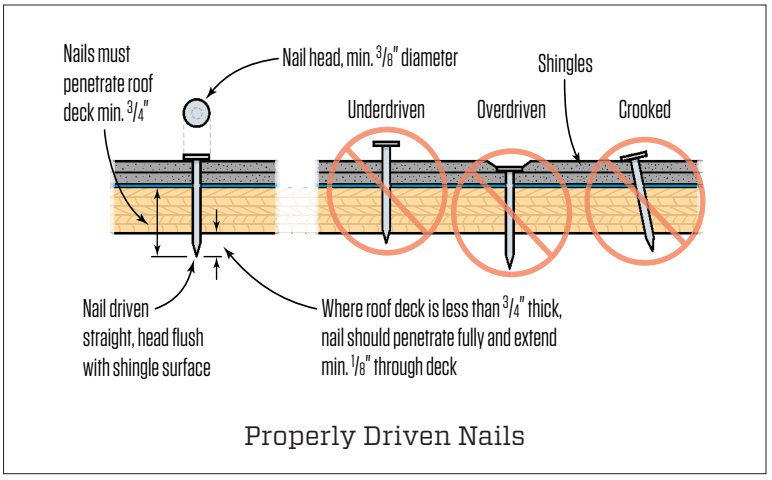
Photo **(2)** shows that the roofer on this particular job did not install any drip-edge flashing, and you can see how the edge of the sheathing has weathered from exposure to water.

Drip-edge should be installed directly over the edge of the roof sheathing along the eaves. Along the rake edges, however, the drip-edge should be installed after the underlayment is installed (see Drip-Edge Installation, facing page, right). This last detail is commonly overlooked because roofers often want to install all the drip-edge at once. Installing the drip-edge *over* the underlayment at gables—an area especially vulnerable to wind-blown rain—is the best way to ensure that water does not have a clear path beneath the underlayment.

When a single length of drip-edge isn't long enough, overlap the end joints at least 2 inches (a specification required in the 2012 IRC). And be sure to install the lengths high along the rake so they overlay lower pieces to promote drainage.



Shingle Nailing



Properly Driven Nails

Shingle nailing. When the author inspected the project, no nails were evident at the ends of many of the shingles **(5)**. The standard nailing for asphalt shingles is a four-nail pattern, with nails placed 1 inch from each end of each shingle and then two nails placed 12 inches in from the end nails, as shown in the top of the "Shingle Nailing" illustration (above left). On laminated shingles, this nail spacing is not as immediately apparent as it is on three-tab shingles, where the nails are placed above the cutouts. In high-wind locations and steep-slope applications, a six-nail pattern should be used, as shown in the bottom of the same illustration (above left).

SHINGLE LAYOUT

Shingle manufacturers specify a minimum overlap, usually in the range of 4 inches to 5 inches. On this roof, the minimum overlap specified by the manufacturer is 4 inches, and the recommended overlap is 6½ inches.

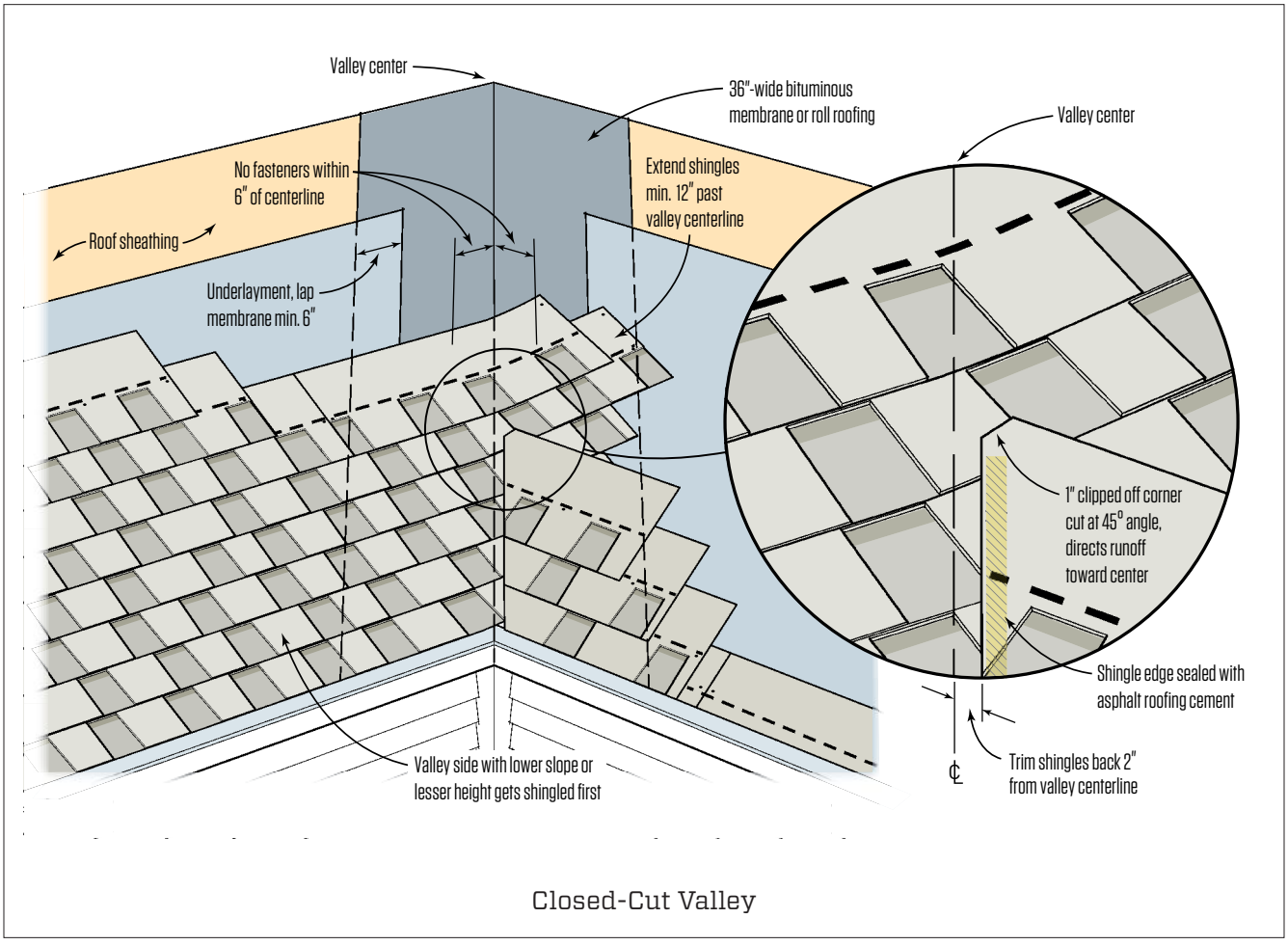
But the way the shingles were installed, the offset was often less than 4 inches—and even as small as 2 inches—which may have accounted for some of the leaks that occurred in the interior near the center of the house. (Bear in mind that it's often difficult to track the exact location of a roof leak, as water often runs down framing members and may end up spoiling interior finishes far from the actual leak site.)

Sticking to the minimum offset helps to keep end joints between shingles at least 2 inches away from the nails at the end of the shingles in the course below.

SHINGLE NAILING

Most asphalt shingle roofs can be fastened with a four-nail pattern. The key is to keep to a consistent pattern—1 inch from the edges and uniformly spaced across the shingle length.

On this roof, the nailing was sporadic, and in many places, there were no nails visible at all. This is often the result of installers trying to blow through an installation as fast as possible, machine-gunning their way across the roof with pneumatic roofing nailers. When this happens, the likelihood for overdriving nails and driving nails crooked increases (see Properly Driven Nails, top right).



Closed-Cut Valley

Of course, overdriven and crooked nails are still possible in the normal course of production. When they do occur, the fastest repair is to drive the nail so it is fully below the shingle surface, seal the hole with roof cement, and then drive a new nail next to it. If it's not possible to sink the nail head, pull it.

In high-wind regions and on steep roofs, a six-nail pattern is required to reduce the risk of blow-offs (see Shingle Nailing, facing page, left).

VALLEYS

Because of the sheer volume of water running off the angled roofs draining into a valley, the detailing at roof intersections is some of the most important.

All valleys, regardless of type, should be lined with a minimum 36-inch-wide peel-and-stick membrane. This membrane should be run with the width of the material centered along the length of the valley. The peel-and-stick needs to be installed directly to the roof sheathing before a roofing underlayment is installed.

The majority of roofs in my area have closed-cut valleys, which only require a cut along one side of the valley and can be installed relatively quickly. The right way to do these is shown in the illustration above.

The two most common errors with closed-cut valleys are failing to take the time to seal down the cut edge with roof cement, and failing to clip the top corner of the shingle at the top of the cut (see detail bubble in Closed-Cut Valley, above).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Penetrations. "Black jacked" plumbing vents are all too common, but this is not a good way to flash a roof penetration **(6)**. Roofing cement dries out and becomes brittle and will crack. Also, gaps and thin spots open up as the cement dries out and these essentially create funnels running straight into the roof assembly **(7)**. Also shown here is a very poor installation of a self-flashing roof vent **(8)**. The shingles were not cut carefully around the vent but were instead jammed up against the vent, distorting the hood.

Clipping the leading corners on a closed-cut valley is almost never done around here, even though it is very important. As water runs down the valley, it tends to get pulled in by the acute angles at the top edge of each course of shingles along the cut edge of the valley. These points can divert water down the concealed top edge of each shingle course. When the corner is clipped, the water will still slosh onto the corner, but now the edge is pointed into the valley and water is much less likely to run along the top edges of the shingles.

Another type of valley is an open valley, which relies on a formed piece of 26-gauge (minimum) metal at least 24 inches wide. It is by far the most durable and leak-resistant kind of valley, but we almost never see one on the reroofs in this area because of the added cost.

ROOF PENETRATIONS

Any roof penetrations, including plumbing vents, roof vents, chimneys, and skylights, present direct opportunities for leaks. Plumbing vents and pop-in roof vents are the most common problem areas, and unfortunately, on a lot of reroofs, very little effort is paid to these other than cutting the shingles around them—usually quickly, while running shingle courses.

Part of the problem may be that replacement roofs are often sold more as a commodity than as a craft. Consumers shop on the basis of price and many roofers sell jobs on low margins. If there's a short-cut to be taken, they will take it. After all, how many homeowners are likely to go up on the roof and inspect it? So while a good-quality, two-piece plumbing boot costs only $20 to $40, there are often enough vent stacks on the roof that the cost difference between installing boots and simply smearing the base of the vent with roofing cement can be the difference between making a profit, however slim, or losing money.

That, of course, does not justify not installing a proper plumbing boot, but it does speak to the idea that selling a quality roofing job begins with educating the client about long-term roofing performance issues. This will be an uphill battle, particularly as DIY home-improvement media continues to push oversimplified ideas of what it takes to remodel a home.

Mark Parlee, a building-envelope consultant (thebuildingconsultant.com) and builder (www.parleebuilders.com) in Urbandale, Iowa, specializes in exterior renovations and building envelope solutions.

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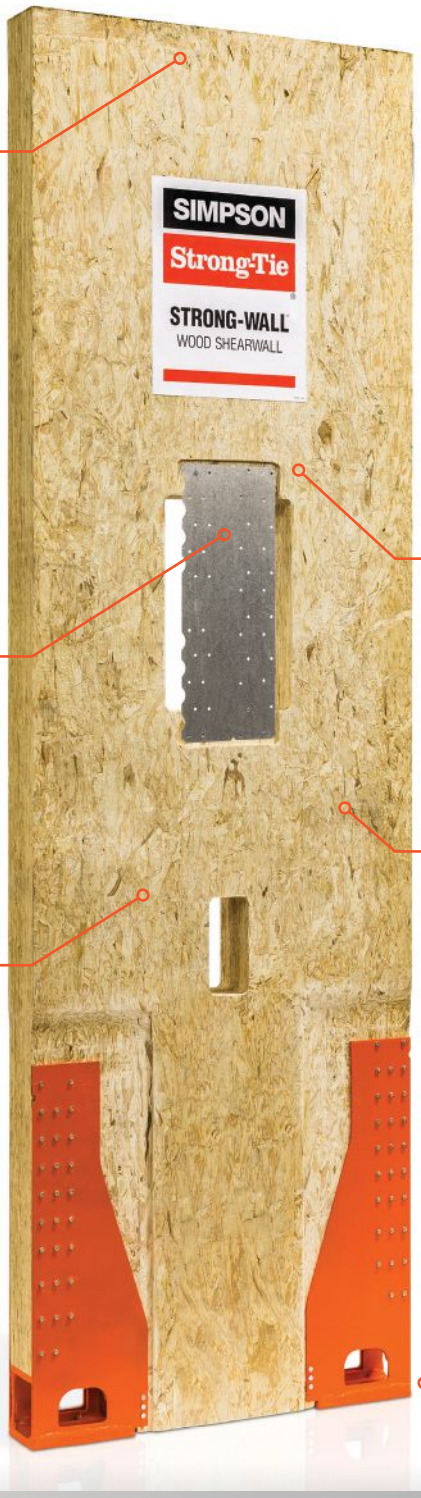

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Layout for Exterior Wall Framing

Working in the right order gets you ready to assemble walls more quickly

BY MATTHEW ANDERSON

In the previous issue of *JLC,* I wrote an article describing the process that our crew typically follows when snapping accurate layout lines for the exterior walls of a house ("Layout Lines for Exterior Walls," Apr/16). That procedure took two lead carpenters only about 30 minutes. While the rest of the crew continued to chip away at their prepared lists—cutting cripples, jacks, and studs and assembling headers, corners, and partition studs—the same two lead carpenters started on the next step: cutting and laying out the wall plates.

The first task is setting up a cutting station for the plates. Two heavy-duty sawhorses are set up in a central but out-of-the-way location on the first-floor deck. A lift of 16-foot 2x6s labeled "plates" had come from the lumberyard, and the crew loaded a few dozen of those boards onto the sawhorses. As they went through the pile, they set aside warped or twisted boards, keeping only the straightest boards to use as plate stock.

SQUARE THE STOCK AND CUT TO LENGTH

Once the stock is loaded and ready to go, two crew members start laying out plates on opposite sides of the house (to stay out of each other's way). They take measurements directly from the wall layout before measuring and cutting the plates to length.

Photos by Roe Osborn

Framing stock rarely comes from the supplier with perfectly square ends, so we always saw one end of the board square before we cut it to length **(1)**. We pull our measurement from the squared end and cut the plates to length. If the length of the plate is less than the length of the stock, two plates (top and bottom for the wall) are cut and tacked together at each end **(2)**. We then place the paired plates on the deck where the wall will be built **(3)**.

If the wall is longer than the plate stock we've been given, we square both ends of two lengths of stock—one for the top plate and one for the bottom plate—and then set the boards in place with one end of each board at an end of the wall and the other ends overlapping in the middle. After aligning the ends exactly on the layout lines, we tack the two pieces together at the overlap **(4)**. Then it's just a matter of measuring from each end to the overlap and cutting the fill-in pieces to complete both plates **(5)**. We use a second top plate, so we never try to break the plates exactly over a stud. In fact, I've been told that nailing the ends of two plate sections to the same stud can create a weak point in the framing.

We usually don't start the actual layout until all the plates are cut and set in place around the perimeter of the deck **(6)**. To keep the framing consistent throughout the house, we always pull layouts from the same point. This keeps the framing members aligned

Cut and square the plates (facing page). After a load of plate stock is stacked on sawhorses, one end is cut square **(1)**. If the plates are shorter than the plate stock, they are measured and cut in pairs and then tacked together **(2)**. The pair of plates is set in the proper place on the perimeter of the deck **(3)**.

Dealing with longer plates. If the walls and plates are longer than the stock, both ends are squared on two lengths. The boards are set in place with one end of each board at an end of the wall, and the other ends overlapping and tacked together **(4)**. The remainder for each end is then measured **(5)**, and the pieces are cut and tacked in place. All the plates are cut and set in place before layout begins **(6)**.

for direct load transfer from the rafters all the way to the mudsills. For this house, we used the side of the house opposite the garage and the back wall of the house as starting points for the layout.

LAY OUT THE ROUGH OPENINGS FIRST

The openings for doors and windows are the first items to be laid out. Close attention must be paid to exactly what the dimensions on the plans refer to. Sometimes they denote the distance to the centerline of opening, and other times the measurements on the plans are to the center of an architectural element of the house. For example, the dining-room slider on the rear of this house was centered on a screened porch. An open deck next to the porch became the centering element for a double kitchen window. Dimensions given on the plans were for the porch and the deck with indications that the openings be centered on those elements.

On the front of the house, a triple window was centered on the living-room wall, with the three windows separated by double 2-by stud pockets. The crew member doing the layout pulled the initial measurement from the side of the house (in this case, the end of the wall) and marked the centerline of the wall, which was also the centerline of the middle window **(7)**. The rough-opening (R.O.) dimensions for each opening had already been noted on the plans, so


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next he marked out the R.O. width of the center window **(8)**. Using a layout square, he drew lines for the stud pockets and then measured the R.O. width of the side windows **(9)**, drawing a square line to mark that opening **(10)**.

The carpenter doing the layout also writes the R.O. dimensions either next to the centerline or in some conspicuous place within the opening **(11)**. These dimensions correspond to the list of headers, cripples, and jacks that the rest of the crew is working from. When we're ready to "load" the lumber for each wall, we can just go to the various piles and grab the framing member that has the same dimensions that are written on the plate.

SPECIAL WALL FRAMING ELEMENTS ARE NEXT

With the openings roughed out on the plates, the layout crew turns its attention to the framing around each opening. This house was being built on Cape Cod a short distance from the Atlantic Ocean, and the plans called for prescriptive high-wind framing with doubled king studs and jacks for each opening more than 5 feet wide, and tripled kings and jacks for openings more than 7 feet wide. The layout crew marks out the required king studs and jack studs on each side of the opening **(12)** depending on its width.

Next, we locate the partition backers for intersecting walls. We build a backer as an L-shaped assembly made from a 2x6 stud with

Openings are laid out first (facing page). Working from the plans, a carpenter measures to the center of the opening for a window **(7)**. Working from the center point, he marks the sides of the rough opening **(8)**. Here, a center window flanks two side windows. After marking out a double 2-by stud pocket that separates the windows, he measures the rough opening for one side window **(9)**, then marks the edge **(10)**.

Framing for the openings comes next. Rough-opening dimensions are written on the plates at each opening for reference when the walls are assembled **(11)**, and jack and king studs are marked out for each opening **(12)**. Next, intersecting walls are laid out. Here **(13)**, the intersection for a fireplace bump-out is drawn as two studs separated by the width of the intersecting 2x6. The marks on the right indicate the stud for sheathing nailing, while the pair on the left show the king and jack studs for the fireplace opening.

an attached perpendicular 2x6. For the layout, we draw a stud with a 5½-inch space next to it. Again, the locations of the interior walls are spelled out on the plans, and the layout crew measures and marks those locations on the plates. Close attention is paid to the size of the intersecting walls. Most interior walls are framed with 2x4s, and for these walls, the 2x6 L-assembly provides ample drywall nailing for both sides of the wall. If the intersecting wall is framed with 2x6s, as are the exterior walls of the fireplace bump-out, we make the partition backer as a U-shape **(13)**. It gets laid out as two studs with a 5½-inch space in between. An example of an interior wall framed with 2x6s is a wall that houses plumbing.

The last pieces of specialty framing to be marked out on the plates are the corners. There are many different techniques for framing corners, but we usually build U-shaped corners unless requested to do otherwise. These corner assemblies are installed on the ends of the walls that extend past other walls.

STUDS ARE LAST

With all the wall elements finished, the final layout items are the studs. Again, the crew member pulls the layout from the designated point and marks out the studs at the proper spacing. For this house, the 2x6 studs were spaced 16 inches on-center. Pulling the

layout from the end of the house, the stud layout is marked 3/4 inch to one side of the 16-inch increment highlighted on the tape **(14)**. That marks the edge of a nominal 1 1/2-inch stud on a 16-inch-on-center layout. Studs are marked across the entire length of the wall, including across all the openings, where marks locate the cripples (short infill studs) below the window sills and above the headers, if required.

For the walls that begin at the edge of the floor deck, stud layout is easy—just hook your tape on the end of the plates and go. The walls that start inside another wall are a bit trickier. The layout still starts at the edge of the deck, but the end of the wall is the width of a 2x6 away. For those walls, we line up the 5 1/2-inch mark with the end of the plates and mark out the first stud location. We drive a nail at that point **(15)** and then hook the tape on the nail to pull the layout **(16)**, remembering that the layout is now marked at the highlighted 16-inch-on-center marks on the tape, and not 3/4 inch away as before.

If the wall has a jog in it, simply measure the distance between the last layout mark and the end of the previous wall. Subtract that amount from the on-center measurement (in this case, 16 inches), and set your tape at that number at the beginning of the next wall to continue the stud layout on that wall **(17)**.


18

Stud layout (facing page). The last wall-framing members to be laid out are the studs. If the wall begins at the edge of the deck, the measurement is pulled from the end of the wall. The stud locations are marked 3/4 inch to one side of the highlighted marks on the tape to center the studs **(14)**. For walls that don't begin at the edge of the deck, the carpenter sets the tape on the end of the wall at the width of the framing and marks the first layout. He drives a nail at that point and hooks the tape on the nail **(15)** before pulling the layout **(16)**. At a jog, he continues the layout from the previous wall **(17)**.

Final steps. The garage plates are laid out last, starting with the openings for the garage doors **(18)**. To mark out multiple framing members quickly, set the square at the edge of the opening and mark two widths in the open center of the square **(19)**. Then just slide the square down to the marks and draw the lines across the plates **(20)**.


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FINISHING UP

The plates for the two-car garage were the last to be laid out. Both openings were to be spanned by a single LVL header, but the plates received the same layout treatment. After the centers of the openings were located, the sides of the rough openings were marked out **(18)**. Plans called for massive built-up framing to support the LVL header, and marking out multiples is an easy task with a layout square. First, line up the edge of the square with the rough-opening line across the plate, and in the open center of the square, mark the positions of the next two members using the lines on the square **(19)**. Then just slide the square down and draw the lines across the plates as the edge of the square lines up with the marks **(20)**. Repeat the process until all the multiples are laid out.

Laying out the plates for this house took just under an hour and a half, again less time than it took to describe the process in words. So in two hours, we had lines snapped and the wall framing laid out, ready for the walls to be built. There was still more "factory" work to be done, so our layout crew jumped in to help. In a few more hours, the crew would be ready to start building and raising the first walls.

Matthew Anderson is the owner of Anderson Framing and Remodeling, a building company based in East Sandwich, Mass.

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Thin-Stone Veneer Over Rigid Foam

Installing real stone over continuous exterior insulation

BY IRA NERENBERG

This is a story about my wanting to build something that I liked but that others said couldn't be done. The stone supplier and the stone mason said it couldn't be done, and I couldn't find any published construction details for doing it. But if nothing else, I'm persistent and have come to learn that there's always a way to reach your goals.

The project, located in the Hudson Valley in New York, called for a low-maintenance, energy-efficient house. We were aiming for a durable, maintenance-free exterior using Nichiha fiber-cement lap siding on the second-story and real stone on the first floor and walk-out side of the basement. Everyone involved wanted real stone, not "cultured" or "cast" stone. Touching and seeing the real thing provides a visual, sensory, and emotional experience that comes only from authentic materials.

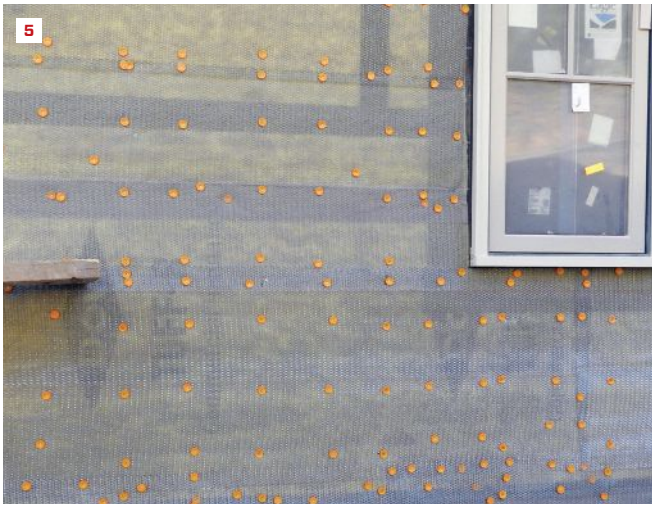
To make the house as energy efficient as possible, we used closed-cell spray foam to fully fill the 3½-inch stud cavities, and 1½ -inch-thick foil-faced polyisocyanurate foam on the exterior to create a thermal break. This gave us a total R-value of around 34 in a wall only 6 inches thick, allowing us to use windows and doors with standard-depth jambs.

In my search for information, I made contact with an engineering firm that wrote a white paper for the Foam Sheathing Coalition on installing claddings over rigid foam. (This report eventually became the basis for the New York State Building Commission's approval of generic fastener requirements for installing claddings over exterior foam.) The process outlined in that article started with determining the weight of the cladding. The real stone we specified weighs 13.4 pounds per square foot. Adding the weight of all the wall components—including the foam, rainscreen, expanded metal lath, and mortar scratch coat—gave us a total weight of 21 pounds per square foot. Based on that, we were able to use the 25-psf category in published design specs—namely, the guidelines in the Evaluation Service Report for FastenMaster HeadLok screws, the fasteners we eventually chose for securing the cladding assembly to the framing. The process for building this assembly is described in the photos and captions on the following pages.

Photos by Ira Nerenberg

As the framing went up, plywood sheathing was installed, and polyiso foam was installed right behind it **(1, 2)**. We chose polyiso because it has the highest R-value per inch (6.5), allowing us to add almost 10-R to the wall without having to incur the expense of custom windows. The choice of plywood as the sheathing was dictated by a more subtle performance issue. When plywood gets wet, it swells consistently across the panel dimension. It also dries out relatively quickly and returns to its normal dimensions. OSB takes longer to get wet but also longer to dry, and it can swell unevenly. While swelling edges are unlikely to telegraph through and crack the mortar, we wanted to hedge our bets. With stone—a "reservoir" cladding that can soak up and hold much more moisture than wood or fiber-cement siding materials—we wanted as forgiving a wall as possible.

A critical element in the process of installing the polyiso is to seal all the joints. We used Zip System tape, which of all the tapes we've used had the greatest ability to stick to the foil facing **(3)**. Before applying the tape, though, we had to wipe off the foil surface with lacquer thinner to remove an oily residue left from the manufacturing process. Below grade on the side and front of the house, we used a Delta-Dry system to create drainage against the ICF (insulated concrete form) foundation and flashed the top edge with Soprema—a peel-and-stick membrane recommended by the ICF manufacturer. It's critical to use materials that are compatible. Above grade on the walk-out side, we installed PermaBase over the ICFs **(4)**. This provided a nail-base to which we could apply the same rainscreen material and scratch coat that we used on the rest of the above-grade walls.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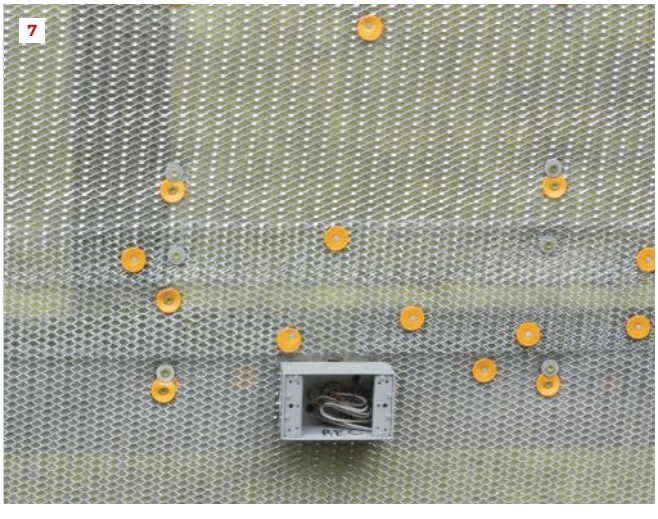
Once all the polyiso had been installed around the house, the carpentry crew installed a drainage-plane material—in this case, Benjamin Obdyke's Home Slicker. This material is a dimensional matrix that provides a channel to drain any water that is driven through the stone face and mortar joints. It has a continuous backer, is easy to bend, and is lightweight enough to be tacked up with a hand stapler. The mason then followed, installing an expanded diamond mesh lath, first with 8d nails into the sheathing to hold it in place, then with screws to help flatten out the lath laying over the rainscreen material **(5, 6)**.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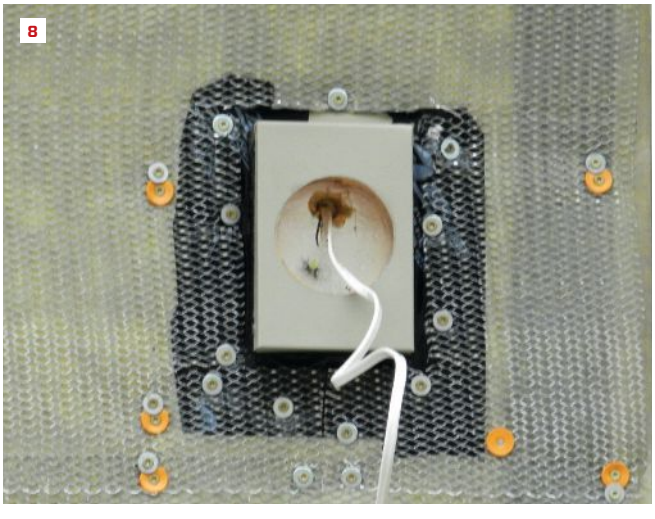
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Since the lath carries the full weight of the mortar scratch coat and the thin-stone veneer, the carpetry crew secured the lath every 6 inches vertically along the studs with 4 1/2-inch HeadLok screws (with grey washers) **(7)**. This fastener specification for securing cladding through foam, for a cladding weight of 25 pounds per square foot, came from the FastenMaster Technical Evaluation Report (TER 1009-01) for HeadLok screws. As the carpentry crew came through to secure the lath, they also worked with the electricians to set the outdoor electrical fixtures. All the fixtures and standoffs needed to be installed and flashed **(8)** properly before the scratch coat was applied.


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The mason applied a very heavy scratch coat to provide a secure bond for the stone veneer. For the mortar, he used Spec Mix Stone Veneer Mortar VM-01 **(9)**. The entire first floor below the second-story beltline was stuccoed, including above the rear deck **(10)**. Note: The standouts just below the soffit are for a ledger board that will support a trellis. With any cladding material, especially one like stone that can hold a considerable amount of water, it's important to promote drainage and drying.


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Working from the top down (so all the mortar that might fall off the trowel or the back of the stone would fall harmlessly to the ground without creating a mess on the face of the stone below), the mason could start installing the stone veneer. We selected material, from Stoneyard.com, that is consistent with the natural stone in the area. We specified a mix of 80% Ledge Stone and 20% Mosaic **(11)**. The mason artistically integrated both shapes into a consistent, beautiful whole. The larger stone had the effect of moving the eye along and breaking up any possible linear effects. The mason selected stone from each of the wood crates to create the pattern, cutting pieces as necessary **(12)**. We used the same stone on the face of the fireplace, which nicely ties the inside and outside together.

Each crate of stone comes with premade corners that are offset so that the mason can easily set each corner and then work to that row **(13)**. The beauty of real stone is that when a piece is cut, it is uniform throughout the material—nothing has to be hidden and no quality needs to be sacrificed, as might be the case with manufactured stone **(14)**. One additional important detail to keep in mind when using a drainage plane is to provide a means for the water to get out at the bottom and for air to get in from the top. At the top and the bottom, we installed a Delta-Dry insect screen, hidden at the top by a small fascia board and simply compressed at the bottom. We also incorporated some weep holes at the bottom that were hidden between the joints.

By the end of the project, everyone involved was a convert to the idea that real veneer stone could be successfully installed on top of relatively thick foam. The clients are extremely happy with the way the stone looks after three and a half years **(15)**. There are no indications of any cracking, none of the stone has come off, and the exterior surface is self-cleaning when it is rained on, so it still looks quite good.

Ira Nerenberg is a registered architect in New York, a professional woodworker, and a retired building inspector based in Hudson Valley, N.Y..

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BY LAUREN HUNTER

1. Dishwasher With a View

KitchenAid's newest dishwasher has a unique feature: a tinted exterior window with a lighted interior that illuminates when the wash cycle is complete. The Energy Star–qualified model operates at a low 44 dBa, ideal for homes with open floor plans. The manufacturer's Clean Water Wash System continuously removes food particles from the wash water through a maintenance-free stainless steel filter. Other features include an upper-rack adjustable bottle wash, a nine-in-one wash arm configuration to improve soaking and scrubbing, and adjustable shelving on both sides of the upper rack. Look for retail pricing around $2,050. kitchenaid.com

2. Stylish Knobs and Pulls

In design, serenity doesn't come only from calming paint colors. Top Knobs' new Serene collection of decorative hardware lends a refined style to knobs and pulls. The collection includes five styles comprising a total of 10 knobs and 21 pulls in a variety of sizes. Additionally, four available 12-inch appliance pulls carry through the same thin width as the cabinet pulls for a cohesive look that thicker, heavier appliance pulls can't always provide. The five styles are available in up to six finishes including flat black, Tuscan bronze, and polished nickel. Pricing for knobs and pulls starts at $6.50; appliance pulls start at $135. topknobs.com

3. Versatile Reclaimed Wood

Available in stone (shown), shadow, crimson, and creme colorways, Olde Wood's reclaimed barn siding brings a unique look to wall treatments. The authentic recycled lumber is virtually maintenance-free, having survived 100 years or more of Northeastern weathering. The color application creates a natural, uneven texture through a process that preserves the boards' weathered look, rusty nail holes, deep graining, and knots. Choose from random widths of 3 to 6 inches or 4 to 8 inches, and board lengths from 2 to 12 feet long. Applications include interior wall or ceiling paneling, decorative accents, and even exterior residential siding. Pricing starts at $9.72 per square foot. oldewoodltd.com

4. Gravel-Free French Drain

The NDS EZ-Drain gravel-free French drain is a prefabricated trench drain solution that eliminates the hassle of dealing with gravel. As such, the maker says installation time can be cut in half compared with traditional applications. For a 4-inch drain, individual pricing for 5-foot lengths starts at around $40 at Home Depot, or on the NDS website for $140 for a set of four drains that can be connected to suit the length of installation. ndspro.com

5. Expanding Concrete Alternative
Sika's Post Fix replaces two 50-pound bags of concrete with a mix-and-pour formulation that expands like magic in just minutes. The small, self-contained package includes a two-component mix that activates without water when the internal seal is burst. With the two components thoroughly combined, installers can pour Post Fix into a post hole to secure fence posts, light poles, mailboxes, and other non-structural posts of a variety of materials including steel, wood, and PVC. An initial set takes place in just three minutes, with two hours to a full cure. The mix is not labeled for structural components such as deck posts. Priced at $11 per bag. usa.sika.com

5

6. Affordable Beauty in the Bath
The Brioso freestanding bathtub is part of the new Maax Professional line designed for the trades. Featuring clean lines with balanced angles and curves, the affordable tub is easy to install and comes in a surprising array of colors: white, platinum gray, black, and ruby. Choose from 60-by-42-inch or 66-by-36-inch dimensions to suit a variety of bath configurations. Pricing ranges from $1,800 to $2,100 depending on color selection. The introduction of the Maax Professional line coincides with the launch of new online tools for construction professionals: The Maax Pros Corner will provide product updates and documentation, while the Partner Portal will allow for 24/7 access to order tracking. maax.com

6

7. Little Lav Sink
Don't downsize to save space in small powder rooms. The Boxe semi-countertop sink from American Standard makes a bold visual statement while fitting comfortably into a smaller footprint. The compact, self-rimming design features a rear overflow and is partially recessed to fit easily on a countertop as narrow as 13 inches. The angular shape is set off by an optional towel bar below the basin that accentuates the design while keeping hand towels within reach without adding clutter. Choose from single or 8-inch widespread faucet hole options. Priced at $260. americanstandard.com

7

8. Complementary Siding and Shakes
Designers looking for complementary exterior products have a new partnership to take advantage of. Novik has announced that it will color-match its NovikShake 8-foot profile to 23 colors of Style Crest vinyl siding. Additionally, Style Crest will distribute NovikStone, Novik Blended Shakes in four colors, and six colors of Novik's StainNatural product (shown), which incorporates wood stain into the polymer shake during manufacture. The partnership will allow designers and homeowners to feel confident that their exterior product selections complement each other for maximum curb appeal. Pricing will vary by product and region. novik.com

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9. Lightweight Sheathing Substrate

Ideal for use under brick, stone, stucco, EIFS, and other siding, USG's new Securock UltraLight Glass-Mat Sheathing is up to 20% lighter than similar products on the market, the maker says. The 5/8-inch sheathing features a re-engineered high-strength, lightweight gypsum core and a coated fiberglass facer mat and back to maximize coverage of air and water barrier systems. The low-VOC material achieved a perfect score on ASTM D3273 tests for mold. Check for pricing and availability from local dealers as Securock UltraLight Glass-Mat Sheathing rolls out regionally this spring. usg.com

10. Fine Finishing

Save time and money with Trim-Tex's newly designed 560 Sanding Pads, available in five grits from extra fine to extra coarse and in corresponding colors for easy identification. With a 60% larger sanding surface than other products, the product's abrasive grit is bonded directly to the foam pad, so there is no paper to scuff up walls when sanding inside corners. Like the previous version of the product, the 560 Sanding Pads also feature the maker's quick-change system, which allows users to easily switch sanding pads when using them in conjunction with the Trim-Tex 540 Pro Sander. Check with your dealer for quantities and pricing. trim-tex.com

11. Deck Out Your Truck

The Decked weatherproof truck-bed storage solution features two full-length, 200-pound-capacity drawers that organize tools and gear while supporting a 2,000-pound payload and full use of the bed area. The waist-height drawers can be customized with locks, trays, dividers, and other accessories for efficient organization. Installation is fast and easy, using the truck's tie-downs rather than requiring drilling into the bed. American-made Decked systems use HDPE and steel components. Look for package pricing around $1,100 online, though actual pricing will vary by truck bed size and accessories selected. decked.com

12. The Home Stretch

Take advantage of Huber Engineered Woods' Zip System Stretch Tape that is now available in a versatile 10-inch width that's ideal for flashing recessed windows and other deep rough openings. Also available in the original 6-inch width, Stretch Tape stretches in all directions to provide speed and ease of application on the job with a single piece of flashing. The high-performance composite acrylic material fits curves and corners with no need for cutting, and creates a strong bond with substrates and with itself to prevent air and moisture from penetrating. The 10-inch width is available in 75-foot lengths for about $200 per roll. zipsystemstretchtape.com

BY MIKE TRILLER AND BRUCE CRANSTON

DeWalt DCN660 Finish Nailer

The DeWalt DCN660 16-gauge 20-volt XR finish nailer arrived when we were just one week into a two-month-long interior trim job, giving us a perfect opportunity to put the gun to work. After having tried several other styles of cordless trim guns, we were excited to try out a fully battery-powered gun that boasts some impressive features. As intrigued by the potential performance as we were, we were also fairly skeptical that a battery-powered gun could replace a pneumatic.

After two months of consistent use and thousands of nails later, we were very happy with how the gun performed. It was able to drive and set nails effortlessly into pine and poplar trim, while it was less consistent in setting nails in harder trim like oak. According to the specs, with a fully charged 2-Ah battery, you can shoot up to 800 nails; we didn't count, but this seems realistic.

DeWalt supplies a well-designed case and a charger, but only one battery; two batteries would be helpful, especially if you're going to use this gun as your main finish nailer. One nice feature on the supplied battery is the level indicator.

We had no problems with jams and misfires when shooting through softer woods and poplar. The gun did jam on a few occasions while firing into oak, and we found the tool-free jam clearing fast and easy to use. At 6 pounds, the gun's not light, but the ergonomically designed handle and the tool's balance make the gun seem lighter than it really is.

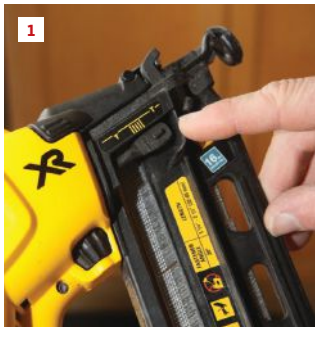
The depth gauge **(1)** gives you a clear indication of the depth setting so every adjustment can be monitored easily. The gun will continue to fire when empty, which was disappointing.

The sequential and bump modes **(2)** allow for fast and precise nailing. Most battery-powered nailers have a recovery time after each nail is fired, but this gun plays like a pneumatic in that respect. The bump mode is fantastic for tasks like running baseboard, though it made us miss an "empty" lock-out feature even more.

Minor criticisms aside, this tool has become a go-to nailer for us. The luxury of being hose- and compressor-free for trim work is priceless, especially because this tool performs so similarly to a pneumatic. And, surprisingly, it's not as loud as other cordless nailers we've used. In short, we would recommend this nailer to any trim crew.

Nail type: 16 gauge, angled 20 degrees; Capacity: 110 nails, 1¼ to 2½ inches; Weight: 6 lb.; COO: Germany; Cost: $400.

Mike Triller and Bruce Cranston are finish carpenters living in Saratoga Springs, N.Y.



Weigh In!
Want to test a new tool or share a tool-related testimonial, gripe, or technique? Contact us at JLCTools@hanleywood.com

BY DOUG MAHONEY

Bosch CSM 180 Metal-Cutting Saw

As a remodeler, I spend most of my days cutting wood. When I do have to cut metal, I use a grinder or a recip saw. But after testing Bosch's 18-volt CSM 180 Metal-Cutting Circular Saw, I realized the downside to the methods I normally use. The Bosch saw is capable of making quick, accurate cuts in materials such as steel studs, rebar, threaded rod, conduit, and Unistrut. And unlike the tools I normally use to cut metal, it produces clean cuts and does not shoot sparks all over the place, thanks to the plastic shroud **(1)**. An LED light can be activated by tapping the trigger and not turning on the saw, which is good for lining up cuts.

I used the saw to cut heavy-gauge metal studs **(2)**, rebar, and conduit. In every case, it made a nice, clean cut that was immediately cool to the touch. A recip saw makes inaccurate and ragged cuts, and an angle grinder is slow, hot, and blows sparks everywhere.

Unlike a typical circular saw, there's no bevel and there isn't much in the way of marking on the depth-of-cut adjustment. The footplate is small, the front pommel handle isn't there, and the kerf markings are minimal at best. All of that was fine for me, because this is a tool for cutting lengths of metal, not for notching a rafter tail. Because of the bare-bones design, it is small and light—weighing in at less than 6 pounds. This makes it easy to use at or above head level. The ergonomics are good; the grip is smartly padded and comfortable to hold. A built-in rafter hook comes in handy and is easy to fold out of the way when not in use.

The CSM 180 comes equipped with a toothed blade, not an abrasive one, so the saw can also cut wood. The saw is not designed for cutting wood, but in a pinch it can be used to make the occasional rough cut when your regular circ saw isn't nearby. It's also good for those times when you hop in the dumpster to consolidate the debris that's in there. You have the convenience of cutting with a circ saw without having to worry about what happens if you hit a nail.

This saw was designed with plumbers, electricians, and HVAC techs in mind. But it would also be handy for the remodeler, who, like it or not, needs to cut metal on occasion. As a remodeling carpenter, I have enough instances when I need to cut metal to justify the price of this saw.

Battery: 18-V Lithium ion; No-load RPM: 3,800; Weight: 5.8 lb. (with FatPack battery); Blade diameter: $5^{3}/_{8}$ inches; Max. cut depth: 2 inches; COO: China. Price: $350 (kit); $200 (bare).

Doug Mahony is a carpenter in Harvard, Mass.

Milwaukee M18 Cordless LED Stand and Flood Lights

BY TIM UHLER

For the past 10 years, we've used Wobble Lights as primary lighting. We needed something more portable and we already own a few Milwaukee tools, so I requested to test the new Milwaukee cordless Trueview LED stand and flood lights.

The stand light **(1)** can be set up from about 40 inches to nearly 7 feet, and its head can be rotated or pivoted. We found that even fully extended, it was stable; the battery, which is located in the base, acts like a counterbalance. The base makes a triangle that measures 26 inches at each side, and the light nicely lit up the room when placed in the corner.

With three modes—2,000 lumens (high), 1,300 lumens (medium), and 850 (low)—getting the right amount of light is easy. When it's time to change the battery, the light blinks, so we were never left in the dark.

The stand light sets up in seconds with a couple of clicks and pulls, and it barely takes up any room in our Sprinter van. Using 4-Ah batteries, we got three to four hours of runtime, depending on the mode. Milwaukee claims that the color of the LED light is a neutral white with a high color rendering, which means the color of the light is more "realistic"; we found it a more comfortable light than the Wobble Light.

Wobble Lights can take 15 minutes or so to fully light. We often lose power on our jobs and even stepping on the cord powering the Wobble Light can cause it to blink out. We were able to keep working, though, while waiting for the Wobble Lights to turn back on, because we had this cordless light on hand. The portability, light output, and adjustability made this light extremely useful. It retails online for about $250.

The small cordless LED flood light **(2)** has three modes for light output as well—3,000 lumens (high), 1,500 lumens (medium), and 650 lumens (low). It can either be used cordless, when equipped with M18 batteries, or be plugged in.

This flood light is durable, especially compared with the old halogen portable lights we always broke too readily. A roll cage protects the light and still allows for the light to be moved 240 degrees. It's also compact and portable at 11 inches by 12 inches by 8 inches tall. We found it extremely useful in crawlspaces and in a basement we had to frame and found that it cast enough light to illuminate most smaller areas like bathrooms or bedrooms. It also did a great job of lighting up the cut station. As with the stand light, when the battery starts to die, the light will blink letting you know to change the battery; we got about two to three hours on a 4-Ah battery. It retails for $150 online. COO: Mexico.

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

Classifieds

BY LISA MARIE NICKERSON

National Women Build Week

In the week leading up to Mother's Day, more than 17,000 women across the country celebrated this year's holiday in a less-than-traditional way: by picking up hammers, laying drywall, and framing a house to make it a home for a family in need of decent, affordable shelter.

It was all part of Habitat for Humanity's 9th annual National Women Build Week, which took place from April 30 to May 8, 2016. More than 300 Habitat offices hosted activities for this year's event, which included the construction and repair of 650 homes, as well as neighborhood revitalization projects and building to green standards. The week launched with 10 "Girls Night Out" house-framing events in Lowe's parking lots across the U.S.

At each build site, women learned new construction skills from Lowe's Heroes volunteers as well as through how-to clinics. While some volunteers were novices, many others were highly skilled professionals. Because the event took place nationwide, climate often determined the stage of construction: Many of the builds held in the northern part of the country were in the early stages of construction, while in some southern sites, the work had been started earlier in the year and was wrapped up during National Women Build Week.

But whether the volunteers kicked off the project or completed it, their time and effort will have a significant impact on helping families in their local community build strength, stability, and self-reliance through shelter.

Lisa Marie Nickerson is associate director of Habitat for Humanity International's Women Build Program (habitat.org).

Photos: Habitat for Humanity International's Women Build Program

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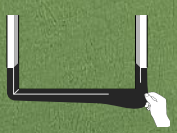

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The new Diablo Steel Demon carbide-tipped reciprocating blades are the first carbide-tipped blades designed for extreme metal cutting; including high strength alloys, cast iron, and stainless steel. These high performance carbide-tipped blades deliver unmatched 20 times longer cutting life than standard bi-metal blades in extreme thick metal cutting applications between 3/16" to 1/2".

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SCAN WITH A SMART PHONE

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Extreme metal cutting carbide-tipped recip blades are available in four lengths: 4"(DS0408CF), 6"(DS0608CF), 9"(DS0908CF),& 12"(DS1208CF)

FOR EXTREME THICK METAL CUTTING INCLUDING:


CAST IRON


METALS & ALLOYS


STAINLESS STEEL
(316 MARINE GRADE)


THICK METAL
(3/16" TO 1/2")

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