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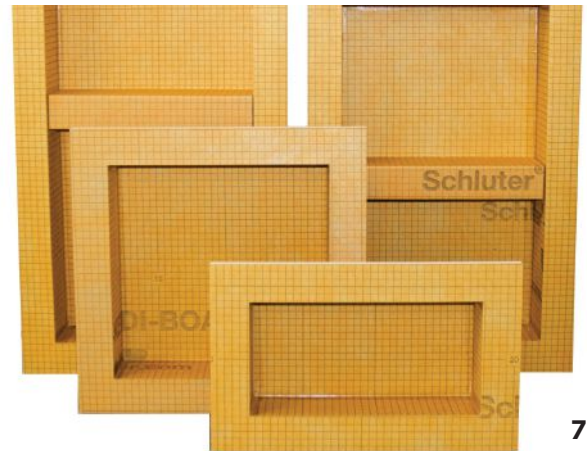
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**ON THE COVER:** Lead framer Tim Uhler of Pioneer Builders gang-cuts the tails on a bundle of I-joist rafters for a custom home on Wildcat Lake in Bremerton, Wash. See the story on page 47. Photo by Kyle Davis.

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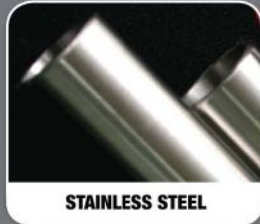
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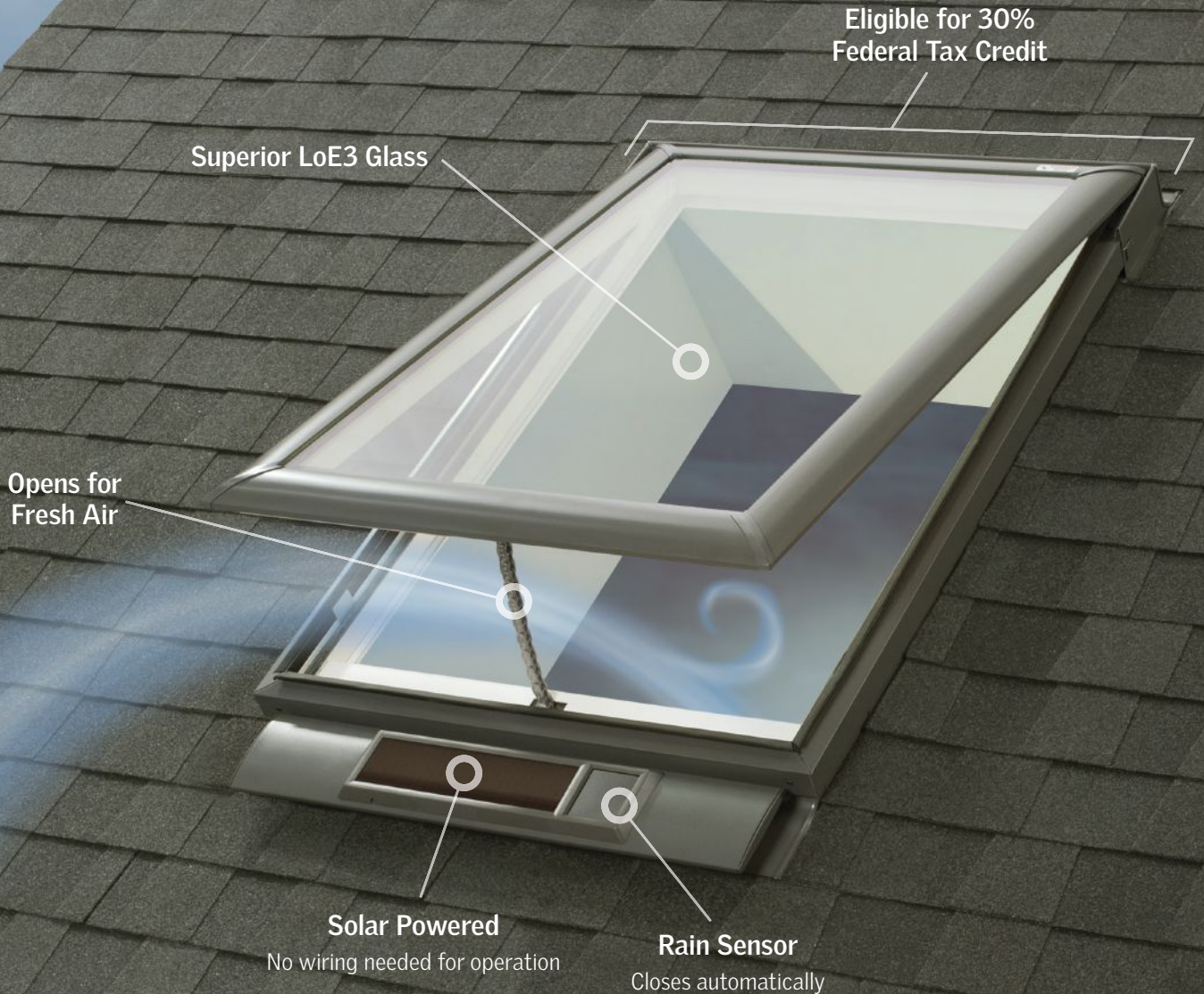
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# Letters

The following excerpts were taken from comments posted on JLC's website (jlconline.com) in response to the indicated articles.

## Solar Skeptics?

**"Deck Mounting a Photovoltaic System," 2/13**

Nice article, but it just makes it clearer that the buyers are probably the "bobos" of *Bobos in Paradise* [David Brooks' *Bobos in Paradise: The New Upper Class and How They Got There*, published in 2000] who think they are "green" but just have to have monster kitchen stoves and such.

Our 2,702-square-foot house in southern California is a good example of why the payoff is never. We use about \$1,000 per year of electricity, and that is with an electric cooktop; electric ovens; two bedrooms as offices with a computer network, copier, and so forth; my old tube radio restoration and playing hobby; and an electric heater in the master bathroom. We do not believe in waste, so turn unused lights off, but make zero special effort to save power. The \$39,000 system featured, even if the owners used the government to steal 50% of the cost from other taxpayers and ratepayers, could never be anything but a big expense, unless they somehow use radically more electricity than we do. Plus, the inverters and such in these systems will eventually fail and need service — probably just replacement, as there are fewer and fewer electronic service people, adding to the cost. — *Stephen Masek*

Often some important points are missed in the rush to install solar panels. Not only does there need to be closer collaboration and understanding between roofing contractors and solar-panel teams and insurers, but currently you will find that all of your roofing warranty has evaporated as soon as the solar guys start work. Remember that nice 20/40-year roofing warranty you paid so much for? Well,

that's now toast with a solar install.

Look very carefully at how these systems affect any roofing repair work and insurance. — *Pete Baston*

## Roof Rules

**"Roofers Face Flood of New State Laws," JLC Report, 2/13**

Here's a rule that way too few roofers seem to adhere to: Don't leave asphalt shingles or felt paper in contact with — or within one inch of — double wall gas flues. Also, make sure to orient the flue into the middle of the roof-decking cutout, rather than trying to make it work with your row of shingles. — *mbishton*

## Good Idea

**"Roof Truss Repair," Q&A, 1/13**

I recommend to clients that if an engineer designs a repair and certifies the installation, a copy of the repair design and certification should be put in a closed plastic bag and stapled to the truss. Plus keep the originals around for disclosure when selling, and pass it on to the buyer at closing. If an inspector goes up in the attic and sees a truss repair and the certification is right there with the repair, it becomes a non-issue note in the report. — *StuBrooks*

Totally. If it is not stapled to the truss it is a call-out for me. — *inspectordeck*

## KEEP 'EM COMING!

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# From the JLC Forums

## When Can I Throw Away My ...

From a March 2013 discussion about business tools that are becoming obsolete.

### Allan Edwards, Houston

I feel we are in somewhat of a technology revolution, more so than the '90s, primarily because of smartphones, apps, and the type of "programs" available. Here are a few items I seem to not use these days:

**Business cards.** I find myself never giving out business cards. I meet prospects who want to build new homes, and they never ask for them and I don't offer them. It is almost like a qualifying tactic: If you can't find me via Google, then I probably don't want to build your house. Okay, that's a little extreme, but you get my point. Same with subs, if you want to reach me (or vice versa), we can find each other without exchanging business cards. People use vCards, email, Google searches, LinkedIn for contact info. I even search people on Facebook now.

**Stapler.** Still use it, but since all paper is digital, why? Same for paper clips.

**Stamps.** If you email everything, wire money, use Bill Pay, why are stamps needed?

**Printed stationery and envelopes.** Twelve years ago, I paid a ton of money to a graphic artist to design a color logo, so I have this nice stationery and envelopes I rarely use. Same for company brochures.

**Plan rack.** I keep one hard-copy set of plans, but not 20 sets like we used to keep.

**File cabinets.** Got rid of them a few years ago.

**Office phone.** I have one because I have a long-time business line and don't want to change it, but a new company could certainly use a cell #. Dedicated fax #?

**Secretary/office manager.** I have been without one for nine months and seem to be doing okay.

**Website.** I feel I still need one, but one could get by with only Facebook.

**iPad.** I rarely use mine, except to watch Netflix. I can do everything on my smartphone that I can do on my iPad.

**Office.** One- to two-person operations can work from home, why couldn't larger, medium-size companies do the same?

### TWhite, Va.

Allan, I ditched my office phone about four years ago. You can easily switch your office phone # to your cell phone. No complaints.

### Dick Seibert, Martinez, Calif.

Like T. White, as soon as I heard that the FCC made all phone numbers portable, I moved my land line to my cell phone and gave up my cell phone number. Now one number reaches me night or day. Privacy concerns about being out of reach when home or away? We don't have no stinking privacy anymore.

### Ted S., Boston

I figure my website will become a portal for all of my customers. A useful tool. I would not get rid of it and especially not replace it with a proprietary service such as Facebook. I would think Facebook will fade away before long.

You forgot one, Allan: Server. I think servers will go away with the new cloud services.

### m beezo, St. Louis, Mo.

What about Post-it notes, ink pens, pencils ... I remember when computers were first coming around, all the talk was about how much easier they were going to make things for everyone. That may be true

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## From the JLC Forums

until the electric goes out, you run out of ink for the printer, or the thing gets a virus and freezes up with all your information ... unretrievable. All I need to do is keep track of about 1,000 yellow sheets of lined paper, have a pencil and pocket knife, and I can continue to bid and bill.

### Ohiobuilder, Bellbrook, Ohio

I just switched to a Verizon office line at \$20 per month — cut it in half from my AT&T.

Would like to move away from mailing checks and get to some sort of EFT system. Most subs and vendors email their invoices.

I do think a website is necessary; in fact my Web traffic has really picked up this year.

I like Facebook for my business but really can't stand it for personal use.

I have envelopes with my logo that are so old the glue doesn't even work when sealing!

I am surprised you don't use your iPad much, Allan, and use your phone more. I did just get a new phone: a Droid Maxx HD. It's really a good phone with the #1 feature being the battery life. I make calls, text, email, and check my calendar — not a huge app guy. To send an email I prefer the iPad.

### mike maines, Portland, Maine

Allan, I just read your article in *JLC (Business, 3/13)* about going paperless. Some good ideas in there! I like your file-naming convention.

### EZGCServices, San Francisco

My two cents.

**iPad.** I agree with Allan, except for reading. I read a lot of newspaper articles and a few magazines; almost every online article I stumble across I save to the "Pocket" app, which makes it much easier on my eyes.

**Paper and cards.** If I need something, such as my medical insurance card, I just take a picture of it and put it in a folder on my phone using Dropbox. Much easier than carrying all that random stuff around, and I'm sure this idea can be applied to many things.

**Website.** I disagree with Allan here. If you are trying to build any kind of online

presence, having a website will help. Said another way, Google is not going to highly favor a Facebook page; every business should be trying to show as high as possible on Google for their area.

**Office phone.** I'd suggest you try out Google Voice. It will give you a number that when dialed can ring any number of phones. It also transcribes your voice-mails into an email (not great quality, but usually good enough to understand). This also allows calls to easily be redirected to someone else if the main cell-phone holder is on vacation or something.

**Office manager.** If there are a few things you can't quite give up, maybe hire someone via Odesk.com. Most things can be done remotely these days.

**Logos.** Sites like 99designs.com can get you a logo to use much more cheaply than 10 years ago. Whether or not you need it printed on paper is a whole different story.

### Allan Edwards

The reason I prefer my iPhone over my iPad is because my iPhone is always with me, typically in my pocket ... My iPad seems to not always be with me, and I really don't like carrying it around.

Regarding business cards — I had my first appointment today with a prospect, they had already visited my website, there was absolutely no reason to hand out a card. I just find myself rarely giving them out.

Office phone — I do use Google Voice and forward my office phone to my cell phone, that works fine. The transcription is not that great, but okay. I think at some size having an office with someone answering your phone is beneficial.

Ted, I agree that servers are becoming less needed. I am on my last one, I am already 60% to 70% cloud-based.

As smartphones progress in terms of camera quality, will digital cameras become less needed? I think so.

What about desktop computers? How long before we don't need a standalone computer on our desk? Three to five years?

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# On the Job

## Greek Revival Column Repair

by Kyle Diamond



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

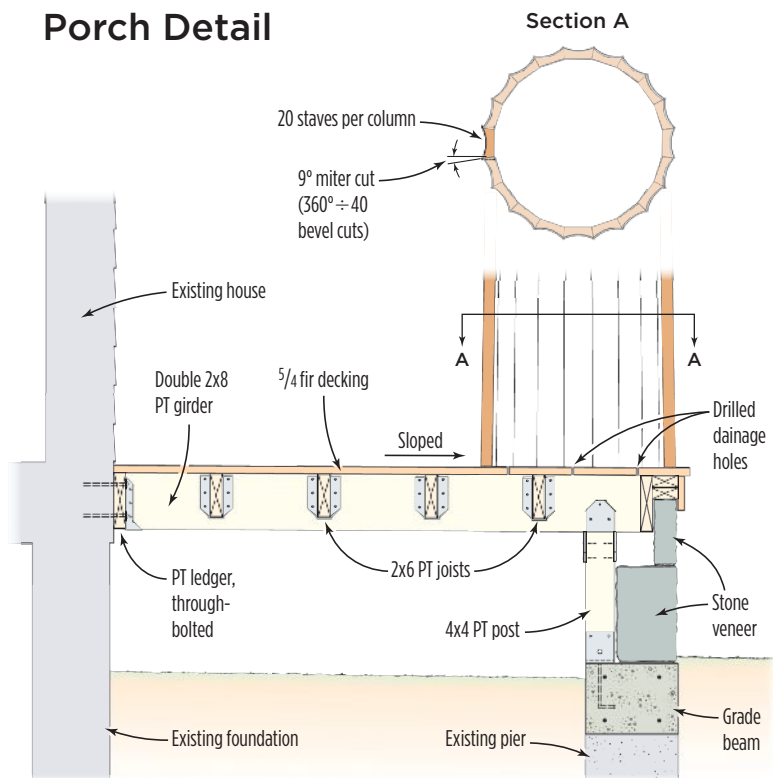
A few years ago my company, New Dimension Construction, completed restoration work on a 160-year-old Greek Revival in Millbrook, N.Y., located in the eastern Hudson River Valley. We spent seven months tearing down and replacing an addition with low ceilings that connected the main house to a kitchen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

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

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

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

## Porch Detail



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

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

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

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

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

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

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

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



**Figure 2.** Spanish cedar boards were milled into fluted staves using a William and Hussey VFO6 molder. The custom-ordered knives, also from William and Hussey, cost around \$150. It took one man one day to mill all the stock, making two passes per piece to avoid chattering while hogging out the ½-inch-deep cut for the fluted profile (inset).



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



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

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

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

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

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

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

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

*Kyle Diamond is a partner with New Dimension Construction in Millbrook, N.Y.*



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## Business | Using a Simple Timecard to Collect Labor History

built or cabinets I had hung, or whether I knew exactly how much time it took to do these tasks. Nor did anyone care what my estimating system said the project should cost. For me, this was truly a no-win situation.

I quickly realized that if I was going to succeed, I would have to put my personal beliefs, opinions, and judgments aside and institute a system based on the actual results of completed projects. Once the system was in place, I reasoned, there would no longer be any arguments about who was right and who was wrong. Salespeople would have more confidence in the estimated price. Clients would sense that conviction and trust that they were hiring the right company. And the production staff would know that they were capable of meeting the budgets and even making a bonus. All I needed to do was incorporate our job histories into our estimating system, and the world would be sunny and bright.

The second thing I learned as an estimator was that the existing estimating process had no link to our job histories; in fact, the job histories were prehistoric. This was a surprise to me because our system was loosely based on Home-Tech's Remodeling and Renovation Cost Estimator (the first estimating resource I ever saw that was tailored to small contractors), and one of the ideas we had embraced was its 25 phase categories or divisions. The management team had duly developed a timecard that listed all 25 divisions, plus a few more for office time, sick days, and vacation days (see **Figure 1, page 27**).

When I was still in the field, I had religiously filled out my card each day, fully confident that this information was being used by someone in the office. So years later, when I started estimating, I assumed we had a vast treasure trove of data I could transfer into our new estimating process. To my dismay, this was not the case. I was told that very few car-

penters filled out the form correctly, and even though some did, the data was too diluted to be useful.

Undeterred, I moved forward, committed to the belief that labor was the most critical item in an estimate, because it was the hardest to forecast and had the big-

gest impact on the bottom line. I needed those labor histories, and I reasoned that the best way to get them was to redesign the timecard. It would have to be simple enough that carpenters would fill it out, but detailed enough to be useful to the estimator and the accountant.

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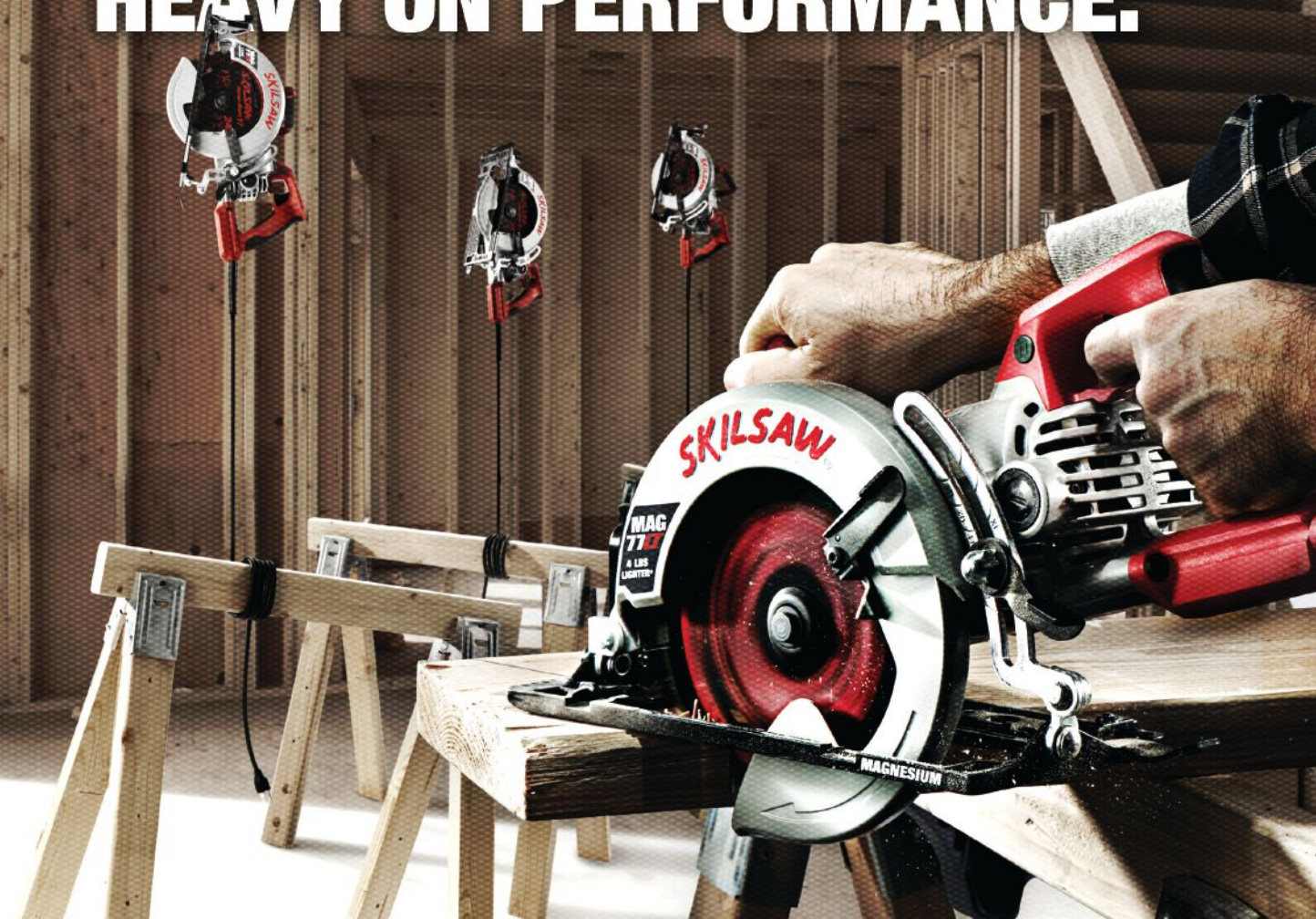
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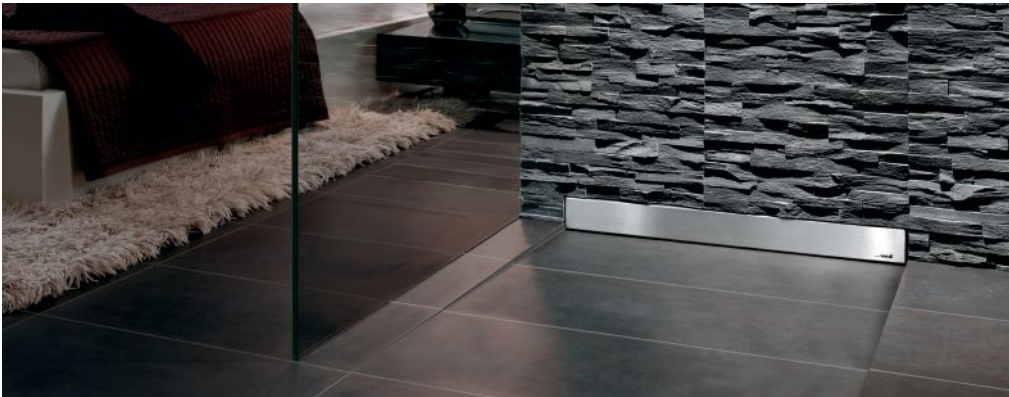


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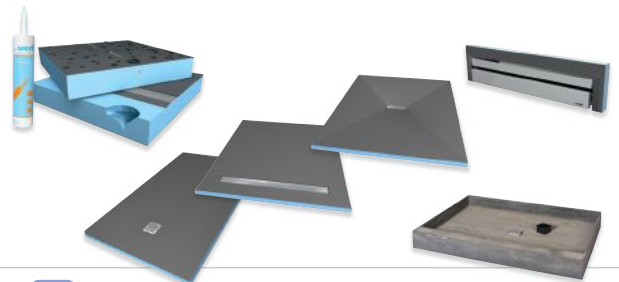
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## Skil MAG77LT Wormdrive Saw

by Terry Goodrich



### MAG77LT Specs

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**Amps:** 15

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**Maximum bevel cut:** 53 degrees

**Price:** \$220 (\$230 for the MAG77LT-72 with twist-lock plug)

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I've been an Oregon framing contractor for 30 years. I employ 12 to 20 carpenters, and together we frame about 75 to 200 single- and multi-family houses per year. Not only is that the ultimate torture test for our wormdrive saws, but it can also torture my veteran left arm — especially since I cut most of our roofs and stairs.

The 7¼-inch Skil MAG77 I usually use is a durable workaholic, has a quality lower blade guard that seldom snags even when cutting compound angles, and is 2 pounds lighter than Skil's standard model SHD77. But Skil just rolled out the MAG77LT, which weighs 2 pounds less than the MAG77 and is now the lightest 7¼-inch wormdrive or hypoid model on the market. When *JLC* asked if I'd like to field-test one, I couldn't wait to see if its reduced weight and other deluxe features would make a difference. After framing eight houses with it, I'm stoked.

### Weight Loss

At first glance, the MAG77LT doesn't look radically different from other Skil worm-

drives. But Skil micromanaged the design inside and out to shed some weight while adding welcome features.

To subtract weight, Skil used magnesium for the blade guards and baseplate, reduced the length of the motor by  $\frac{3}{8}$  inch, reshaped the motor housing so it's cylindrical and is attached with shorter screws, moved the spindle lock from the front to the side of the gearbox and combined it with the oil plug, and even refined the rafter-hook mount.

I appreciated the lighter weight as soon as I lifted the saw, and the benefit was multiplied after using the tool all day or cutting overhead, such as when trimming rafter tails from a ladder. In my opinion, that alone is a game-changer.

Skil increased the no-load cutting speed from 4,600 to 5,300 rpm, so the saw should cut a bit faster. I didn't drag-race this model against my other Skils, but after cutting just about everything framers will normally cut with it (including plenty of LVL), I can't tell the difference.

### Other Upgrades

The saw I tried cut perfectly square at the 0-degree setting, but if it ever veers off, it can be corrected by adjusting a screw on the baseplate. It bevels to 53 degrees (compared with 51 degrees for the SHD77 and MAG77), and the bold new bevel scale has white markings against a black background for a much easier read. The "Cut-Ready" depth bracket has practical scales that make it faster and easier to set the correct depth for cutting lumber and sheet goods. The new soft-grip rear handle is also an improvement.

I especially like the tool's unique multi-function wrench, which lives on the base-



Sam Scott

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# Toolbox

plate so it's always within reach. It's a blade wrench, plus it can pry the diamond knock-out out of a new saw blade, loosen an over-tightened bevel or depth lever, and remove and install the oil plug and brush caps.

## The Bottom Line

When I first started using this saw, I was annoyed when I came up empty after instinctively reaching up front for the spindle lock. But once I got used to the new location on the side of the gearbox, I found

it to be more convenient. So much for my only complaint. I love the saw's light weight, it performs like my other Skils, it has every feature I can imagine wanting, and I expect it to last for years — just like its proven predecessors. Would I spend \$220 for one when I can buy a new MAG77 for \$180? Absolutely. In fact, I think it's a bargain.

*Terry Goodrich is a framing contractor and custom home builder in Scappoose, Ore.*



Amenities include a multifunction wrench that stores in the base, a rafter hook, and a more-convenient spindle lock that's combined with the oil plug.



## Orbital Recips

In his review of the DeWalt DWE357 reciprocating saw in our April *Toolbox*, Greg Burnet wrote: "... it doesn't have orbital blade action, a mode that allows a saw to make faster cuts in wood. Personally, I miss this feature."

I like that feature, too, but have often wondered what the actual difference is between orbital and nonorbital cutting action. So I ran that question by David Lincoln, Milwaukee's product manager for AC and DC saws. Here's his answer, which was verified by Milwaukee's engineering team: "When cutting in wood, orbital action can increase the speed of cut by up to 20 percent. However, the harder the user pushes, the less benefit orbit has for cut time."  
— Bruce Greenlaw



## Dust-Free Adhesive Anchoring

Hilti just launched the innovative HIT-HY 200 adhesive anchoring system for anchor rods and rebar dowels, which is approved by ICC-ES for use in uncracked or cracked concrete in all seismic zones. The system offers two options that can eliminate the need to clean out your holes with compressed air and a wire brush before injecting the HIT-HY 200 adhesive: You can either hook Hilti's unique hollow SDS-max or SDS-plus drill bits to a Hilti vacuum to suck up the dust as you drill, or you can use Hilti's new HIT-Z anchor rods and eliminate hole cleaning altogether. Both methods are supposed to be up to 60% faster than the traditional installation method.

Sim Ayers, owner of SBE Builders in Discovery Bay, Calif., installs lots of adhesive anchors, so we

asked him for a quick opinion. After watching the video at [us.hilti.com/HY200](http://us.hilti.com/HY200), he said the vacuum option really piqued his interest, not only because it promises to be much faster than the usual cleaning procedure, but because it doesn't blow clouds of dust everywhere or drop it by the holes — a huge consideration when working in occupied buildings. Ayers recently bid on a seismic retrofit in an occupied multistory building and says if he gets the job, he just might submit Hilti's ICC-ES report to the structural engineer and buy into the system.

You can buy the components separately, but at the moment Hilti is also offering four deluxe starter kits that cost \$2,600 or \$3,000 and include everything from a rotary hammer to a cordless dispenser, plus some adhesive. — B.G.

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### 21-Gauge Nailers

Ever heard of 21-gauge brad and pin nailers? If not, you're in good company, judging by the recently resurrected "21 gauge nailer/pinner" thread in the *JLC* Finish Carpentry forum. But some contributors to the thread have said they use these tools a lot because the fasteners have significantly more holding power than 23-gauge pins but leave much smaller entry holes than 18-gauge brads. The major power-tool manufacturers don't offer 21-gauge nailers, but one high-quality option mentioned in the thread is the Cadex model CPB21.50 ([cadextools.com](http://cadextools.com)). Since Cadex also makes 23- and 18-gauge nailers, we called the North American distributor for an opinion about the 21-gauge option. The short answer: "The 21 gauge ... can be the only finish nailer a finish carpenter needs. Throw away your 18-gauge and put the 23-gauge back in your toolbox until you are shooting pins of 35mm ( $1\frac{3}{8}$  inches) or less." — *B.G.*

## Pelican 2720 LED Headlamp

by Michael Davis

**M**y first headlamp was clunky, with a big battery pack in the rear and an incandescent bulb in front. It made me feel like I should be headed off to the coal mines. But from the first time I used it, I was sold. Suddenly I had a light that shone where I needed it and left both hands free for work.

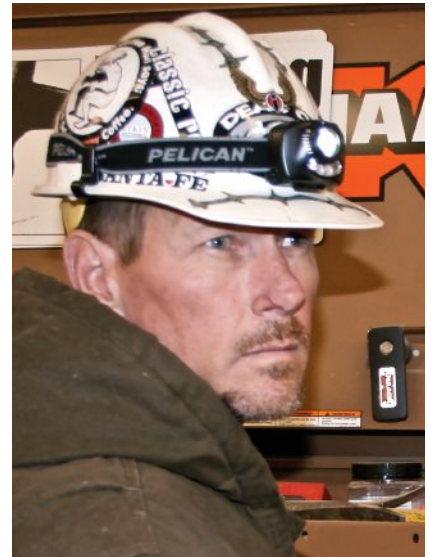
Today's headlamps are smaller and packed with features. One of the latest entries into the market is the Pelican 2720 LED Headlight. I've been using one for a couple of months, and I really like it.

The 2720 is powered by three AAA batteries. It's compact and lightweight, and the adjustable elastic headband holds the lamp firmly in place while you work. Included are two clips that quickly attach the headband to a hard hat, which is the way I normally wear mine. When I'm not using the light, I don't even notice it up there.

**Flexible beams.** The lamp produces a powerful beam that you can adjust from 80 lumens to five lumens by holding down the on/off button. Battery runtime ranges from eight hours to 175 hours depending on the output. You can also adjust the beam from spot to flood by moving the magnification control at the top of the LED lens, and the lamp can pivot downward from 0 to 90 degrees.

Two red LEDs below the main lamp allow you to see in low light without losing your night vision. That's not all that useful on job sites, but it's great for weekend camping trips. The red lights can also switch to an emergency mode that signals SOS, which you hope you never need.

**Motion sensor.** What really sets the 2720 apart is its "Gesture Activation Control." Adjust the light to fit your needs, then press the motion-sensor button, and the



**Pelican Products**  
800/473-5422  
[pelican.com](http://pelican.com)

light can be turned on and off by passing your hand within a few inches of the lens. This feature can be invaluable. For example, on the job site when it's cold and I'm wearing gloves and I go into the dark tool trailer, I wave my hand and my lamp comes on; another wave when I come out and it's off. (This also has its drawbacks: If you're working in close quarters — say repairing a pipe under a kitchen sink — you can accidentally switch the light off if you move your head too near a pipe.)

The headlamp has an IPX4 rating, which means that water splashes have no harmful effects. Mine has been rained on and still works fine. It lists for \$50.95 but can be found online for around \$35. It's a great little light.

*Michael Davis owns Framing Square in Conifer, Colo.*



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# PRO

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Tools and materials seen at *JLC Live*

# Innovative Products 2013

by Charles Wardell

**A** lot of construction pros say that the *JLC Live* show is the most valuable annual event they attend. That's no surprise. In addition to a full lineup of educational seminars and live demonstrations, the event includes a jam-packed exhibition where attendees can put their hands on any number of new tools and products. The *JLC* editorial staff spent

three days at this year's Providence, R.I., show walking the floor and talking with vendors, and found lots of products that solve a variety of problems faced by builders and remodelers in the field. Here's a small sampling of what was on display.

*Charles Wardell is a JLC contributing editor.*



TS 55 REQ

## On Track

One of the busiest spots at this year's show was Festool's booth, where attendees flocked around the new **TS 55 REQ** track saw, a redesign of the TS 55 EQ. New features include an easy-to-read depth scale, a control knob for finer depth adjustments, a flat housing for flush-cutting against walls, a riving knife that emerges from the base before the saw blade (for easier positioning in existing cuts), and improved dust extraction. Like other Festool track saws, this one includes a slip clutch to reduce the chance of kickback, limit stops that prevent the saw base from rising during a plunge cut, and a guard that keeps the blade covered above the cut line. It costs \$585; a 75-inch guide rail adds about \$185.

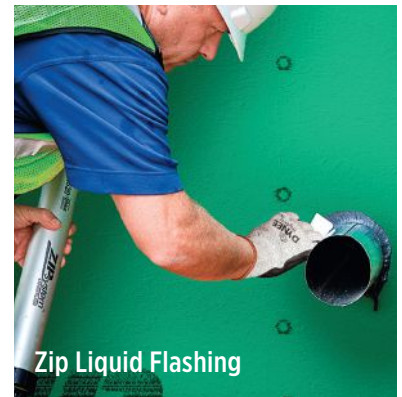
**Festool**, 888/337-8600, festoolusa.com.



Insul Cube



Automatic Operator



Zip Liquid Flashing

## Insulation Bag

The band-joist area can be a challenge to insulate correctly. A lot of contractors don't want to spray foam into the area, so they opt for less-than-ideal solutions like cutting fiberglass batts and stuffing them into place. If you're using blown fiberglass or cellulose, National Fiber offers a third way. Its **Insul Cube** is a fire-rated bag that you fill with blown insulation on the job site, then friction-fit between the joists. You vary the amount of insulation according to the size of the space. If you need to squeeze the bag behind pipes or wires, you can put it in place empty, then fill it. The bags cost \$1.35 each.

**National Fiber**, 800/282-7711, insul-cube.com.

## Invisible Motor

Most powered window operators have a less-than-elegant look. Andersen's new low-voltage **Automatic Operator** is an exception because it's built into the window frame. It comes with a wall-mounted controller and a handheld remote that can control up to four windows. A sensor automatically closes the window when it starts to rain. The window won't operate if the screen is removed (a safety feature that was designed to prevent it from closing on someone's hand). The operator is available on the company's 400 series and A series awnings, for window sizes from 2 feet by 2 feet to 5 feet by 4 feet. Added cost is \$400 for the first window and \$220 apiece for up to three additional ones.

**Andersen**, 800/426-4261, andersen corp.com.

## Liquid Flashing

People who don't like to detail flashing tape around pipes and other curved wall penetrations might consider **Zip Liquid Flashing**. This liquid-applied product is being marketed as a complement to flashing tape and will waterproof and air-seal penetrations in one step. The maker's engineers told us that it combines the waterproofing properties of polyurethane with the long-term durability of silicone. The application temperature range is 35°F to 110°F. It can be applied to wet surfaces and dries tacky in 15 minutes. It's sold in 20-ounce sausage tubes or cartridges; a tube costs around \$20.

**Huber Engineered Woods**, 800/933-9220, huberwood.com.



**Q Premier Boiler**



**Garage Ventilator**



**Tru Exterior Trim**

## Compact Combo

The **Q Premier Boiler** combines a 132,000-Btu heating-only boiler and a 24-gallon charged indirect hot-water tank in one compact unit with roughly half the footprint of a conventional boiler and water heater. One potential problem with a combination boiler/hot-water heater is a mismatch between the heating and DHW loads, but Rinnai claims that this isn't an issue with the Q Premier: You can size for the heating load yet still get 243 gallons of 107°F water during the first hour after a full charge, thanks to temperature stratification (heating the top of the tank first) and domestic priority (in which DHW takes precedence over heating). The boiler costs \$8,475.

**Rinnai**, 800/621-9419, rinnai.us.

## Exhaust Fan

People who use the garage as a workshop and keep it sealed up in winter may be exposing themselves to a toxic stew of fumes from paints, fertilizers, pesticides, and stored gasoline — not to mention potential carbon monoxide from car exhaust and that open-combustion water heater that hasn't been serviced in years. Enter the **Garage Ventilator**, a 7-cfm continuous-exhaust fan that goes on the floor of the garage next to an exterior wall and is ducted to the outside. The manufacturer also offers a fan-powered makeup register that can pull makeup air from inside the house, if needed. Pricing starts at \$795.

**E-Z Breathe**, 866/822-7328, ezbreathe.com.

## Beadboard From Fly Ash

Boral's **Tru Exterior Trim** is made from PolyAsh, a blend of 70% fly ash and proprietary polymers. Its expansion rate is one-third that of PVC, says the maker. Screw heads can be driven cleanly flush to the surface without mushrooming (at least that's what we found on the samples we received). The material is approved for ground contact and is compatible with silicone and acrylic caulking. It can be painted with any acrylic latex. The company just introduced a 5/8-inch by 6-inch beadboard that sells for \$1.60 to \$1.70 per linear foot.

**Boral Composites**, 800/926-7259, boraltruexterior.com.



Flak Jacket



Flex 100H



Club House

## Slow Burner

Weyerhaeuser's **Flak Jacket** is an intumescent fire-resistant coating for Trus Joist TJIs. In multifamily buildings, it provides a one-hour fire rating for floor and ceiling assemblies with one rather than two layers of 5/8-inch drywall. In single-family construction, it gives I-joists the burn equivalency of solid 2x10s, a requirement for unfinished basements in some jurisdictions that have adopted the 2012 IRC. Of course, the first thing we noticed is that the flanges are only partially coated. No problem, says the company: The coating swells when heated, covering enough of the flange to achieve the needed fire rating. Expect to pay about 50% more than for the company's standard I-joists.

**Weyerhaeuser**, 888/453-8358, woodbywy.com.

## Small and Smart

The **Flex 100H** heat-recovery ventilator is designed for homes with less than 2,000 square feet of floor space. In Eco mode the fan runs continuously at the speed needed to maintain the home's preset temperature and relative humidity. The maximum continuous speed is 100 cfm, but Turbo Touch mode lets the user boost output to 150 cfm for 20- to 60-minute intervals, which means the HRV can double as a bathroom exhaust fan. The company's EcoTouch Controller (sold separately for \$130) has a dedicated button for the Turbo Touch feature. The Flex 100H costs about \$920.

**Fantech**, 800/747-1762, fantech.net.

## New Twist on PVC

**Club House** decking is a cellular PVC product with a core that the maker says is engineered for strength and water resistance. The cap stock is co-extruded using a material that expands and contracts at the same rate as the core, which supposedly reduces chipping and delamination. The boards come in two patterns — an earth tone and simulated hardwood — with a different shade of color on each face. They carry a 25-year fade and stain warranty and cost \$3.50 to \$4.25 per foot.

**Deceuninck**, 877/563-4251, deceuninck-america.com.



Bestfence V3 PRO



Embassy Ceiling



Column Wrap

## Quick Workstation

Setting up and breaking down stationary tools can be a time-sucking vacuum, but the **Bestfence V3 PRO** system gives you some of that time back. Setup is a matter of folding down the hinged legs, extending and locking the rails, then removing the rail tables from their cradle on the back of the saw and snapping them into place on the rails. Breakdown is similarly simple and quick. Lockable wheels make the workstation easy to move from place to place. It costs \$850.

**Fastcap**, 888/443-3748, fastcap.com.

## Suspended Ceiling

An **Embassy Ceiling** not only looks better than a conventional suspended ceiling, it also eats up less headroom. Once installed, the bottom of the cross members lies a mere  $1\frac{3}{4}$  inches below the bottom edge of the joists. Both the cross members and the 2x2 panels are made from MDF with a laminated paper finish. They come in three colors: white, coffee, and maple. As with any suspended ceiling, the panels can be lifted in and out of the frame. The system costs \$4.15 to \$4.50 per square foot, including panels, cross members, and all hardware.

**Embassy Ceiling**, 800/567-5813, embassyceiling.com.

## PVC Column

Wrapping columns with cellular PVC trim used to be a fussy job, but the major PVC suppliers are coming out with column wraps that make things a lot easier. Azek's **Column Wrap** has three connected panels with press-fit lock seams that, when folded together, wrap around the structural post. The fourth panel then locks into place to create a tight and secure enclosure. The product comes with a smooth or white matte finish in 10-foot lengths and in sizes that fit around 4x4, 6x6, and 8x8 posts. Prices range from \$90 to \$180 per post.

**Azek Building Products**, 877/275-2935, azek.com.



## Instant Dust Door

The **Zip Door** is made from 4-mil plastic sheeting with a built-in zipper. It can be installed in less than a minute and is applied to the wall opening with two-sided tape. The side that goes against the wall adheres gently to the wall surface like traditional painter's tape; the side that sticks to the plastic makes a stronger bond but can be repositioned for up to an hour before it's fully set. In cases where lead paint is present, the door meets the EPA's RRP requirement for a covered doorway, says the maker. A 3-foot by 7-foot door costs about \$30, and a 4-foot by 8-foot door about \$35.

**ZipWall**, 781/648-8808, zipwall.com.

## Triple-Pane Windows

Marvin Integrity Windows has added a triple-pane glazing option to its **Wood-Ultrex** casements and awnings. The glazing uses three panes of glass, two low-e coatings, and argon gas fill to achieve U-factors of .18 to .20 (compared with .28 for the company's best double-pane casement). The triple glazing is available on casements up to 3 feet wide by 6 feet tall. Prices range from \$430 to \$900, depending on window sizes and options. The company declined to provide a window-to-window price comparison with equally sized double panes, but did say that the triple-pane option makes the most sense economically in cold northern climates.

**Marvin**, 800/328-0268, marvin.com.

## Carpet Board

**NyloBoard** decking was described to us as a "noncomposite composite." The resin is mixed with post-industrial carpet fiber rather than sawdust. Although the product is 80% carpet fiber by volume (20% by weight), the resin makes it impervious to water. It looks like capped decking but isn't — the resin rises to the surface during the manufacturing process. Board edges can be grooved or square. The 1x6 boards come in lengths up to 24 feet and are rated for 200 pounds per square foot for a 16-inch span, 100 pounds for a 24-inch span. They cost \$3.50 to \$4 per linear foot.

**NyloBoard**, 877/695-6909, nyloboard.com.



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# PRO

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# Framing a Roof With I-Joists

Tips and tricks for working efficiently with I-joist rafters



With the Big Foot Head Cutter (a saw table for a chain saw), the author makes 33 tail cuts in a single pass through a bundle of I-joist rafters. The whole process — including racking, layout, and cutting — took about 30 minutes.

by Tim Uhler

**H**ere in the Pacific Northwest, we typically frame our roofs with Douglas fir 2x12s because it's easy to get good-quality pieces up to 24 feet long. But when we need to span long distances, we usually use I-joists for rafters.

**Overcoming negatives.** While there are clear benefits to using I-joists for rafters (see “Benefits of I-Joists,” next page), there are also drawbacks, most of which come down to additional labor and costs.

Typically, we make several decisions early, including: Will the rafters sit on top of the ridge,

or will we use hangers to support them? Will we cut birdsmouths, or will we seat the joists on beveled plates? Will the I-joist rafters overhang the plate, or will we cut them flush with the wall and add tails to create the overhang? In each case there is added prep work, so it's important to be clear on these details up front.

No matter what the details are, though, the key to being productive is breaking the job down into small steps that you can accomplish easily and quickly. In the pages that follow, I'll demonstrate some of the ways we do this.

### Planning

I have found that if I do the layout in SketchUp or a CAD program and send that to the supplier, I can cut down on a lot of head-scratching at the job site. On my drawing, I provide the layout I want to follow, show bearing points, and specify whether I want the joists to hang from the ridge or sit on top. The supplier can then do the sizing and provide a dimensioned drawing for the building official. One of my goals in this design phase is to end up with as many rafters of the same size as possible so we can gang-cut them.

The drawing also puts all the details in one place. Being familiar with the different rafter details provided by the manufacturer is crucial to reducing the time it takes to cut and install I-joist rafters. I can look at the drawing and plan what will work best for my crew with the tools we have.

### Benefits of I-Joists vs. Sawn Lumber

**Uniformity and length.** I-joists are manufactured in 60-foot lengths, so there is no upcharge as the lumber gets longer. Each joist is exactly the same depth and width — no wane, no hook, no defects. And we can order I-joists in 1-foot increments, which cuts down on waste.

**Engineered strength.** To span long distances with solid-sawn lumber, we can decrease the on-center spacing, upsize to a deeper piece of lumber, or install intermediate support to reduce the span. But I-joists are manufactured with several possible strength ratings for each joist depth, which means we can usually keep the on-center spacing the same and avoid sizing up to the next depth. This helps us preserve consistency and keeps things simple.

**Light weight.** I-joists are much lighter than equivalent-size dimensional lumber, which makes them easier to handle. On one recent job, we set about twenty 27-foot-long, 14-inch-deep rafters, twenty-five 22-footers, and thirty 20-footers — all I-joists and all much easier to handle than the same-size 2x12 Douglas fir rafters.

**Sustainability.** I-joists are a resource-efficient product, both in how they are manufactured and in reduced job-site waste.

### Gang-Cutting

Plumb cuts on I-joists can be handled with a simple plywood jig (A). But making each plumb cut one at a time can be tedious on a whole house or large addition. Instead, for about the last eight years we have been using a Big Foot Head Cutter — a table attachment that goes on a chain saw — to gang-cut rafters.

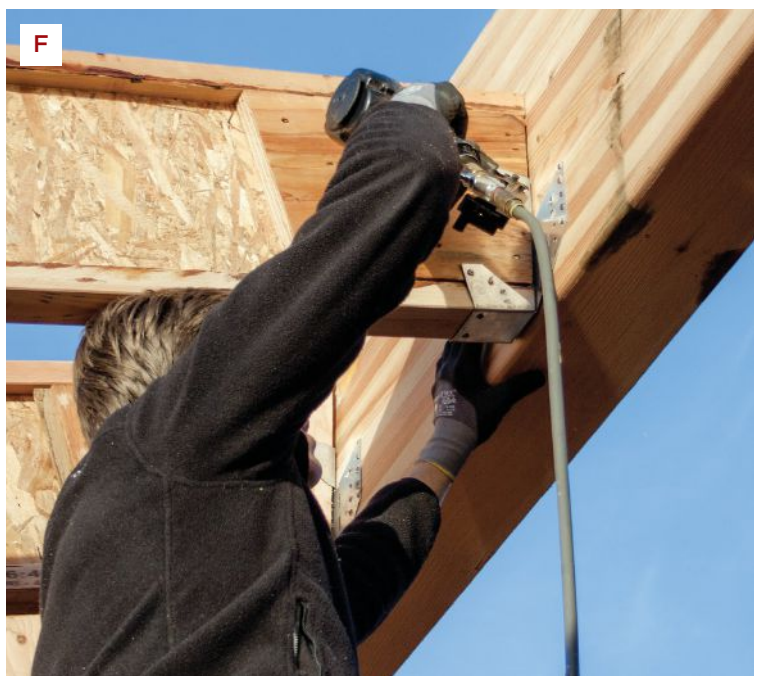
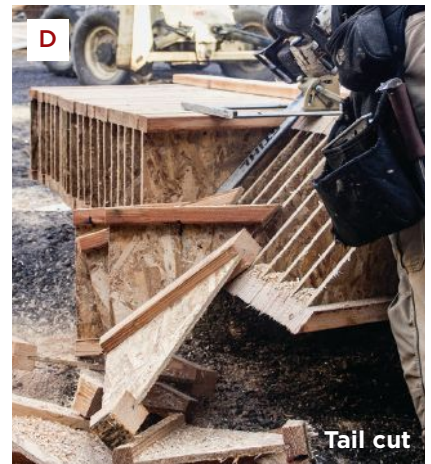
**Racks.** To set up for gang-cutting, we stack joists of the same length side by side on racks we build from 2x12s braced on edge (B). The supplier makes this easy by bundling the joists by length. Pieces of 2-by scrap — screwed to the top edge of the 2x12 on either side of the bundle — clamp the I-joists in place, and a 2x4 tacked across the top edges at each end serves as a saw guide.

**Head and tail cuts.** With the I-joists firmly supported on the racks, we can make our head cut for the ridge (C) and tail cut for the eaves (D). After these plumb cuts are made, the rafters are ready to have web stiffeners installed.

### Web Stiffeners

One key to speeding up the job is to pre-install as many of the pieces as possible on the ground so less time is spent fumbling up top. This applies especially to web stiffeners, which we like to nail to the I-joists before we begin setting rafters. Plywood web stiffeners, ripped to fit between the top and bottom flanges, are always needed at the eaves to provide a flush surface for nailing eaves blocking. We may also need them at the ridge if we are using hangers, in which case it is best to also install all the hangers on the I-joists while the rafters are still on the ground (E). That way, as the framer at the ridge installs each rafter, he just has to nail the hanger to the ridge, greatly reducing the amount of time he needs to work off a ladder (F).

To quickly rip web stiffeners, we like to use a table saw with an outfeed table or our DeWalt crosscut saw with a ripping guide. Then we stack the strips of plywood, so we can cut multiple pieces to length at once using the Big Foot saw. In a half-hour, we can cut a lot of web stiffeners.



### Soffits and Squash Blocks

For enclosed soffits, it is much faster — and there are fewer pieces to deal with — if we let the I-joists run past the plate. When doing this with gang-cut rafters, it is important to string the ridge to keep it very straight and running parallel with the wall plates. Otherwise, you have to run the rafters long and come back later to cut them in place to get a straight fascia line.

For open soffits, however, we cut the rafters plumb with the plate line and add 2x6 tails flush with the top flange of each I-joist rafter (G). For this work, we need to install squash blocks — short 2x4s that transfer the roof load to the wall and help tie down the roof (completing this tie-down requires metal connectors). We install the squash blocks on each side of the rafter — one below the 2x6 tail and one on the opposite side (H).

To cut squash blocks, we use the Big Foot saw again, chopping multiple pieces at one time. If the weather is decent (which isn't always the case in the rain-drenched Northwest), we might use a miter saw for this. It only takes a few minutes to set up the stops, and then the cutting is foolproof.

**Eaves blocking.** We cut eaves blocking from I-joist stock. Whenever possible, we like to install it as we go when setting the rafters, just like we do when setting trusses (I). We cut the blocks  $\frac{1}{16}$  to  $\frac{1}{8}$  inch short to prevent us from “growing” off layout.

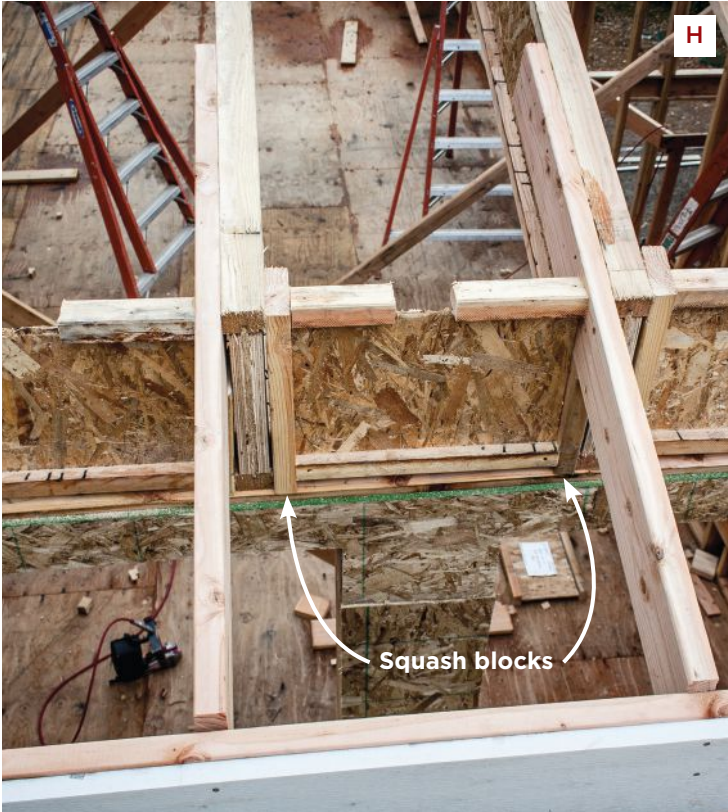


### Beveled Eaves and Ridge Strips

One detail I insist on using is a beveled strip at the eaves to eliminate any birdsmouth in the rafter. Having to cut a birdsmouth complicates things, and adds much more time than it takes for us to rip beveled strips on a table saw (J). By using beveled strips, we are also able to keep the full depth of the rafter, which maximizes the amount of insulation at the plate line. (An alternative is to use the Simpson VPA variable-pitch connector, which eliminates the need for the beveled strip and serves as a tie-down connector, too.)

Sometimes we use the same type of beveled strip when the rafters are set on top of the ridge (K). Blocking above the ridge is required in this situation (L), but before installing it you need to decide how the rafters on each side of the ridge will be joined. If you use plywood gussets, you will need to fasten these to the webs before installing the blocking. Or you can install the blocking first, and after the roof is sheathed, you can install metal strapping over the ridge, nailing it off to the top flanges on both sides of the ridge.





## Valley Rafter Tricks

We usually use two pieces of LVL for valley rafters. On a regular valley, there's nothing unusual: We bevel the top edge of each LVL to match the slope of the roof, and the tops of the rafters plane into the valley. The two LVLS meet at the centerline of the valley, which is where the two roof planes come together.

But on this house we had a split-pitch roof — 8/12 on one side of the valley and 12/12 on the other (M). In this situation, known as a “bastard valley,” the roof planes don't land at the center of the valley, but are offset to the side with the shallower pitch. This is a big headache when you have a cathedral ceiling inside. In our case, we also wanted to keep the overhangs equal on both sides without cutting birdsmouths in the rafters.

The plumb depth of a 14-inch rafter is shorter for an 8/12 pitch than for a 12/12 pitch. This means the roof surface on the 12/12 side is higher. The valley sits on the beveled plate on the 8/12 side, so we left the bottom edge of



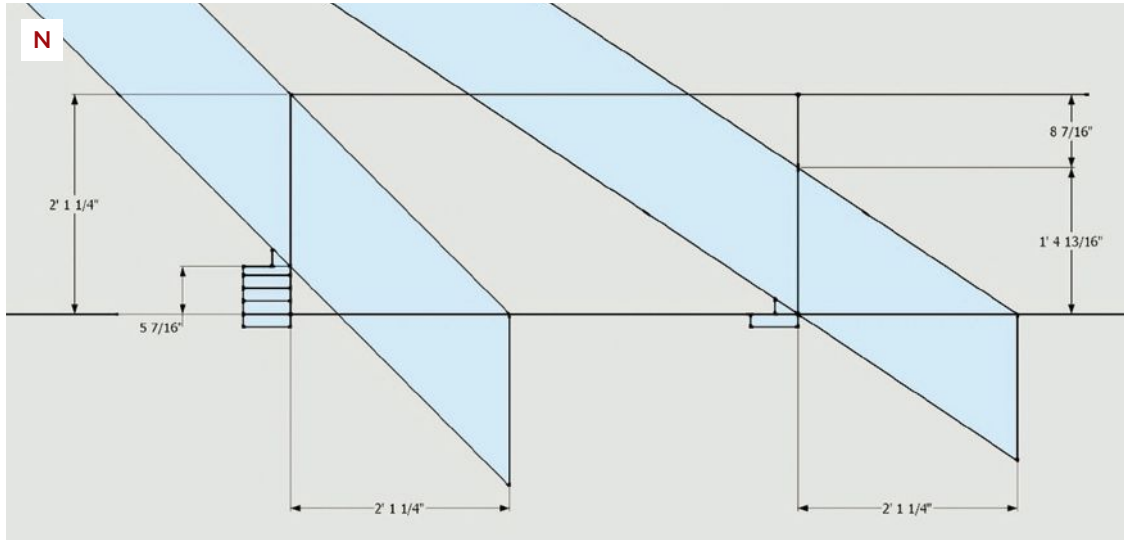
the LVL on that side square, while on the 12/12 side we ripped a bevel to match the steeper slope. Working from a section drawing (N), we were able to measure how much we had to build up the plate to support the 12/12 rafters (O). Doing it this way meant the bottom of the valley would have a crisp edge that matched both slopes, making a perfect surface on the inside where the two dry-wall planes join.



## Gable-End Overhangs

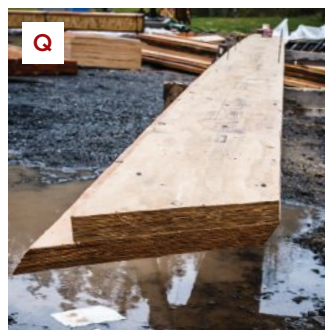
On any roof (I-joists or sawn lumber), we speed things up by framing the gables on the ground as rake walls, with the overhangs pre-installed, and then lifting the assembly into place (S). Or, we may order LVL for the gable rafters, as we did on the shed-dormer area, and notch for the lookouts (T, and L on page 50).





We took the plumb depth for each pitch and ripped two pieces of LVL — one to match the plumb depth of the 8/12 rafters, and one (deeper) piece for the 12/12 side — and screwed them together (P) with the tops at different heights to create the valley rafter (Q). We sheathed the 8/12 side first, then the 12/12 side. The valley doesn't line up perfectly with the intersection of the fascia, but the offset is very minor. Unless you knew the offset was there (R, see arrow), you wouldn't notice it.

In roof framing, absolute perfection is hard to come by. It all comes down to preference. On this job, the two constraining variables were a cathedral ceiling inside the house that needed to be crisp, and the owner's insistence on equal overhangs.



## Hip and Valley Fill

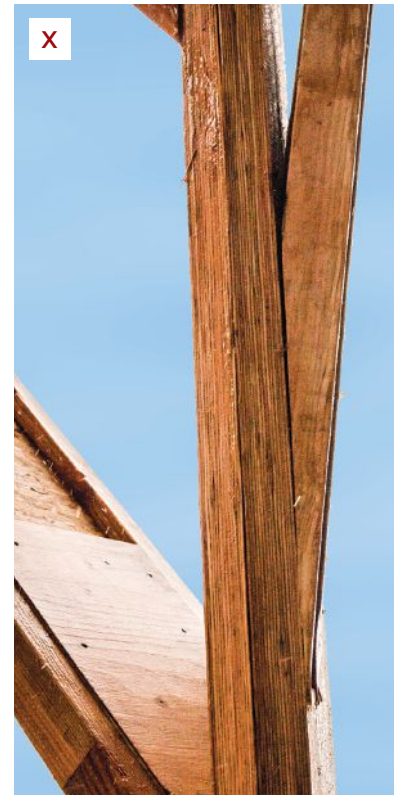
While we've had success using hangers, we prefer to make cheek cuts in hip and valley jacks (**U**). After installing the jacks, we add Simpson LS Angle clips to reinforce the connection. These clips can be bent (just one time) to the angle the jack makes with a hip or val-

ley (0 degrees to 135 degrees), and can be installed using Simpson SDS screws for added strength.

To cut the jacks, we first nail the web stiffeners to both sides of the I-joist, then make the cut with our Big Foot 10 $\frac{1}{4}$ -inch saw (**V**). If the cheek cut is greater than 45 degrees, we use our Big Foot with its swing table, which will bevel up to 75 degrees. On the steeper cuts, we will more than likely need to finish the cut with a recip saw.

**Super-steep bevel cuts.** On the bastard valley, the jacks on the 8/12 side landed on the valley at an 8-degree angle. The only way we could cut this was to freehand with a chain saw (**W**), but the cuts came out perfectly (**X**).

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



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# Plaster Repair Strategies

Minimize demolition by patching cracks, resurfacing with fabric, or adding a layer of drywall



by Tom O'Brien

**I** love the look and feel of old plaster, so when the inevitable cracks and crumbles appear, my goal is to preserve as much as possible. But I'm not a purist. Unless I'm working on a historically significant house, I rely on modern methods and materials to make efficient and invisible repairs. Materials and techniques vary depending on the degree of damage and its location.

## Plaster Repair Strategies

### 1. Prep Work

I start every plaster repair job by identifying all of the damaged spots and circling them with a pencil. Then I prep the area by cutting open each crack and flaring the edges. Intact plaster is tough stuff, so it's easy to know when and where to stop cutting. When the demo is done, I vacuum the debris from the crevice, then apply firm hand pressure to the surrounding plaster, checking for sponginess (an indication that the keys have broken and the plaster has separated from the lath).



#### SLICE AND FLARE

Slice open each plaster crack with a utility knife, then flare the edges with a 5-in-1 tool to increase the bonding surface area. Because this process takes a toll on cutting tools, keep a small sharpening stone at hand to restore their edges.

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### 3. Stabilizing Loose Cracks

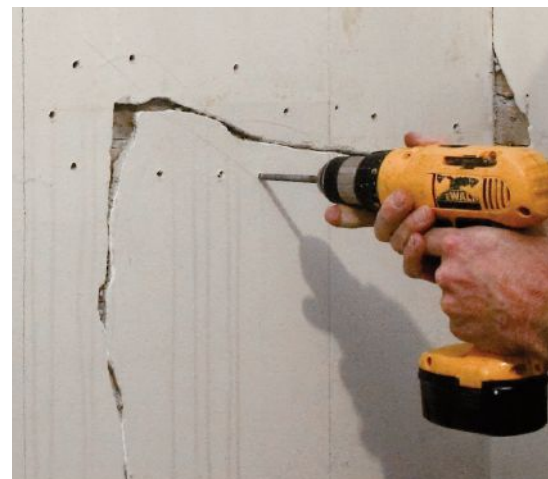
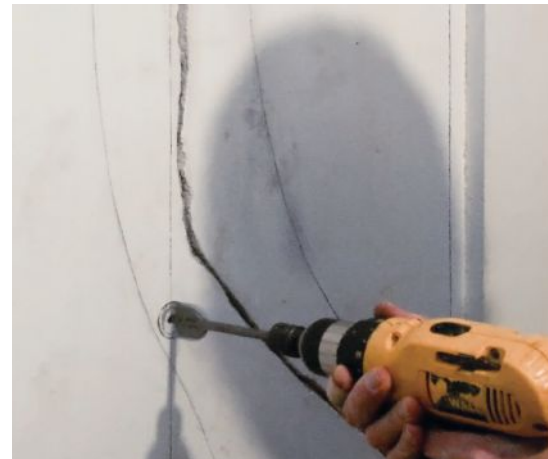
If the plaster surrounding a crack is loose but otherwise intact, it must be reattached to the lath and framing or the repair will be temporary at best. This can be achieved with mechanical fasteners, adhesives, or a combination of both.

**Plaster washers.** When used with drywall screws, these thin, perforated discs (Charles Street Supply Co., 800/382-4360, charlesstreetsupply.com) flatten under pressure, which draws the plaster tight to the substrate without causing new cracks. They're most effective when they can be driven into framing rather than lath alone. I predrill to avoid splitting lath, and because the washers tend to sit slightly proud of the surface, I countersink them (slightly) to avoid having to feather the joint compound to create a flush appearance.

If the wall still feels spongy after the plaster washers have been screwed to the studs, I add a few more, this time fastening to the lath alone. Securing plaster washers to lath can be tricky, because it's easy to split the thin, dry wood, so I again predrill carefully. I also countersink for the washers — but not with a spade bit, which would burrow through the lath and leave nothing for the screw to grab onto. Instead, I use a 1¼-inch carbide hole saw, which can be adjusted so the pilot doesn't bore into the wood.

**Adhesive.** Another option for securing spongy plaster is to use glue. I'm aware of one company that makes a proprietary system for regluing plaster to lath (Big Wally's Plaster Magic, 802/254-1330, plastermagic.com), but I've achieved good results by injecting standard construction adhesive.

This method requires applying pressure to the plaster to hold it tight against the lath while the adhesive cures. Sometimes the plaster washers provide all of the clamping needed. If the screws holding the washers have already been driven, back them out before injecting the adhesive, then tighten them up again. When plaster washers aren't enough, I'll use a sheet of ¾-inch plywood, covered in plastic, as a clamping surface. The plywood can be screwed to the studs or braced with 2x4s.



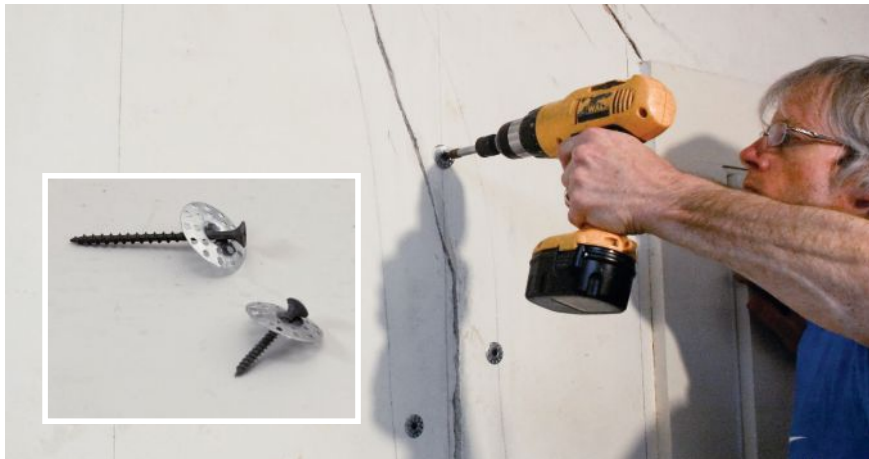
## 2. Filling Cracks in Solid Plaster

If the surface feels solid, the crack can be repaired with joint compound and tape. To fill the crack and set the tape, I use a setting-type joint compound — like Durabond 90 — which sets up hard but dries quickly, so it can be recoated the same day. For succeeding coats, I generally use all-purpose ready-mix joint compound because it's easy to sand smooth. But if I'm pressed for time, I'll mix up a sandable setting-type compound (such as Easy Sand 90), which is harder to polish but sets quickly. For repairs in highly-visible locations, I'll skim-coat the entire wall surface to make sure everything blends.



### FILL AND TAPE

To repair a crack in solid plaster, first mist it with water to prevent the patching compound from drying out too quickly, then fill it with a setting-type joint compound. Cover the filled crack with fiberglass tape and skim it with another layer of compound, then wipe it clean with a drywall knife. Use ready-mix compound for finish coats.



### USE PLASTER WASHERS

After locating solid framing either behind or alongside the path of the crack, drill  $\frac{3}{32}$ -inch pilot holes about 2 inches away from the crack's edges. To countersink for the washers, use an expendable  $\frac{1}{8}$ -inch spade bit to carve a shallow circle into the face of the plaster. It's important to leave the brown coat intact; otherwise the plaster will be too weak to withstand the pressure from the washer. Fastening with  $2\frac{1}{2}$ -inch screws into the studs clamps the plaster under the washers. If the spaces between washers are still spongy, attach the washers to the lath with  $1\frac{1}{4}$ -inch drywall screws.



### INJECT ADHESIVE

Start by drilling a series of  $\frac{1}{4}$ -inch holes every few inches, being careful to drill through the plaster without penetrating the lath. After vacuuming out the dust, squirt a little water into each of the holes, then inject the adhesive until it oozes out around the edges of the tip. Keep a damp rag nearby to wipe up the excess adhesive before it skins over. When plaster washers don't provide enough clamping pressure, fasten plastic-covered  $\frac{3}{4}$ -inch plywood over the glued area until the adhesive has cured.

### 4. Applying a Drywall Patch

Often, water damage or some other localized trauma will render a small section of plaster beyond repair. In these cases, I replace the damaged plaster with a drywall patch. Plaster varies in thickness, so I keep scraps of 1/4-, 3/8-, and 1/2-inch drywall on hand to serve as patches.



#### PRY AND PATCH

To repair a small, severely damaged area, use a flat bar to pry off the loose, crumbling plaster, leaving the lath in place. Square off the edges with a knife and a straightedge, mark the stud locations, and fasten a drywall patch using 2-inch drywall screws. Where edges are fastened to lath alone, use construction adhesive and 1 1/4-inch drywall screws.

### 5. Covering Major Damage

Walls and ceilings that are riddled with cracks are seldom worth patching. But as long as the surface is reasonably flat (no excessive crumbling or sagging), I prefer to cover them — usually with drywall — rather than deal with the mess and expense of demolition.

*Ceilings are easy.* Regardless of the extent of damage, it's generally less work to apply a layer of 1/2-inch drywall than to patch and fill. Even if crown molding is in place, it's often easier to remove and reinstall it than it would be to tape and finish the corners. On most jobs the drywall goes directly over the plaster, but the project shown here was an old house that had never had overhead lighting. Rather than fish the wiring through an insulated attic floor, we decided to add 1-inch furring and run conduit in the space between.

*Walls are more problematic.* Because the drywall butts up against baseboards and casings, it diminishes their profiles and requires flat-taping to cover the joints. When I have to make major plaster repairs in bedrooms and other private spaces where the appearance of skinnier baseboards and casings won't be so noticeable, I use 1/4-inch drywall, remove the trim elements, and rabbet the edges to eliminate the need for tape whenever possible. In public spaces, I try to avoid this practice because it diminishes the rich shadow lines of antique moldings.

### 6. Using Fabric

I don't recommend wallpapering over cracked plaster, because the cracks always show through. But a proprietary system such as Nu-Wal (Specification Chemicals, 800/247-3932, spec-chem.com), which combines a fiberglass mat with an acrylic binder, is almost as easy to apply. This approach has two advantages: The mat is less than 1/16 inch thick, and you don't have to wait for multiple patching coats to dry. The one disadvantage is that significant cracks and bulges must be leveled out with joint compound or they will be noticeable. I like this type of system for closets, where I don't worry too much if the surfaces aren't perfectly smooth, and for prominent locations where I don't want to reduce the molding profiles or gut the wall.

*Contributing editor Tom O'Brien is a restoration carpenter in New Milford, Conn. Photos by Jake O'Brien.*



## LAYER CEILINGS AND WALLS

For most ceilings, drywall can be applied directly over the plaster. On this job, the furring created a space to run conduit for overhead lighting. When covering plaster walls (photos below), use 1/4-inch drywall to minimize the effect on trim profiles. To ensure a permanent bond, use both constructive adhesive and screws to fasten the thinner material.



## REINFORCE WITH FABRIC

The author used the Nu-Wal Plaster Restoration System to quickly stabilize cracked plaster in a closet without increasing the wall thickness. Installation involves applying an acrylic binder, smoothing on a fiberglass mat, and coating it with a top layer of binder. The slightly textured finish surface can be painted or the binder can be tinted beforehand.



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# Drying Wet Framing

In tight houses, make sure the frame is dry before closing up the walls

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by Matt Risinger

**I**n my 20-year career as a builder, I've worked in three different climate zones: Washington, D.C.; Portland, Ore.; and now Austin, Texas. In all places, I built houses that got wet — sometimes soaked — in the framing stage. Time was when we could assume that the frame would dry naturally, even after the walls were closed in. But today we are building tighter houses that are less able to dry once the drywall has been installed.

The worst-case scenario in a wet house with a very slow drying rate is that mold and rot can form on the framing. I once took apart a one-year-old house in Portland that had wood rot damage not from leaks but from wet framing lumber that never dried to the inside or outside. Other

## Drying Wet Framing

Pin-type moisture meters measure resistance from point to point, then translate that into moisture content — the lower the resistance, the higher the MC. The type of material also affects the reading; I like this Extech model MO220 because it can be calibrated for hardwood or softwood and for many different species. Added functionality — like the ability to store data and download it to a computer — can drive the price of a meter up to \$500-plus. The GE Protimeter, the Lignomat, and the Delmhorst are also good meters.



problems — less dire but still troublesome — are nail pops in drywall, cracks in drywall around window heads, squeaks in floors and stairs, interior trim joints that open up, and caulking that pulls and cracks.

Fast construction schedules contribute to these issues big time, because the house framing barely has any time to dry on its own before the next stage of construction begins. Such “short cycle” houses are notorious for having lots of drywall cracks and other cosmetic defects after a year of post-construction heating and cooling by the occupants. These are commonly attributed to “settling,” but in my experience the more likely cause is movement produced by drying of the frame.

Most of the lumber used in my homes is kiln-dried, so it should arrive at the job site with a moisture content (MC) of 12% to 14%. How water is stored in lumber is a complex subject beyond my expertise, but the important thing to remember is that lumber can take on moisture, either while it's being stored or after it's in place in a building's frame. The general consensus among experts is that mold spores are activated and the rot process begins when the MC rises above 19%.

Since we don't typically build houses under a giant tent, we need to take a systematic approach to deciding when things are too wet and — when necessary — implementing a drying process for the framing lumber. What follows is a description of the steps I take to monitor and control the moisture content of the framing before closing up the walls.

### Moisture Meters

The first step is to buy a moisture meter. I like to use pin-type meters to check framing because they're accurate and aren't affected — as pinless meters can be — by the grain, knots, or other defects in wood. (Pinless meters are great for taking a lot of moisture measurements quickly without putting holes in finished materials, but that's not an issue with framing lumber.)



I take a measurement on the plate and in two spots on the stud, one near the plate (left) and one about chest high. It's important to bury the pins in the stud all the way to ensure accurate readings. I use a Sharpie to mark the MC% and date on each stud I test (above). If the stud is in need of drying, I'll mark a subsequent reading that shows a drop in moisture content of 1 or 2 points. I rarely mark more than three readings. Keeping track of how fast the wood is drying helps me estimate when moisture content will be low enough that I can schedule insulation and drywall.

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Joe "The Pro" Sainz  
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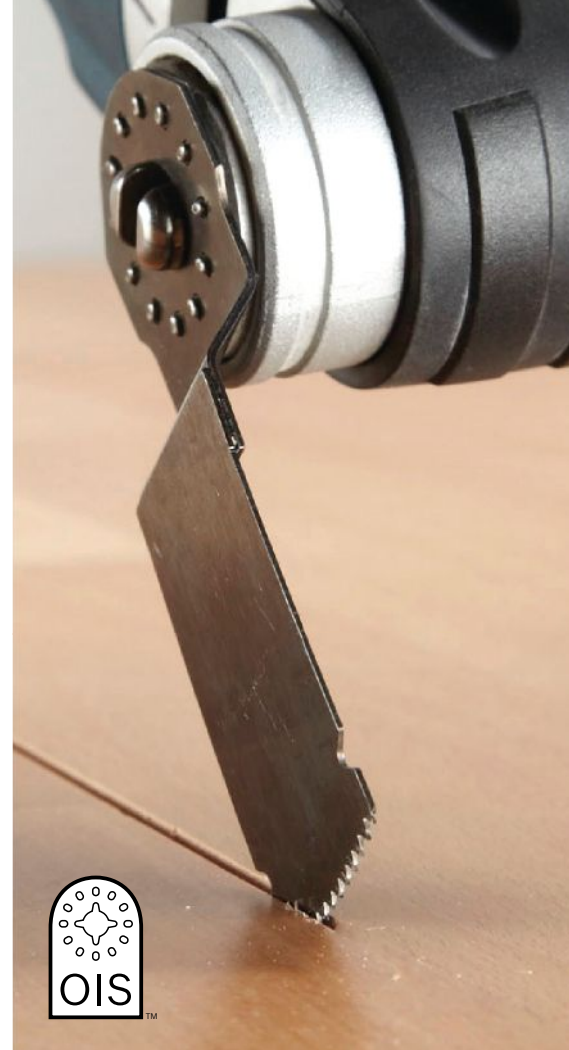
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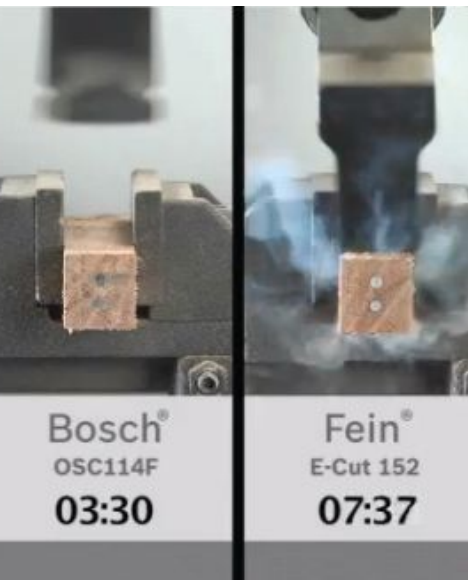


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## Drying Wet Framing

I like my current meter (see photos, page 68) because it's reasonably priced at around \$150, it's small enough to keep in my truck, and it gives digital readouts to 10ths of a percent.

### Mapping Moisture

Once the frame is under cover, I check the moisture content to establish a baseline,

then monitor the wood as it dries. I also delegate this task to my project managers because they are the ones in charge of scheduling insulation and drywall — work that can't start until the building is dry. Ideally, each project manager should own a moisture meter that stays with his truck.

I usually check all areas of framing that

have puddles nearby, then poke every 10th stud about chest high and again at the bottom near the plate. The plates typically have the highest moisture content, both because they soak up water from the subfloor and because moisture tends to gravitate down the vertical studs. I recommend taking and recording readings from the bottom plate every fourth stud.

I use AdvanTech subfloor, an OSB product with a high glue content, so I've never had a water issue with my subfloors. But if you use plywood, sweep the puddles off and map the MC.

You might also want to take some readings on the sheathing if it's been exposed to heavy rain. Also measure king studs, because they'll take the longest to dry and shrink the most.

How often we check MC depends on how wet the house is to begin with. If we're actively drying the house using one of the methods discussed below, we check walls every three or four days to reposition equipment, more often as we get to the desired level (15% at the baseplate, 13% chest-high). If you use a plywood subfloor, check it every day to make sure drying is progressing.

Drying to below MC19% is essential, but my standard is to get all readings down to 15% or lower for kiln-dried lumber, and 17% or less for any green or pressure-treated lumber. The reason is that once a home is occupied and the hvac system has run for a year, the studs will typically reach equilibrium at MC10% to MC12%; if studs lose more than 5 points after drywall is installed, the resulting shrinkage will cause more visible flaws in the finishes.

So what can you do if your framing is soaked? The easiest thing is to just wait. Given enough time (and assuming the framing is under cover), wet lumber will dry naturally. But climate makes a difference in how long you have to wait. If outdoor temps are above 60°F, it may take two to four weeks to get from



The two-speed Quest C1000 (right) uses 2.4/2.8 amps (low/high) to move 2,700 cfm. The Quest A3000 box fan (left) operates in the same range, but its airflow is more diffuse. Because this equipment will get abused in the truck and on the site, I look for a durable molded plastic shell. Good commercial-grade fans start at about \$300, and I own mine because I use them in a variety of situations (such as drying drywall mud). But they can also be rented from many of the national and local rental companies at a cost of about \$10 per day or \$150 per month.



No matter what the temperature is, wood won't dry very fast in high humidity. I check outside humidity mainly to determine if a dehumidifier will be necessary. Here my Extech Humidity/Temperature Pen is reading 78.7°F, but humidity is also high at 75.7%. If humidity stays above 60% for 24 hours, I'll bring in a dehumidifier.

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## Drying Wet Framing



Like all of my dehumidifiers, this Quest PowerDry 4000 has a built-in hygrometer. If I'm in the drying stage I set it to "Always On." If I'm drying joint compound or paint, I set it to 55% RH (the range is 30% to 70%). If I'm keeping a house stable from trim stage onward, I'll set it for around 45% RH.

18% to 14%. But if the weather is cold and rainy, you could be looking at six to 12 weeks. And if the temperature drops below freezing, you will be waiting for a very long time.

Since we build to a schedule, we have three ways of actively drying things out: move the air, dehumidify, and add heat. We use these strategies separately or together, depending on job-site conditions.

### Move the Air

The easiest and cheapest way to dry a house is to use fans to blow air on the wet spots. Kelly Stelk, president of Home Certified, a Portland company that provides drying and temporary heat services, tells me he uses 10 fans for preinsulation drying of a 2,500-square-foot house. We don't use that many, because we don't usually get as soaked and my custom houses have longer schedules. If daytime temps are above 45°F, a fan blowing 24/7 on a wet area of framing will reduce moisture content by 0.3 to 1.0 percentage point per day. That means that by running three or four fans, I can take 5 points off the moisture content of a house in about a week.

I own several conch-shell carpet fans — the type remediation contractors use

to dry wet carpeting — as well as box-type air movers (top photo, page 70). I position a 50-50 mix of both types around the house based on moisture-meter readings. I chain and padlock the fans to the framing and run them 24/7 till the drying is done.

### Dehumidify

Blowing air will work to a certain extent, but controlling humidity is the key to really drying down your framing. Remember that 100% humidity means that the air has reached its maximum capacity to hold water and no drying can occur no matter how much air you move. I also own an Extech Humidity/Temperature Pen (bottom photo, page 70), and anytime I'm drying a house and get an outside humidity reading above 60%, I shift into lock-down mode: I close all the windows and bring in a dehumidifier. Running fans in conjunction with a dehumidifier will bring down your moisture content in roughly a week, assuming it's not too cold.

### Add Heat

Here in Austin, winters aren't cold enough for houses not to dry prior to drywall. If you're building up north, however, where cold temperatures and frozen lumber are the norm, you don't have much choice except to use heat to dry things out. But you can't use just any heat. Although it's common to see propane heaters used on job sites for temporary heat, they aren't good for drying. In fact, a typical propane heater adds one gallon of moisture to the air for every hour of runtime. You also never want to use the client's furnace for heat during construction. This will void the manufacturer's warranty and can wreak havoc on the ductwork.

What you really need is a heater *outside* the house blowing hot, dry air into the building.

**Matt Risinger** owns Risinger Homes in Austin, Texas. This article was adapted from an entry in his weekly blog.



Home Certified of Portland, Ore., provides temporary heat with electric heaters (left), which are typically set up after the shell is enclosed and used until the dust level in the house is low enough to run the home's hvac system (usually about the time carpet is installed). The company also operates diesel-powered, indirect-fired heaters rated for 90,000 Btu (right). These units have external fuel tanks and can run for up to three days on one tank of fuel.

These two photos courtesy Home Certified

# Products



## Adjustable Niche

It takes time to build a truly waterproof tiled shower niche, but using one of Schluter's kits can speed up the job. Made from the company's 1/2-inch-thick Kerdi-Board tile backer, *Prefabricated Shower Niches* have presealed inside corners and 2-inch-wide integrated flanges that sit flush with the surrounding wall. They come in four sizes, from 12 by 6 inches to 12 by 28 inches; the larger models include an optional shelf that can be set to any height before tile is laid. Prices range from \$55 to \$105.

**Schluter-Systems**, 800/472-4588, schluter.com.



## Germ-Fighting Faucets

Moen now offers faucets treated with "Microban antimicrobial protection," which the company says prevents bacterial growth on surfaces. Faucets treated with Microban also feature the company's Spot Resist stainless finish, which is supposed to keep the surface clean-looking by resisting fingerprints and water spots. These finishes are available on the *Ashville* two-handle center-set bathroom faucet (\$100) and the *Walden* single-handle kitchen faucet (\$160).

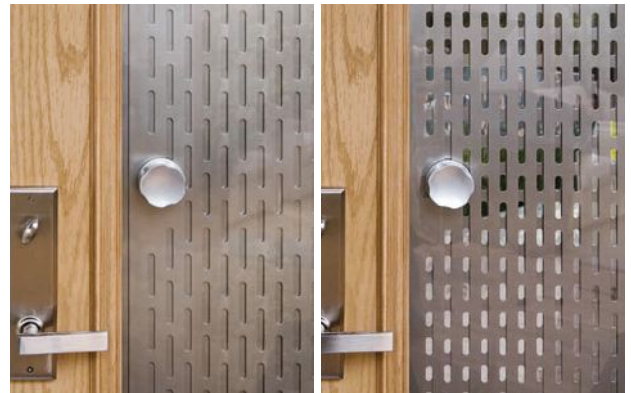
**Moen**, 800/289-6636, moen.com.



## Power Nap

The motorized *Power Screen* is a cool way to extend a home's living area in summer by converting a covered porch or patio into a screened and shaded private space. The system can be installed in existing porch openings or mounted during construction. Widths from 4 to 25 feet and drops from 3 to 20 feet are available. The price to the builder ranges from \$15 to \$30 per square foot, depending on the fabric.

**Trivantage**, 866/888-8120, peopleloveshade.com.



## Light Control

The modernistic *Array* door light system can be retrofitted to any door that will accept a 22-inch by 64-inch glazing panel. It consists of two sliding panels of perforated, powder-coated aluminum placed between panes of tempered low-e glass. A simple interior control knob lets the user adjust light levels by setting the perforations to open, closed, or anywhere in between. Cost for the panel is \$600.

**ODL**, 800/253-3900, odl.com.

# Products



## Easy Chair

The locking heads on *Prolok* rebar and mesh chairs mean that no bar ties are required — the worker just snaps the rebar into place. The high-chair design will accommodate two perpendicular rebars. A Sandplate base is available that adds stability when pouring over a sand base; it won't puncture plastic vapor barriers. Cost ranges from 33 cents to \$1.06 per piece.

**Grip-Rite**, 800/676-7777, grip-rite.com.



## Instant Arbor

Trex *Pergola* kits feature fiberglass columns in round, tapered, and square profiles and a mounting system that secures the columns to the foundation or deck. Horizontal members have an aluminum core with a Trex exterior. The pergolas can be freestanding or attached to a structure, and can be fitted with retractable or fixed canopies. Kits come in nine finishes and cost \$5,000 to \$13,000, with \$8,000 being the average.

**Trex**, 800/289-8739, trex.com.



## Quick Cable

Slender steel cable is currently a hot item for exterior deck rail assemblies, but its minimalist look can also be a great fit for interiors. Feeney's *CableRail* can be used inside or outside the home and includes quick-connect fittings. The cables are made from 316-grade stainless steel and come in precut lengths from 5 to 70 feet. The average length sold is 20 feet, which costs about \$40.

**Feeney Products**, 800/888-2418, feeneyinc.com.



## Attic Ladder

The *Energy Seal Attic Ladder* combines an R-5 insulated, 1-inch-thick door with an integrated weatherstripping system that supposedly reduces air leakage by 60%. Rated for loads up to 375 pounds, the folding aluminum ladder costs \$200.

**Werner**, 888/523-3371, werneratticladders.com.

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# Products

## Central Vac

With the *Intervac*, remodelers can offer their clients an inexpensive alternative to a whole-house vacuum. The machine is installed in a central location and — instead of using wall piping — comes with a 30-foot hose. Measured suction is about the same as with a good upright. The Intervac filters out 99.9% of particles down to .3 micron, including fine dust, allergens, and pet dander. Two models are available: a flush-mount unit that's recessed into the wall surface and hardwired; and a surface-mount model that plugs into a standard 100-volt outlet. Both cost around \$250.

**Intervac Design**, 888/499-1925, [intervacdesign.com](http://intervacdesign.com).



## No-Prime Spackle

*Patch Plus Primer* is both spackle and primer — a handy product for small patching jobs. It uses “engineered nanoparticles” to create a primer-like film on the surface of the repair, so all that’s needed is a finish paint coat. According to the maker it reduces the skill level needed to achieve professional-looking results. It can be used on drywall, plaster, wood, stucco, and concrete, and costs about \$6 for 8 ounces.

**3M**, 888/364-3577, [3mdi.com](http://3mdi.com).

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# Products

## Retrofit Toilet

The new two-piece *Riose* wall-outlet toilet is designed for retrofit jobs where the floor won't accommodate a drain pipe. The gravity-only flushing system uses just 1.28 gallons per flush; clogging problems are addressed with an oversized 3.15-inch trapway and a 3-inch flush valve. The chair-height ADA-compliant bowl is elongated and includes a soft-close seat, and the inside of the bowl has an anti-microbial surface. The toilet costs \$465.



Icera, 855/444-2372, icerausa.com.

## No Sweat

According to Lennox, the advantages of the new XC25 SEER 25 air conditioner go beyond energy efficiency. One of the company's installing dealers told us that because the unit ramps up from just 30% of its full capacity (compared with 60% for the SEER 21 model), it can dehumidify a house without overcooling it during humid but cool evenings and mornings. Lennox has not yet released final pricing, but the cost of replacing an existing 4-ton unit should be around \$11,600 (including labor).



Lennox, 800/953-6669, lennox.com.

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# Toolbits



## 16-Volt Impact Driver

Rockwell's new 1/4-inch 16V *Max-Lithium Impact Driver* is more powerful than 12-volt tools but lighter and more compact than 18- and 20-volt models. Its headstock is 4.9 inches long (as opposed to 6 inches on other leading brands), giving it a slight advantage in tight spaces. The 2.5-pound tool has no-load speeds of 0-2,400 rpm and 0-3,000 bpm and a variable-speed switch; a built-in LED work light doubles as a low-battery-charge indicator. It comes with two 1.3-Ah batteries and a 30-minute charger and costs \$140.

**Rockwell Tools**, 866/514-7625, rockwelltools.com.



## Clean Cutter

We used the Diablo 10-inch 90-tooth *Ultimate Flawless Finish* blade on a job-site table saw to cut 1-inch-thick white oak. Rips took noticeably less effort than with other carbide blades, and cross-cuts were smooth with no splintering. The manufacturer credits the blade's "Axial Shear Face Grind" tooth geometry — which combines alternate top bevels with faces that are angled to slice more cleanly through the wood surface — and thin kerf design. The blade comes in 10- and 12-inch models for \$60 and \$70 respectively.

**Freud**, 800/334-4107, diablo tools.com.



## Glue Gun

The *PAMtite* hot-melt glue gun lays down a bead of thermoplastic adhesive with a one-minute open time that sets five minutes after application. It's being marketed as an alternative to cartridge applied adhesives, some of which can take hours to set. The glue can be used on nearly any material — the company claims it's strong enough for carpet tack strips — but is especially popular for molding work where the installer doesn't want to have to fill nail holes. Pricing for the gun starts at \$100; a pound of glue (about 18 sticks) costs \$13.

**PAM Fastening Technology**, 800/699-2674, pamhotmelt.com.



## Compatible Vac

Although the *Hammervac Universal Dust Extractor* is part of Milwaukee's M12 line of tools, the company says it's designed to fit most major brands of SDS-plus rotary hammers and AC/DC hammer drills. To achieve compatibility, it comes with three sizes of side-handle collars. Its replaceable filter is HEPA-certified and will remove 99.97% of particles greater than 0.3 micron. The tool has a three-position switch (on, off, and auto-on, which turns it on and off with the drill) and costs \$200.

**Milwaukee Electric Tool Corp.**, 800/729-3878, milwaukeetool.com.

# Toolbits



## Versatile Storage

You could offer *ProSlat* wall storage as part of a garage upgrade or use it yourself in the shop. The installed product looks something like a retail slat wall, but the panels are made from 2-mm-thick recycled plastic with a weight capacity of 75 pounds per linear foot. According to the maker, the panels' tested impact resistance is 25 times greater than that of drywall. They're screwed to wall studs and can cover entire walls or just a section. They cost \$3 to \$4 per square foot.

**Pro Slat**, 888/691-2944, [proslat.com](http://proslat.com).



## Not Just for Drywall

The *Jab Saw* comes with a bi-metal plunge tip for drywall, but it has many other uses as well. The blade can be removed and replaced with any hacksaw or reciprocating-saw blade — including wood, metal, and specialty blades — which means the saw can handle a variety of materials, from metal to PVC. It costs about \$15.

**Ideal Industries**, 800/947-3614, [idealindustries.com](http://idealindustries.com).



## Cellular Sentinel

The *GSM Cable Lock* can be used to guard table saws and other stationary tools left on the job site. It has a rugged plastic body and a steel cable; if an unauthorized person cuts or removes the cable, the alarm sends a text message to as many as four cell phones. The lock costs \$200 with a 10-foot cable, \$220 with a 20-foot cable. It works with an AT&T or T-Mobile network for a monthly charge of about \$10.

**Nu-Set**, 800/606-8738, [nuset.com](http://nuset.com).



## Bug Resistant

The company that licenses insect-repellent technology to 30 different outdoor clothing brands has launched its own line of clothing — including socks, pants, shirts, and hats — called *Insect Repellent Work Wear*. According to the company, workers fully clad in its products will be protected against everything from ticks to flies and mosquitoes “unless they’re someplace really bug-infested like the Everglades,” in which case a bit of DEET on the face may be in order. Tee shirts range in price from \$16 to \$24, and cargo pants cost about \$60.

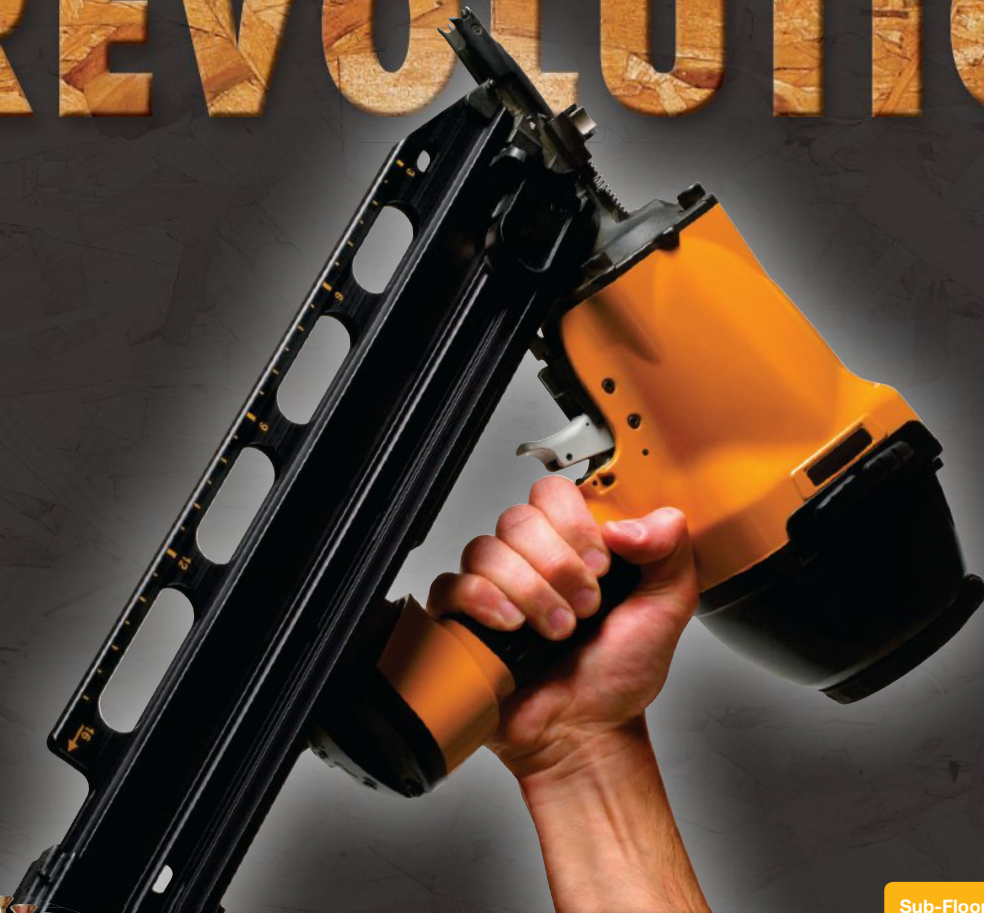
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# Backfill

## The Fine Art of Floor Planing

**F**ishermen hauling nets get a lot of attention from painters. So do farmers and cowboys. Residential builders and remodelers? Not so much. But there's one noteworthy exception: a large canvas by French Impressionist Gustave Caillebotte called "Les Raboteurs de Parquet" ("the floor planers"), depicting three tradesmen hard at work on a hot day, long before the appearance of drum sanders, power planes, and electric fans.

The floorboards have cupped, and the worker on the right in the painting (below) is using a *rabot* — a heavy scraper plane — to knock down the raised edges, while the central figure uses a *racloir*, or metal hand scraper, to flatten them, leaving an expanse of smooth, raw wood. The third worker, on the left, is reaching for a file to freshen up the hooked edge of his own scraper, which he holds loosely in his left hand. A bottle of red wine stands in the right foreground, from which the hardworking

raboteurs evidently refresh themselves as necessary. Piles of curled shavings on the floor echo the ornamental iron grillwork in the window that lets in the light.

Caillebotte's portrayal of ordinary workers was widely criticized as vulgar and overly realistic when the painting was first exhibited in 1876. Even the workers themselves came in for some abuse. "The arms of the planers are too thin, and their chests too narrow," one observer complained. (Art historian Parme Giuntini notes the subjects' shirtlessness was the painter's way of "heroicizing" them; in reality, Parisian tradesmen of the time would never have stripped down while at work.)

But quality work shines through in the end. "Les Raboteurs de Parquet" is now recognized as a minor masterpiece — and so, in its way, is the flooring job it framed. They may have had skinny arms, but those guys knew what they were doing. — *Jon Vara*



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