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On the cover: GO-Logic's Steve Morin (green hat) and John White position a SIP on a unit under construction in the Belfast Cohousing & Ecovillage in Maine. Photo by Ted Cushman.

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THE JOURNAL OF LIGHT CONSTRUCTION (ISSN 1056-828X), Volume 32, Number 3, is published monthly by Hanley Wood, LLC, One Thomas Circle, NW, Suite 600, Washington, DC 20005. Annual subscription rate for qualified readers in the construction trades: $39.95; nonqualified annual subscription rate: $59.95. Publisher reserves the right to determine recipient qualification. Canada Post Registration #40612608/G.S.T. number: R-120931738. Canadian return address: Pitney Bowes Inc., PO Box 25542, London, ON N6C 6B2. Periodicals postage paid at Washington, DC, and at additional mailing offices. POSTMASTER: Send address changes to The Journal of Light Construction, PO Box 5853, Harlan, IA 51593-1353.

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"Strong, Safe Decks," by *JLC* Staff with Michael Chotiner (Sep/13)

I appreciate the Best Practices Decks guide in the September issue. [But] one detail needs some qualifications—and a slap on the wrist for the cover photo.

The cover photo drives me crazy! I've spent the past eight years doing presentations at the JLC Live and Deck Expos circling back to the groundbreaking article in *JLC* by Virginia Tech professors on guardrail post connections. One of the many points made in the article is "don't notch 4x4 guardrail posts." Another is that screw attachments won't secure posts adequately to meet codes. What's on the cover? Someone preparing to mount a notched guardrail post with screws. Perhaps art trumps best practices for cover shots. It is a good image aside from the poor practices illustrated.

The illustration on page 39 showing a post bearing on the foundation footing may not be best practice. I used to use this detail until I got spanked by an engineer. Unless the footing is designed for the deck posts, there may be issues with concentrated loads and off-center bearing on the edge of the footing.
—Mike Guertin, East Greenwich, R.I.

JLC *Editors respond:* Art does not trump best practice at *JLC*, but sometimes we miss what is right in front of us. You are right (as are others who commented online) about the less-than-best practice depicted in that image. We missed it and we apologize for not getting it right. Fortunately, as you also point out, the railing details in the article itself are correct.

Regarding the illustration on page 39, while it is best to excavate and reinforce the existing footing under the deck posts, in most cases it would not be required unless the potential for increased future loads is high (adding a hot tub, for example). If the through bolts remain tight (they can loosen as the posts dry out), the wall picks up some of the load; and assuming the wall is reinforced, the small lateral load is negligible. Unless the load on the deck is very high, the capacity of the footing and soil should be adequate to resist shear and carry the point load (see "Footing Fundamentals," Oct/00).

"Q&A," Simple vs. Continuous Joists, (Oct/13)

Congratulations on an excellent magazine. I have read *JLC* for many years (back to newspaper format) and enjoy the sharing of experience and expertise.

Mr. Mark McKenzie's response to a recent question regarding simple vs. continuous span joists provided plenty of good information. However, it should be noted that the bending forces are not reduced. It is fairly common to confuse strength with stiffness. Although using continuous joists does reduce the deflection and will make the floor feel more stiff, the maximum bending force is the same. For a simple span, this force—which wants to break the board—occurs at the middle, whereas for a continuous span, it occurs over the center steel beam—but in both cases it is the same ($M = WL^2 \div 8$).

Interestingly, it changes from a "positive to negative moment," but that is a different conversation. We could also discuss wood grading rules, whereby the board can vary in the middle vs. the ends, but "I-joists" are not affected by this. *—Ralph Schmidt, SE, PE, Wauconda, Ill.*

Mark McKenzie responds: Mr. Schmidt is correct. If the two spans are exactly equal on either side of the support (say 14 feet), the maximum moments are the same. However, if the spans are unequal (say 12 feet and 14 feet), then the maximum moment in the continuous span is reduced compared with the maximum in the two simple spans.

"Stick-on stone worse than EIFS?" by Clayton DeKorne (posted Sept. 26, 2013)

JLC Online comment: Some of the most popular lick-'em/stick-'em stone designs ("ledge stone," for instance) promote capture and hold of water. They have all kinds of protruding horizontal surfaces that won't drain or dry, and they're not grouted in any way. So water (or snow) sits on them and eventually soaks in (or freezes). Around here [Pennsylvania], I've seen problems with freeze-thaw spalling the surface off of the "rocks," which exposes an even more porous surface, etc., more porous surface, etc. Early failure guaranteed. *—jstoddard*

Online response to comment: Joe, you are correct. The dry stack, albeit cool looking, will allow more moisture to collect in the assembly and enter the scratch coat. This will in turn allow additional exposure and collection. In an environment that does not experience freeze-thaw it may not be such an issue, but in our area [Iowa] it can make a world of difference. *—Mark Parlee*

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Q Most of the homes I work on are slab on grade. Occasionally I need to break a large hole in the slab for a drain or to repair a hole where some penetration such as a drain has been removed. What is the best way to repair a hole in a concrete slab before tiling over?

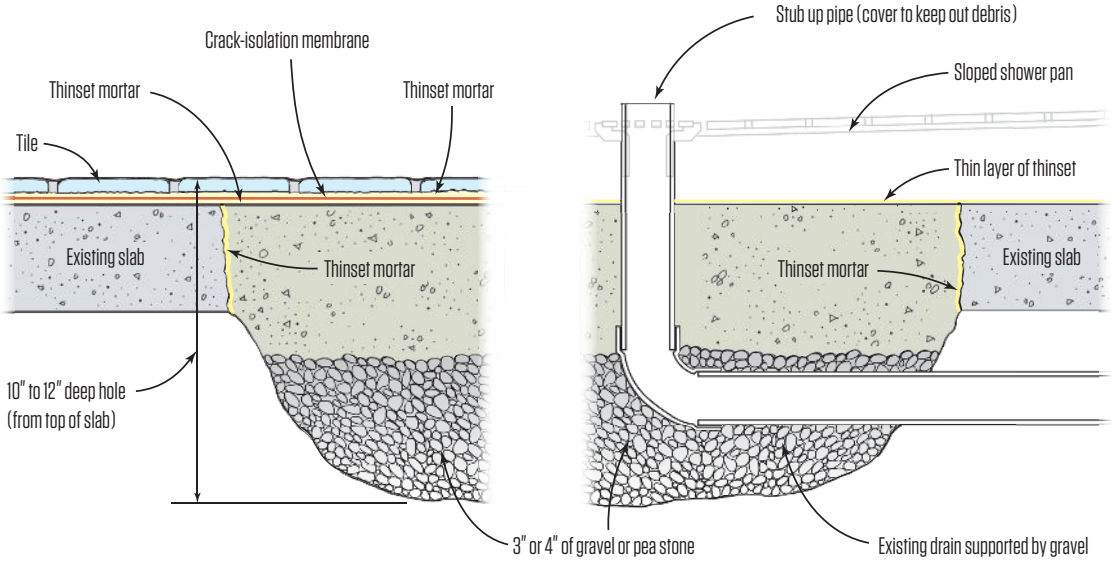
A Michael Byrne, a veteran tile installer and consultant, and the moderator of *JLC*'s Ceramic Tile forum, replies:

With a hole in the slab like you describe, you have one of two conditions: The hole is to be covered up by something (such as a shower pan), or it will be covered directly with floor tile. Either way, dig the hole down, removing soil to a depth of 10 to 12 inches from the top of the slab. Then add back 3 or 4 inches of gravel or pea stone so that the hole is around 6 inches deep from the top of the slab to the top of the gravel. If you have excavated under a drain in the hole, be sure that the gravel fills the space below the drain and supports the drain completely.

If the hole you're repairing is around a drain, be sure that the pipe is high enough to clear the top of the slab. If not, add a stub and then cover the pipe to keep out debris. Prepare the hole by scrubbing away any soil from the concrete along the inside of the hole, then rinse with clean water. When the rinse water has drained away from the concrete, but the concrete is still damp, spread a thin layer of thinset mortar over the concrete. Pour in the fresh concrete immediately to fill the hole, and let that cure. The thinset has better adhesive quality than regular concrete and that thin layer helps the new concrete knit with the existing slab.

If the hole you repaired is in the middle of a floor that you are tiling over, install a crack-isolation membrane over the entire floor before putting down the tile. If the area around the repaired hole is part of the footprint of a shower stall, wait until after the shower walls are framed. Then clean the concrete in the shower area with a sponge

Slab Repair Before Tiling



and clean water. While the concrete is still damp, spread a thin layer of thinset mortar over it, and immediately float the mud layer for the shower floor, sloped ¼ inch per foot toward the drain. Again, the layer of thinset helps adhere the mud layer to the concrete slab. When the mud layer cures, install the shower pan, water test it, and you're ready to tile.

Q If I'm building in a heating climate on frost walls, with an uninsulated crawlspace and a dirt floor, how deep do I need to place my footings for the posts supporting the center beam?

A Steve Baczek, a residential architect from Reading, Mass., who specializes in building science, replies: Typically the footings for the center support posts are placed at an elevation similar to that of the perimeter frost-wall footings. But this placement is not necessarily because of frost protection; rather, it's done because the hole for the crawlspace is usually excavated to that depth. If the depth of the frost-wall footings meets the code requirements for frost protection (Section R403.1.4.1 in the IRC), then the footings for the support posts at the center of the crawlspace—being at the same elevation—will meet those requirements by default. Even when the foundation walls are trenched and the crawlspace floor is not excavated to the same depth as the footings, most building officials are likely to require the footings for center supports to be at frost depth as well.

With a vented crawlspace, there is a chance that the crawlspace air could get very cold. But the risk of the ground freezing in the center of the crawlspace is still minimal. In most cases heat loss from the floor above would keep the crawlspace temperature above freezing. Only if you went to great lengths to air seal and insulate the framed floor above—without insulating the crawlspace—would the air in the crawlspace be completely unconditioned and the risk of freezing increase. But insulating a floor, with all the pipes, wiring, and penetrations, is very difficult to do well. It is much easier, and uses less material, to create a sealed crawlspace by insulating the foundation walls and air sealing, so the entire crawlspace is brought inside the conditioned volume of the house. This is the strategy I recommend for most crawlspaces. It also requires covering the dirt floor, and of course, closing any crawlspace vents. By conditioning the air in a crawlspace—whether the heat source is the house above or the ambient temperature of the earth below—the floor of the crawlspace should not be at risk of freezing, and the soil supporting the footings in the center of the crawlspace (at any depth) should not be in danger of freezing.

Regardless of the climate you build in, you should never leave the dirt floor of a crawlspace open and uncovered. At a minimum the dirt floor should be covered with a 6- to 10-mil polyethylene sheeting ballasted in place with stone or covered with a 2-inch to 3-inch concrete "rat" slab.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BY TIM UHLER

Working With Large Beams

On nearly every house we frame, we install glulam or other engineered beams. Most of the designs include large open areas and vaulted ceilings, which require reaching over distances and lifting some monster beams to great heights. But what used to take us an entire afternoon to lift now takes minutes with good planning and the right equipment.

CUTTING LARGE BEAMS

Most of the time, we use a Big Foot (bigfootsaws.com) 10¼-inch saw to cut beams **(1)**. Every framing crew needs at least one of these saws. We have a 14-inch Big Foot Big Boy, too, but we prefer to use it only for exposed beams, where we don't want saw marks on the cut end. We also keep a chain saw in the truck and use that to cut beams whose ends won't be exposed **(2)**. To keep the cuts straight, we may use the Big Foot to define the cutlines and then finish them off with the chain saw.

HANDLING LARGE BEAMS

It's not unusual for us to have to deal with 18- or 24-inch-deep glulam beams. These are often too heavy for my crew (typically just two guys) to lift, much less flip over and cut to length.

Use a machine. We have had a forklift on site since 2002 to do our heavy lifting. While it can be a point of pride to manhandle a beam into place, it isn't safe and it isn't very smart or efficient.

Our first forklift was a later '70s model that we bought for $7,500, and it had nothing but mechanical problems. It was clear right away how much labor and time a better one could save, so a year later (2003) we took advantage of an economic stimulus plan to buy an Ingersoll Rand


3


4

VR90B (ingersollrandproducts.com). This machine has required only routine maintenance. In 2005, we bought an Ingersoll Rand VR1056, which gives us a 56-foot reach straight up. We were fortunate to be busy enough over the next three years to pay it off.

Planning. We order all of the engineered beams at once and have them bundled together apart from the rest of the lumber package. This makes them easy to store on site and simplifies moving them. I don't like to manually pull or lift a beam unless there is no other option. Instead, we'll use the forklift to pick up one end of the beam, set stickers, and lower it back down. This gives us the clearance we need to pick the beam up from the center for final placement.

Cutting. We often use the forks to tip a beam on edge (crown up or "top" stamp up), then pick it up and hold it on the forks at about knee or hip height so we can cut both sides while the beam is in a vertical position. That way, when the thickness of the beam exceeds the capacity of our saw, we don't have to flip it to cut from the other side. It also eliminates any stresses that might bind the blade.

Lifting and setting. To lift a beam into place, we use two basic approaches. The first is the easier method and works well if we can get direct access to the beam's final location. We just center the beam on the forks and lift it into place on support columns or walls **(3)**. We do this for most garage beams and for some beams that sit on top of first-floor walls.

A variation of this technique is to attach the support columns and hardware to the beam while it's on the ground, then lift the whole assembly into place **(4)**. Often this is the safest, most efficient way of handling the beam. We can work faster on the ground, and when we set the beam, we only need to plumb and brace it—no drilling or fastening hardware up high.

Rigging. The second approach is to strap the beam with rigging straps **(5)**. This takes a little longer but gives the guys on ladders or scaffolding more maneuverability to guide the beam into a pocket. We have an assortment of rigging straps that are rated

5

6

7

for far more weight than we'll ever lift. To locate choke points for the straps, we typically split a beam into thirds. The strap angle off the beam should be 60 degrees or greater. (Note: Some states may have specific rules about who can rig.)

We often have to drive with the boom in the air, which can cause large beams to swing all over the place. This can be very dangerous, but we have never had an accident, because we take our time and always use at least one tag line so that the beam doesn't swing out of control.

Hand signals. There are standard hand signals for signaling a crane or forklift operator. We've modified them so that they make sense to us, and we train anyone new on our sites to use our version. It's important that everyone on the crew uses exactly the same signal style and that the operator stays focused on the framer who's doing the signaling **(6)**. We learn to watch the hand signals, but the driver also takes note of the signaler's facial expressions and body language.

Lifting without a machine. Sometimes we have to set a beam where we can't use a forklift. This comes up more often in remodeling situations, but on one new house, the owner didn't decide until after the trusses were set and the roof was dried-in that he wanted exposed interior beams. To give him the look he wanted, we had to set a 42-foot-long, 5 ½-by-12-inch glulam. It needed to go up 14 feet in the air—and we had just three guys on the crew.

We had the lumber company drop the material as close to a window as possible. From there we were able to slide the beam onto a section of rolling scaffolding. We simply wheeled the beam into place, then used two wall jacks to lift it up **(7)**, bracing the jacks to keep them straight.

Whenever we work with large, heavy materials, we take the time to come up with a plan. We don't want to cut a beam incorrectly or have anyone get hurt. With good planning and equipment, big beams don't slow us down.

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

A Safe Push Stick in 60 Seconds

BY CARL HAGSTROM

When it comes to table-saw safety, there is no substitute for a good riving knife or blade guard—period. But the unfortunate truth is that jobsite table saws with this equipment are rare birds. A close second in table-saw safety equipment is a good push stick. (And no, a chunk of 1x3 with a V-cut in the end does not qualify). Here's how to make a push stick in less time than it will take you to read this article.

You're on the jobsite and just broke out your portable table saw to make a couple of rips when you realize that you left your push stick back at the shop. The temptation is to make the rips bare-handed—after all, by the time you set up to make a push stick, you'd be done, right? You might reconsider, though, if you knew you could make a push stick in less than 60 seconds using just a chop saw. In fact, I'll show you how to make two push sticks in that time.

For material, I use a scrap of 1-by or ¾-inch plywood a couple of feet long and narrow enough so that I can cut it standing up in the chop saw (most larger chop saws can handle a 1x6 on edge). Then I follow these steps.

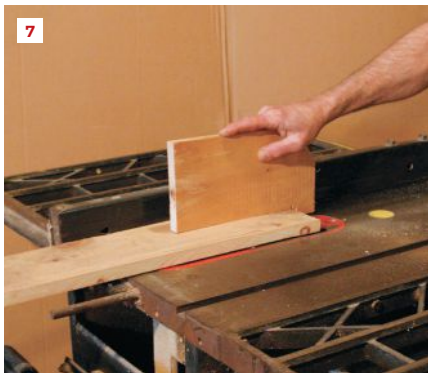
First, I square both ends of my scrap, then place the narrow end against the fence and plunge the blade into the board for a rip that takes off a strip ½ inch to ⅝ inch wide. (The 2-foot length of the board allows me to hold the board a safe distance from the blade). I lower the head of the saw until it bottoms out, which determines the length of the rip. If your saw has a fine-cut trim blade, slowly "bounce" the blade in and out of the rip so that the blade doesn't overheat **(1)**.

Flip the board over and lower the blade into the same kerf to finish the rip from the other side so that the length of the rip is equal on both sides of the board. Reverse the board and make the same plunge cuts for a rip on the other end **(2)**.

Next, I stand the piece on edge and cut off the strip I just ripped at the point where you can't see daylight through the kerf. (Do the same at both ends of the board) **(3)**.

Now I cut the push stick to length, slicing through at least 2 inches from the cut I just made to leave a 2- to 3-inch heel **(4)**.

Photos: Brett Hagstrom



Finally, I chamfer the corner of the push stick above the heel where my hand will rest. One 45-degree cut will work, but I like to nibble at it with a few more cuts to round off the corner for a smoother, more comfortable grip **(5, 6)**.

In 60 seconds I've made two push sticks and still have time for a sip of coffee. When you push stock through the saw with this push stick, your hand is pushing parallel to the saw table in a stable, controlled fashion rather than in a straight line toward the blade **(7)**.

A couple of additional notes: If I'm ripping material thinner than ¾ inch, I cut down the heel so that it doesn't quite contact the bed of the table saw when the push stick is placed on the material being ripped. If you feel safer with a handle grip, you can take an additional minute and cut out a hand hole with a jig saw **(8)**. The hand hole also gives you a convenient way to hang the push stick on the fence of the table saw to keep it handy.

So take that one minute—it could mean still being able to count to five on one hand.

JLC contributing editor Carl Hagstrom runs the professional woodworker site WoodWeb.com.

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BY GEORGE WEISSGERBER

Unit Prices for Labor

In my previous column (Oct/13), I began a discussion about how I create a "unit" for a unit price estimate. I used framing 20 linear feet of a typical 8-foot-high exterior wall as an example and described how to do the materials take-off using a sketch.

Labor is more difficult to estimate. The time it takes to do a task is subject to a multitude of issues that have had estimators pulling out their hair for decades. While there is no "silver bullet" formula for estimating labor that will work for everybody, there are some procedures that I am fairly sure will not work for anybody. The most common is the "guesstimate." This seat-of-the-pants method depends solely on the experience and ability of the estimator. It may work for an individual estimating his own labor on a limited number of projects, but beyond that, this method is the most risky and least accurate.

Other contractors rely on books or websites that publish labor rates for construction tasks. Some specify costs; others provide man-hours to which contractors apply their own labor rates. Similarly, estimating software often comes with cost databases that include labor rates. These resources can be reasonably accurate, as long as you adjust for geographic variations and understand the assumptions they make about working conditions, crew size and ability, and other factors.

The best way to get labor numbers that truly reflect your operation is to keep good job-cost histories and feed that data back into your estimating system (see "Using a Simple Timecard to Collect Labor History," Jun/13). If you haven't yet implemented that system, you can jump start it by choosing a single task, like wall framing, and keeping close track of man hours used over the course of several similar jobs. Then use that data to calculate average labor hours required for the task based on the actual abilities of your crews and the actual conditions on your jobsites.

Labor Hours per Material Unit

Work Type	Description	Hours	Unit
Wall framing	2 x 4 studs at 16" o.c. & plates	.02	Hrs/BF
Headers	Dbl 2 x 8	.02	Hrs/BF
Wall sheathing	4 x 8 x 7/16	.014	Hrs/SF

To use your own data to find hrs/BF or hrs/SF, divide average hours used for each framing task by total SF or BF of materials used. (BF = thickness x width [in inches] x length [in feet] ÷ 12). This table shows figures for tasks associated with framing and sheathing a typical exterior wall.

Total Hours for 20-Foot Wall

Component	LF or SF	Dimension		Total	Units	Hrs/Unit	Subtotal
Studs/Plates	288	2	4	192	BF	.02	3.84
Headers	21	2	8	28	BF	.02	.56
Sheathing	20	–	8	160	SF	.014	2.24
						Total Hours	6.64

This table shows how total labor hours are calculated for a typical 20-foot-long exterior wall by multiplying hrs/BF or hrs/SF by total material quantities for each of three framing components.

BOARD-FOOT METHOD

Whether you use published cost data or your own records, here's a method that applies a unit of time to the material quantities used—the table (top left) shows how it applies to our 20-foot wall example. Published cost data usually provides labor in terms of hours per board-foot (hrs/BF) and hours per square-foot (hrs/SF). To convert your own labor data to these units, add together all of the framing labor on all of the jobs for which you've been keeping records—the more data, the better—then divide the total by board feet of lumber and square feet of sheathing used on all of those jobs. This will give you hrs/BF or hrs/SF to plug into the "Hours" column.

The bottom table shows how to find total labor to frame our 20-foot wall by multiplying BF and SF of material times hrs/BF and hrs/SF. Board feet equals thickness x width (in inches) x length (in feet) ÷ by 12. (For example, an 8-foot 2x4 contains 5.33 BF — (2x4x8) ÷ 12). "Total Hours" (6.64) would be plugged into the labor section of the "Item or Task Worksheet" (Aug/13) and multiplied by the hourly crew cost to arrive at the cost of framing labor.

Next time, I will show how to compile all we have discussed into a complete estimate using "assemblies."

George Weissgerber, a senior vice president at Case Design/Remodeling, in Bethesda, Md., developed the company's estimating system and handyman division.

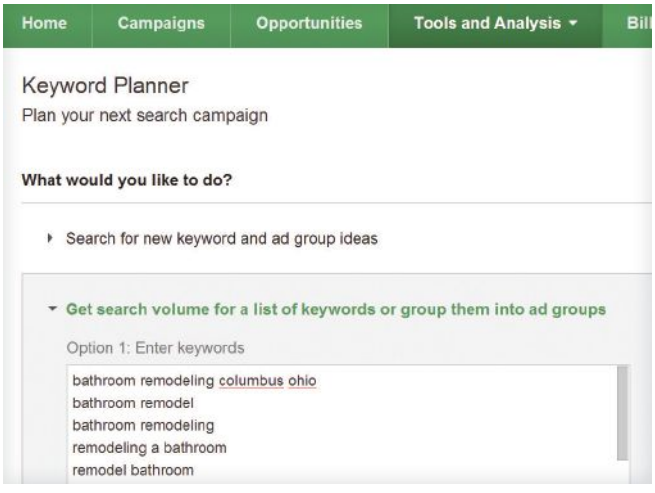
Finding Strong Keywords

BY APRIL WILSON

Search engine optimization (SEO) used to focus on computer codes with names like "meta tags," "meta keywords," and "meta descriptions" that lived behind the scenes on your website. It was considered best practice to repeat about 20 of the same keywords over and over to "convince" the search engines that your website should be on the first page of search results for those keywords.

In the new search landscape, however, the old "meta" strategy can actually penalize your website. So what do you need to know to make sure your site is ready for the new rules?

1



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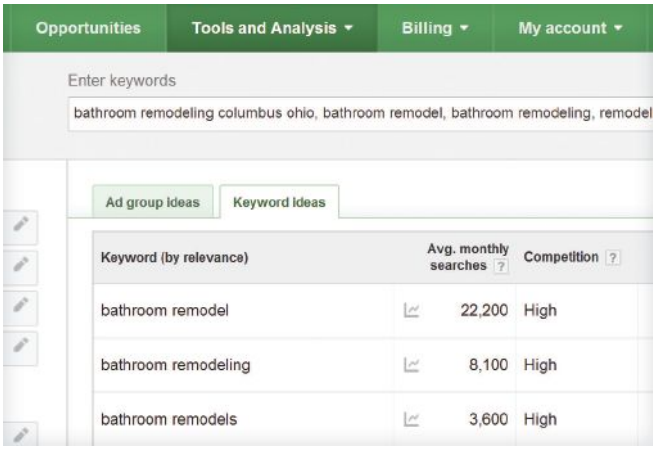

CHOOSING THE RIGHT KEYWORDS

Today, SEO is all about subject matter expertise. Your first step should be to audit the keywords you have competed on in the past; if you have a long list, you need to pare it down to no more than three or four subject terms.

For example, your list might look like this (if you own a remodeling company in Columbus, Ohio):

bathroom remodeling columbus ohio
bathroom remodel
bathroom remodeling
remodeling a bathroom
remodel bathroom
bathroom remodeling cincinnati
remodeling bathroom
bathroom remodels
how to remodel a bathroom
bathroom remodel columbus ohio
bathroom remodeling companies
bathroom remodeling columbus
bathroom remodel pictures
cincinnati bathroom remodeling
bathroom remodelers
columbus bathroom remodeling

Fortunately, the Google AdWords Keyword Planner provides tools to help you sift through your list and choose the best four terms. Go to the Keyword Planner home screen, choose Tools and Analysis, select "Get search volume for a list of keywords ..." and, under "Option 1: Enter Keywords," paste in the list **(1)**.

(You will need to be signed in to access Keyword Planner, and if you don't already have a Google AdWords account, you will need to create one before you can use the tool. The account is free unless you are running an AdWords campaign, so just skip the section of account set-up that asks you to enter financial or billing information. If you already have an AdWords account, you won't be charged for any of the research unless you choose to buy a keyword.)

When you click the blue Get Search Volume button at the bottom of the screen, you'll get a list of results. By default, Google puts these into "Ad group ideas"; instead, click on the tab labeled "Keyword ideas" to get the full list **(2)**. The trick is to figure out which keywords are high in search volume and low in competition. Keep in mind: There is no "right" answer, and it

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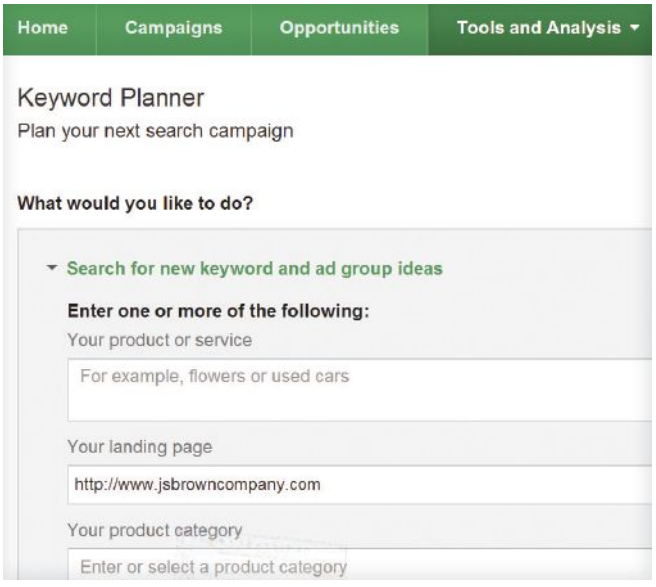

may take some trial and error. The important thing is to choose three or four terms that focus on your main product, optimize for your local audience by focusing on your location, and get more traffic for your website.

FINDING THE RIGHT KEYWORDS

If you don't have a list of keywords, or if you do but aren't sure which ones best describe your business, you can use this same tool to find relevant keywords. Open Tools and Analysis again from the main menu, but this time select "Search for new keyword and ad group ideas." Instead of cutting and pasting a list of terms, put your website address into the box labeled "Your landing page" **(3)**.

When you click the blue Get Ideas button at the bottom of the screen, Google will display a list of relevant keywords it has detected on your website. Use this list to repeat the process of analyzing search volume and competition to identify the three or four terms that best describe the main focus of your business.

USING KEYWORDS ON YOUR WEBSITE

Once you have your short list of key terms, take a critical look at the text on your website. Look for redundancy on each page. For any term used more than twice, delete all additional instances. Make sure every page of your website mentions at least one of the three or four keywords you have chosen **(4)**.

You want your writing to sound natural—you don't want to sound like a robot or machine by repeating the same terms over and over. If it doesn't make sense to you when you read it out loud, you shouldn't have it in your website copy.

Once you've found the right keywords and have eliminated any text currently on your website that doesn't focus on those subjects, the next step is to restructure the content in your navigation to reflect these changes. Having valuable content is a critical component of Google's next update, called Hummingbird. We will cover that in the next article.

April Wilson is CEO and president of Digital Analytics 101, an online marketing company. digitalanalytics101.com

4

Current Text	SEO-Optimized Text
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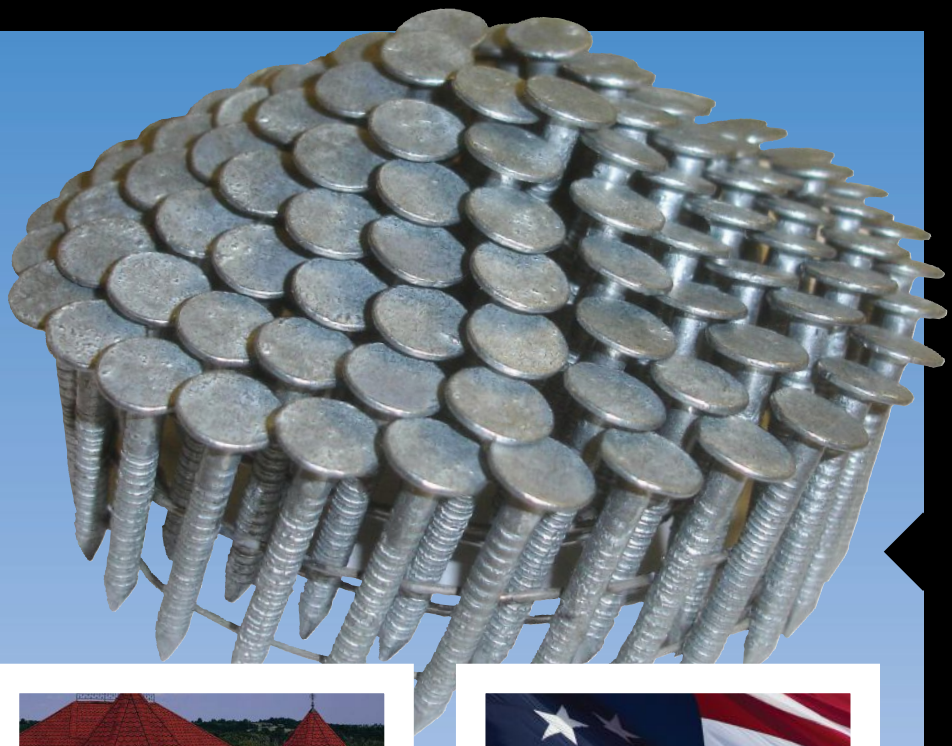

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Building Above-Code Walls

Four design/build teams solve the puzzle of high-performance wall construction—in four different ways

BY TED CUSHMAN

Building an insulated wall to meet code is a no-brainer; the code book will tell you what to do. But if you're trying to surpass code and build, say, a Passive House or a zero-energy home, there's no simple road map.

In the next eight pages, *JLC* brings you four real-world examples of high-performance wall systems, each designed and built by a different team, but all tailored to roughly the same New England climate. We asked each team to draw and describe its wall system's construction details, including the tie-in to the roof and foundation, and to explain how its system handles heat conduction, air infiltration, and moisture control.

Each wall beats code, and each has its pros and cons. All four of the building/design teams are learning as they go, and these examples are at various points in a process of constant improvement in materials and methods.

For reasons of space, we've left out an important topic: detailing the window and door openings. Look for more about that at jlconline.com in the weeks and months ahead.

BELFAST, MAINE, COHOUSING UNITS

Designed and built by Matthew O'Malia and Alan Gibson, GO Logic

Our wall system forms part of a set of two-family and three-family designs that we developed for a 36-unit multifamily cohousing project in Belfast, Maine. The design is guided by the Passive House building standard, and the finished buildings meet the criteria for Passive House certification. (However, it's up to the individual homeowners to apply for formal Passive House status, and so far none of the homes are officially certified.)

The wall system consists of an inner stick-framed 2x4 stud wall, insulated to R-13 with dense-packed blown cellulose **(A)**. Outboard of this wall, we apply 8¼-inch-thick, R-32 SIPs (structural insulated panels) supplied by R-Control (r-control.com). The entire wall system, including drywall and wood shingle siding, has an R-value of 46 (13+32+.45+.5).

The wall system is airtight at the exterior skin of the SIPs, where we seal the joints with tape. However, we also establish an airtight vapor-control boundary at the inboard face of the SIPs to prevent interior moisture from penetrating the panel joints and condensing near the cold exterior in winter.

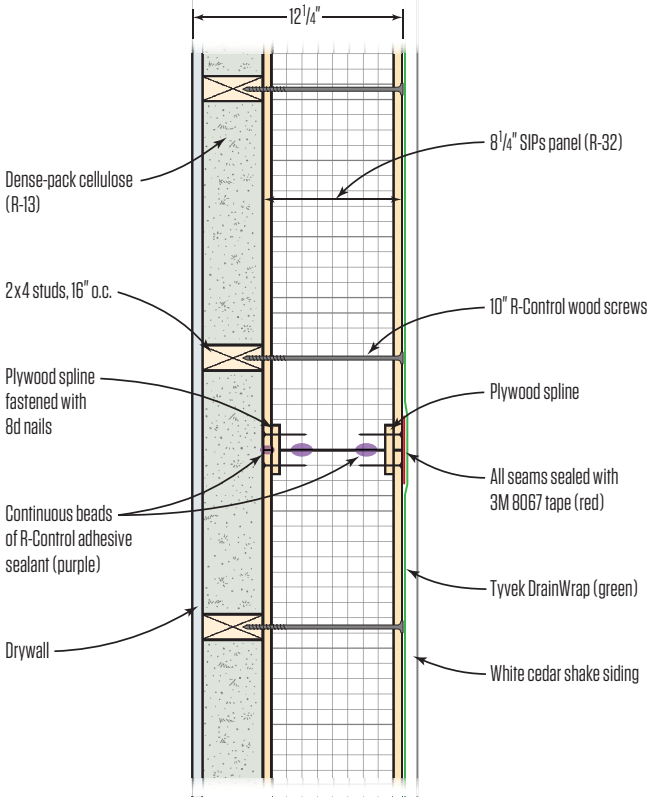
Construction proceeds as follows: After the foundation slab is poured, we frame and brace the first-story stud walls, frame and deck the second floor, and frame and brace the second-story walls. Then we apply the SIPs to the outside of this stick frame. As we stand up and attach the SIPs one by one, we apply beads of R-Control adhesive sealant to the EPS foam and also to the edges of the inner OSB skin of the SIPs. We bed the panel bases in sealant and apply sealant to any penetrations or gaps (see photo at right).

At the top of the wall, we extend the ceiling air barrier (Zip sheathing) under the truss heel and seal it to the outer airtight skin of the SIPs using tape **(B)**. To integrate the wall system air and vapor barrier into the slab foundation, we fold the heavy plastic sub-slab vapor barrier around a PT plywood sill under the SIPs panel and sandwich the end between the mudsill and the bottom plate of the inner wall **(C)**. Then we seal the corner before setting the SIPs.

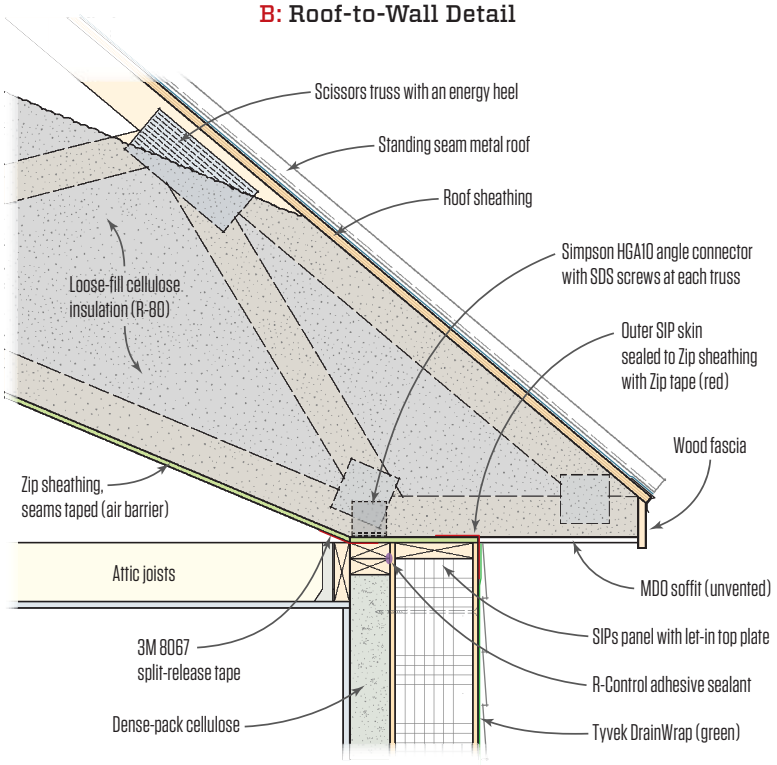
In the course of building out the 36-unit Belfast project, our methods have evolved. Most of the improvements to our system have come from our carpenters in the field—we send the details out to them, they start using them, and often they find better ways to accomplish the goals. With practice, our results have also improved: Our latest blower door test results came in at 0.21 ACH50.

Photo: Ted Cushman

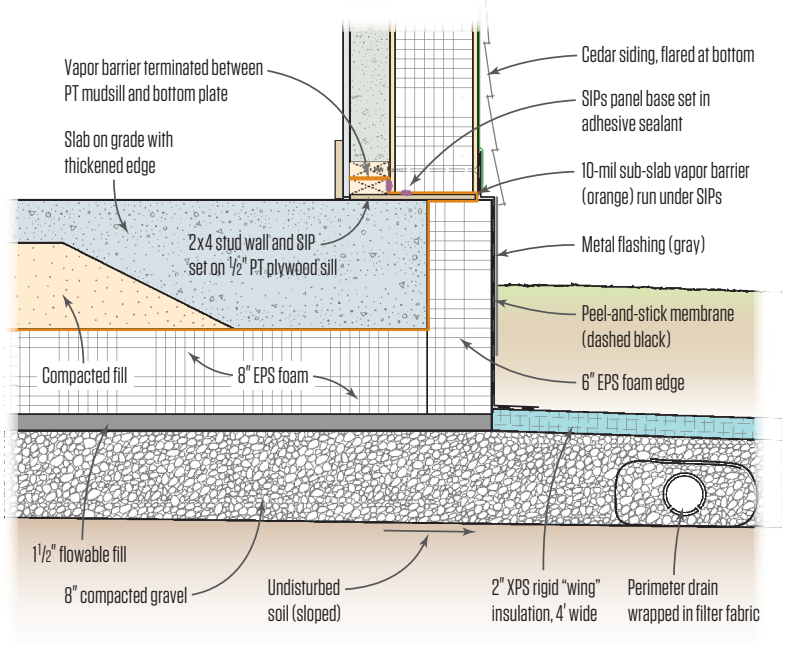
A: Wall Assembly (Plan View)



B: Roof-to-Wall Detail



C: Slab Edge Detail



(A) The load-bearing 2x6 stud wall at the core of the GO Logic wall system supports the second floor and roof loads. After the walls are braced, crews fasten SIPs to the exterior one at a time using 10-inch R-Control wood screws. To maintain a continuous airtight vapor-impermeable boundary at the inner face of the SIPs, crews apply beads of R-Control Do-All-Ply adhesive sealant to the edge of each inner panel face before standing the next panel. Adhesive sealant is also applied to the edges of the panel foam cores in each joint, adjacent to the panel spline grooves.

(B) At the roof, Zip sheathing applied to the underside of the truss bottom chords provides the air and vapor barrier. To integrate this sheathing with the wall system air and vapor barrier, crews rip a strip of Zip sheathing to cover the full thickness of both the framed and the SIP walls, and apply a strip of 3M 8067 tape onto the bottom side before fastening it to the top plate of the inner wall. The tape has split-release paper, so half of the tape is left flapping inside the building with the paper still on. After the roof trusses are set and the Zip sheathing nailed to the ceiling, crews peel the rest of the tape and seal it to the ceiling sheathing to complete the airtight joint.

(C) The foundations are reinforced concrete slabs-on-grade placed in an EPS insulating form system on top of a sub-base of compacted stone dust and self-leveling, non-shrinking "flowable fill." To integrate the sub-slab moisture barrier with the wall system air and vapor barrier, crews lay a heavy plastic membrane across the slab perimeter insulation and double the plastic back over a protective sheet of preservative-treated plywood. Then they fold the plastic up and onto the PT mudsill, where it is covered and secured by the bottom plate of the inner wall.

MAINE SINGLE-FAMILY HOME

Designed and built by Chris Corson, EcoCor Design/Build

The wall system shown here is an improved version of the system I used for the house I built in Knox, Maine, in 2011 (see "An Affordable Passive House," *JLC* May/12 and Jun/12). Since building that prototype house, I've switched to some advanced European materials for air-sealing and moisture management that weren't on the U.S. market back then.

We start with an inner 2x4 stud wall, sheathed on the exterior side with OSB **(A)**; all joints and nail lines are sealed with Pro Clima Tescon Vana tape (fourseven five.com). The OSB layer is airtight, and also braces the structure. Next, we fasten 11⅞-inch wood I-joists to the outside of the walls, driving 4-inch GRK RSS structural screws through the flange and OSB sheathing into the studs. As a weather barrier over the I-joists, we apply a vapor-open waterproof fabric from Pro Clima called Solotex Mento Plus.

We double strap over the fabric to create an air space behind the siding. For vertical siding (barn boards or shiplap), we apply vertical strapping along the length of the I-joists, then horizontal strapping for nailing. But if the plan is for horizontal siding, we first nail horizontal strapping across the I-joist ribs, then apply vertical strapping for nailing. Finally, we fill both the inner 2x4 wall and the outer I-joist assembly with blown-in dense-pack cellulose insulation for a total wall R-value of 56.

Our roof system has also evolved. We're still using raised-heel trusses, aligning them over the wall studs and insulating the attic with several feet of loose-fill cellulose. But instead of skinning the underside of the trusses with OSB and tape to form the airtight second-story ceiling, we now staple Pro Clima Intello Plus, a fabric reinforced to support insulation, under the trusses and tape the seams, then strap the ceiling for drywall **(B)**. To tie that under-ceiling fabric into the taped OSB sheathing that forms our wall's airtight control layer, we apply a strip of Pro Clima DA-S polypropylene fabric over the top of the wall plate before setting the trusses, and tape it to the OSB layer and to the ceiling fabric with Pro Clima Duplex double-sided tape.

Outboard of the concrete foundation wall, there are 6 inches of Type IX EPS insulation, which matches up with the insulated cavity of the outer I-joist assembly **(C)**. The top of the concrete sill is sealed with Prosoco R-Guard FastFlash. To connect our airtight wall to the foundation sill, we tape the OSB sheathing layer to the sealed concrete with Pro Clima Budax butyl adhesive tape.

A: Wall Assembly (Plan View)

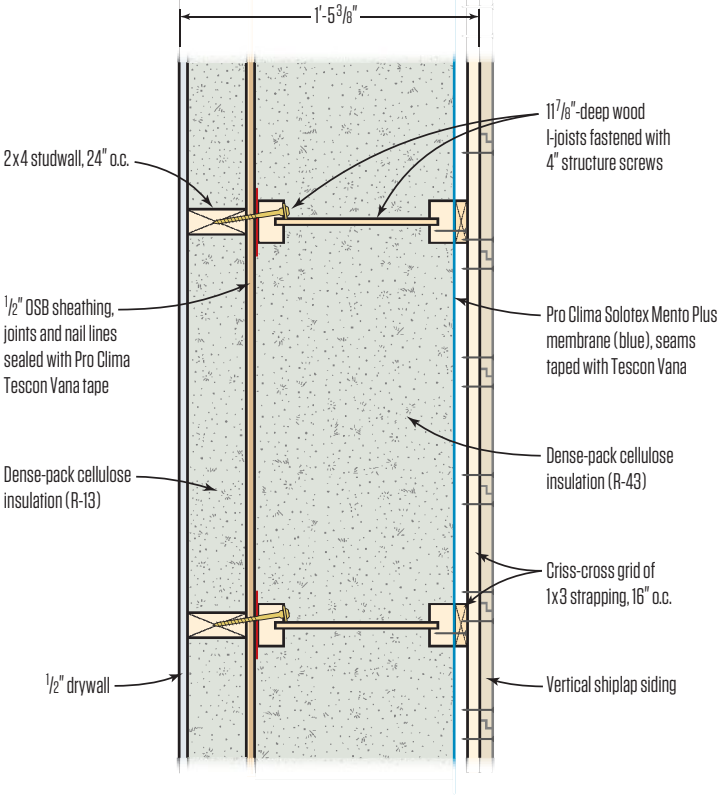
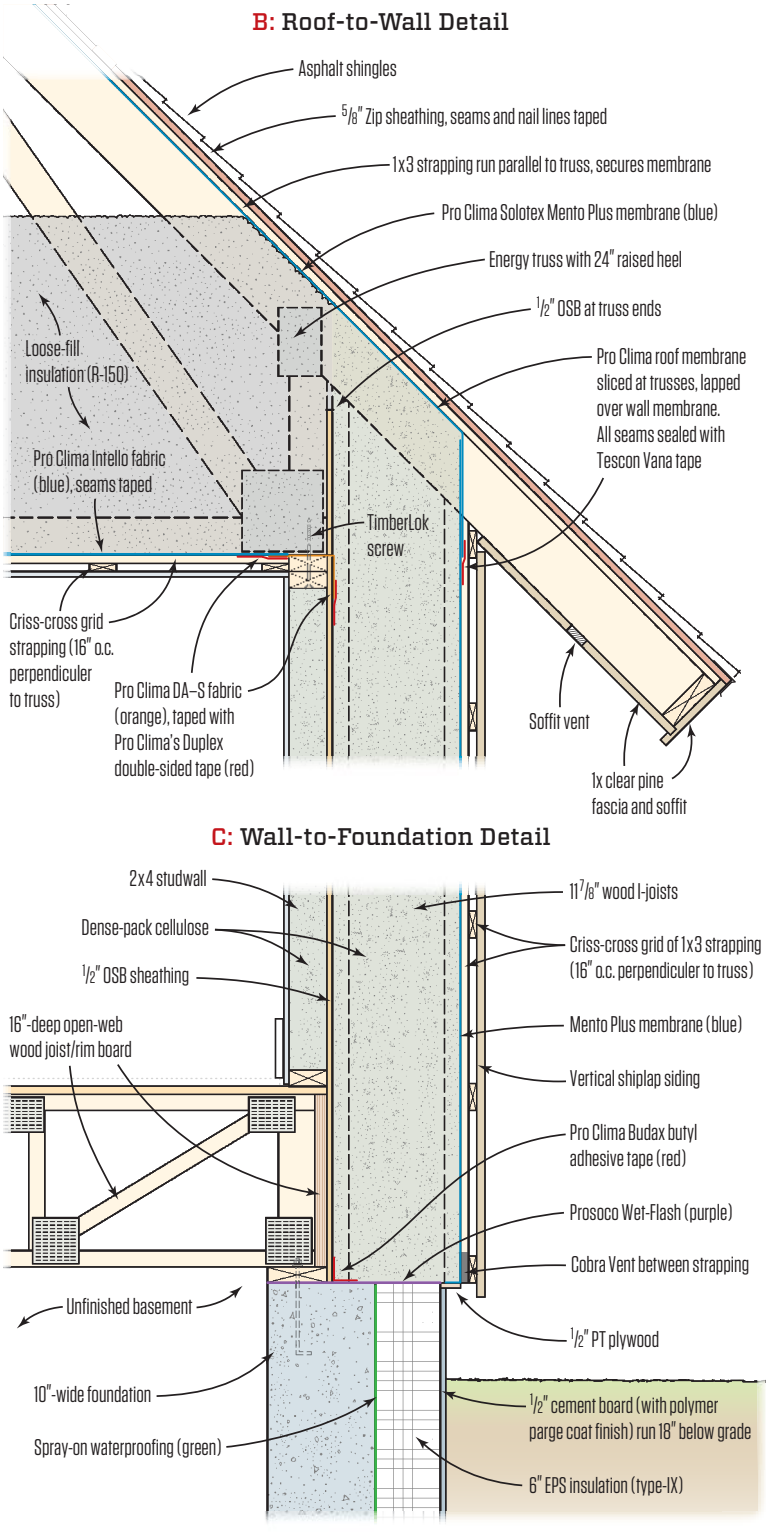


Photo: Ted Cushman



(A) EcoCor's wall system is based on a simple stick frame with OSB sheathing, which then gets wrapped in an outer blanket of wood I-joists. The inner frame's sheathing is taped at joints and nail lines. After the house is framed, sheathed, and roofed, the I-joists are screwed into the wall studs. (We typically use 12-inch I-joists, but on some projects have upsized to 16-inch I-joists.) Both the I-joist cavities and the inner stud walls are filled with dense-blown cellulose insulation, for a total wall R-value of about 56 (not including membranes). The system is airtight at the plane of the OSB and is vapor-open to the inside or the outside.

(B) Where the wall system meets the roof assembly, the airtight boundary runs across the wall plate to the underside of the truss ceiling. To accomplish this, the crew lays a strip of airtight fabric across the wall plate before setting trusses, taping the fabric to the OSB on the outside of the stud wall and to a layer of vapor-control Intello Plus fabric stapled to the underside face of the trusses on the ceiling inside. Self-sealing tape is applied over the staple lines, and strapping along the trusses secures the fabric. The ceiling is cross-strapped for drywall, and drywall screws are sized so they will not poke through the strapping or punch holes in the fabric. The roof is insulated to about R-150.

(C) The house shown here sits on a full basement foundation. The basement walls are poured using conventional formwork and then insulated with 6 inches of expanded polystyrene (EPS) rigid foam. The insulated I-joist wall cavities meet up with the foundation insulation. To complete the airtight boundary from the wall to the foundation, the OSB sheathing extends down past the floor system rim board to the concrete sill, and tape is applied to the joint between the sheathing and the waterproofed sill.

"AVALON," A CONNECTICUT FARMHOUSE

Designed by Russell Campaigne, Campaigne Kestner Architects; built by Phil Cyr, J & P Building and Remodeling

Our wall example is part of a zero-energy single-family house built for the tenant farmer of an organic farm in rural Connecticut. The owners wanted a sustainable, healthy, and self-sufficient home. Using REM/Design to analyze the cost-benefit trade-offs, we designed the envelope to keep the home's energy demand low enough that heating and cooling can be supplied by a 1-ton Mitsubishi Mr. Slim mini-split heat pump. That left room in the budget for rooftop solar electricity panels with enough capacity to operate the house at net-zero annually.

The wall is framed with 2x4 studs 16 inches on-center and is sheathed with Zip System OSB panels taped at the joints for airtightness **(A)**. The stud bays are filled with open-cell spray foam insulation. (The original spec was for blown cellulose, but the local insulation contractor charged less to install foam.) Over the sheathing, we applied two layers of 1.5-inch foil-faced rigid polyiso insulation, for a total-wall R-value of 44. We fastened the first layer with 2-inch roofing nails and fastened the second layer through vertical strapping using 6-inch screws with 1½-inch fender washers.

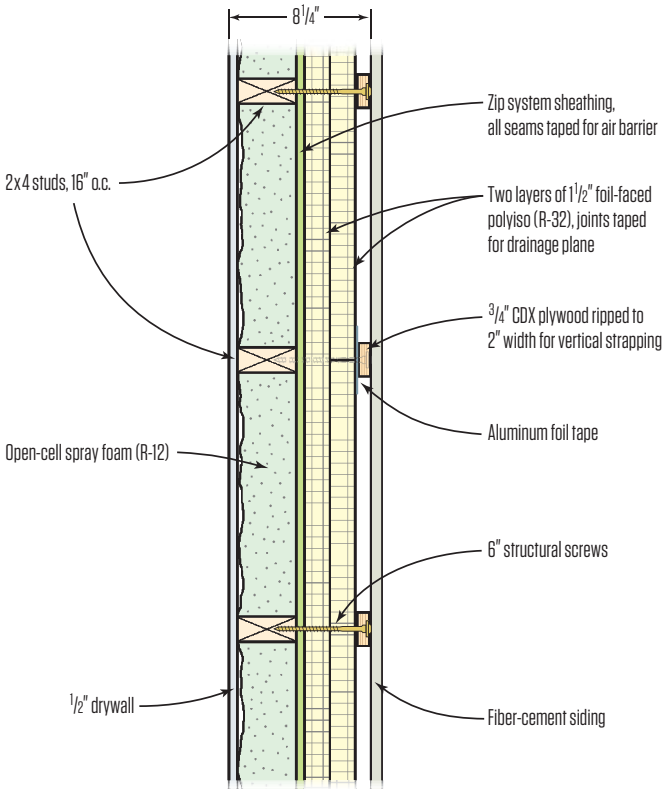
The exterior foam reduces thermal bridging at the wall studs, and the foil facing supplies a drainage plane for the fiber-cement lap siding applied over vertical strapping ripped from ¾-inch CDX. The foam seams are taped with Thermax aluminum foil tape.

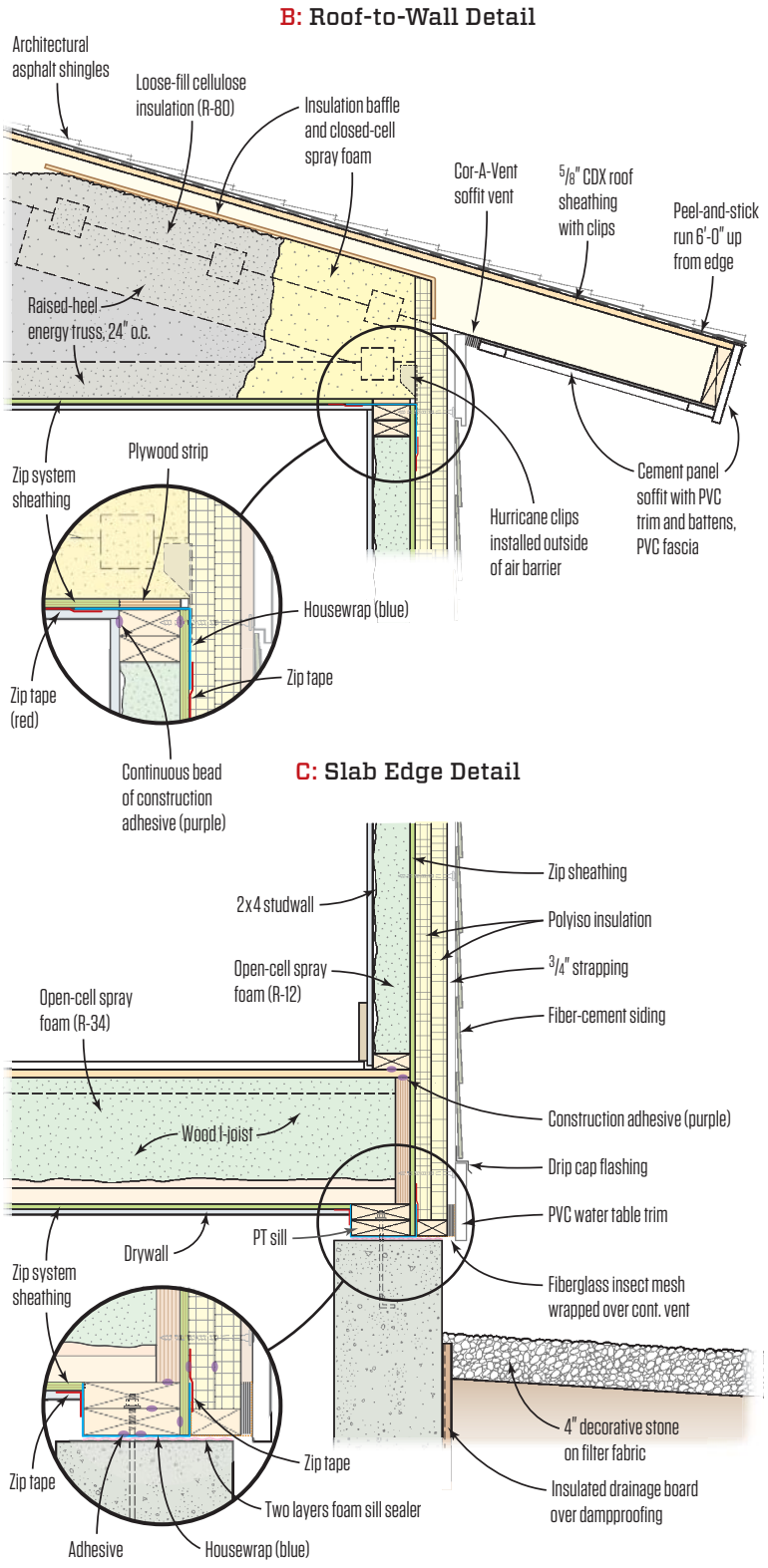
Because the farmhouse basement is to be used for cold storage and washing of farm produce, we thermally isolated it from the conditioned living space upstairs by insulating the first-floor joist bays with spray foam insulation. We made the basement ceiling airtight by screwing Zip sheathing to the underside of the floor joists and taping the seams **(C)**. Connecting that airtight floor to the wall system was tricky. We laid a wide strip of Tyvek housewrap down on the foundation sill before framing the floor. After the framing was complete, we taped the Tyvek to the wall sheathing and to the underfloor sheathing with Tyvek tape.

The truss roof is insulated to R-80 with loose-fill cellulose **(B)**. At the top of the stud wall, we applied Zip flashing over the wall plate, adhering it to the inside and the outside edges of the plate, and protected it by nailing a strip of Zip sheathing along the top of the top plate. We also sheathed the underside of the trusses with Zip sheathing, taping the seams, and taping the sheathing to the wall plate flashing to complete the air seal.

Photo: Phil Cyr

A: Wall Assembly (Plan View)





(A) The structural wall is a 2x4 stud frame with Zip System exterior sheathing. Over the taped Zip panels, the crew attached two layers of Tuff-R foil-faced rigid polyiso foam insulation (R-7 per inch), fastening the first layer with roofing nails and the second layer with long screws. Tuff-R was chosen because it's easily available on the local market and functions as a vapor barrier against interior moisture as well as a drainage plane material for exterior bulk water (wind-driven rain). Strapping over the foam, attached with 6-inch GRK RSS structural screws, creates a drainage space and provides nailing for pre-primed cementitious lap siding.

(B) The truss roof is insulated to R-80 with loose-fill cellulose. The air barrier at the ceiling plane consists of Zip System sheathing nailed to the underside of the trusses. To connect this ceiling air barrier to the air barrier at the wall sheathing, Tyvek was laid down over the wall plate and sealed to the plate's top and sides. Tape along the interior edges of this flashing completes the seal to the ceiling and the exterior sheathing.

(C) "Avalon" has a full concrete basement that is not conditioned because it serves as a workspace and a storage facility for the organic farm. To isolate the working basement from the living space above, the first-floor joist system was insulated with spray foam and sheathed on the underside with Zip System sheathing, taped at the seams. This sheathing is connected to the Zip sheathing on the outboard face of the exterior wall frame with a strip of Tyvek. The crew sets the Tyvek down on top of the basement wall early in the construction process, before placing and anchoring down the pressure-treated sill. After the floor and walls were framed, this Tyvek was taped to the underside of the basement ceiling and to the face of the first-story wall frame using Tyvek tape.

NORWICH, VERMONT
SINGLE-FAMILY HOME

Owner-designed, with Christopher Smith Architect; built by Hazen Hill Construction

The wall system in this example grew out of a dialogue between the homeowners and the architect. The owners, a visual artist and her retired art-professor husband, approached us with a nearly complete design after working with several other architects and builders. Our challenge has been to realize their distinctive artistic vision for their home, along with their very ambitious energy-efficiency goals, while also working within the hard limits of their budget.

We chose the simple double-stud-wall method for this house mostly because of budget issues. The interior 2x4 wall, framed at 16 inches on-center, supports the first-floor frame and roof system **(A)**. It is tied to the outer wall frame with 4x12-inch gussets sawn from ½-inch plywood and is x-braced with metal straps. The outer wall is sheathed with plywood, covered by a skin of Grace Ice & Water Shield. The 12-inch open cavity in the wall is filled with blown-in dense-pack cellulose (R-43).

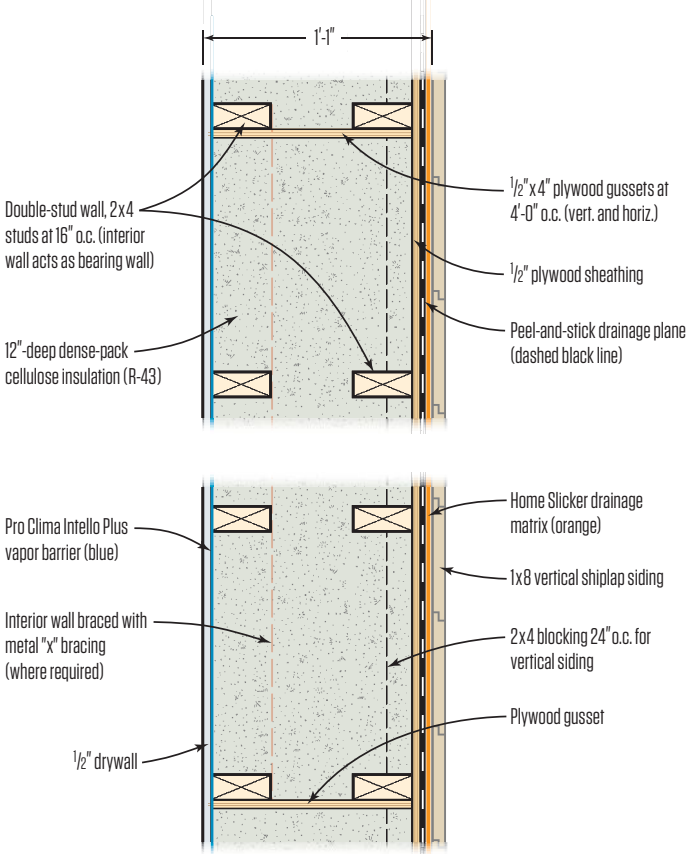
To create a high-ceiling effect in the open-plan first story, the floor above is framed with trusses with steel webs left exposed to below. The low-slope roof is framed with wood I-joists **(B)**. At the top of the second story exterior wall, the Ice & Water Shield laps over the wall edge onto the roof sheathing. (The 2x6 eaves overhang was attached afterward.) The roofing material is a fully adhered PVC membrane, so the air and vapor barrier for the wall, located at the outer plywood skin, continues on to the top surface of the roof.

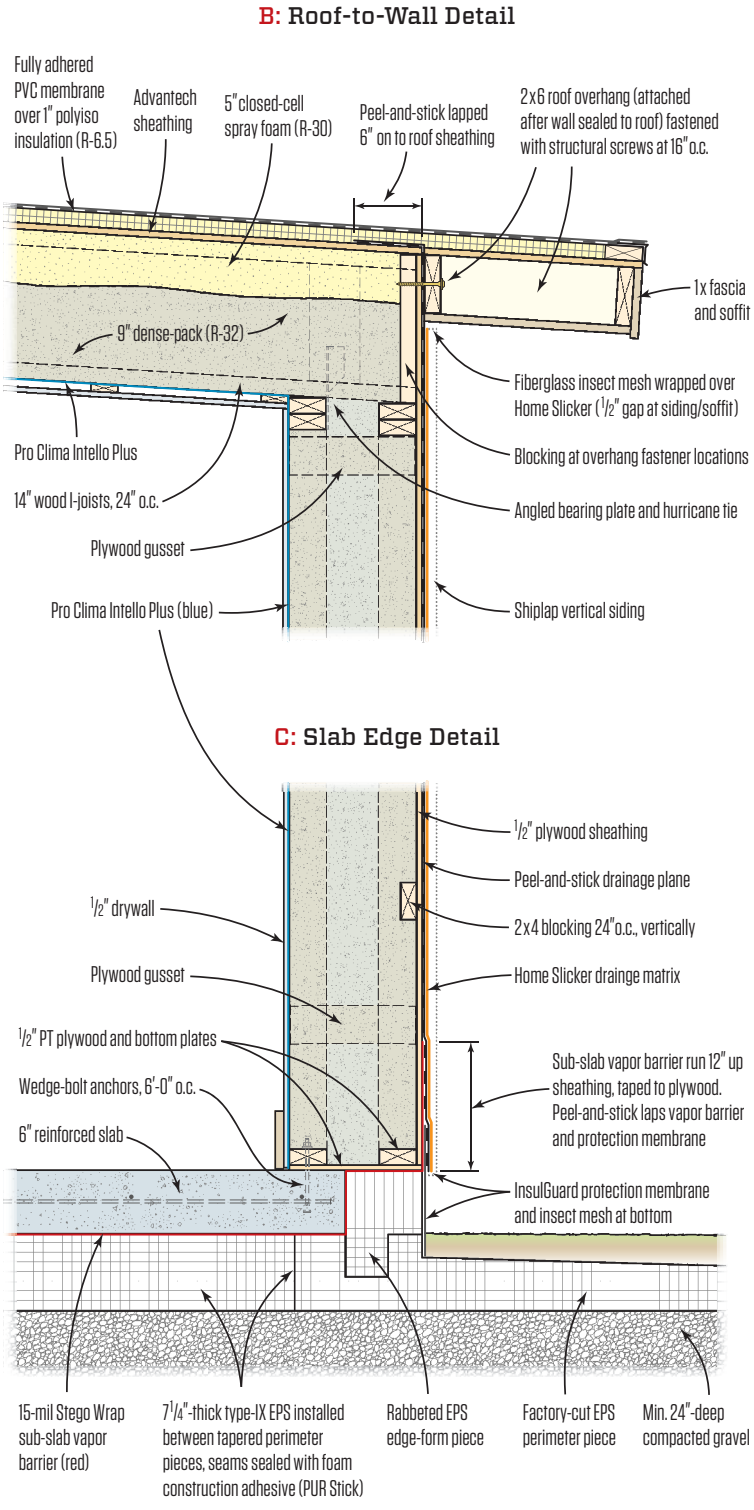
The foundation for this house is a 6-inch reinforced slab poured in an EPS insulated forming system, as developed by Chris Corson (see "An Affordable Passive House," *JLC* May/12 and Jun/12). We tied our wall system to this foundation by placing a 12-inch-wide plate of half-inch pressure-treated plywood to span the slab and the perimeter insulation **(C)**. The interior wall plate sits on this plywood plate and is anchored to the concrete slab. The outer wall plate, which does not carry floor or roof loads, rests on the plywood plate above the foam. The 15-mil Stego Wrap vapor barrier under the slab foundation runs under the plywood plate, folds up, and is sealed to the plywood skin of the outer wall frame with peel-and-stick membrane.

Ted Cushman is a freelance writer based in Peaks Island, Maine. He is editor of the Coastal Contractor newsletter and has been a regular contributor to JLC *since 1993.*

Photo: Ted Cushman

A: Wall Assembly (Plan View)





(A) The wall system is a 12-inch-thick, double-2x4 stud wall, sheathed on the outside with 1/2-inch plywood. The interior wall frame is supported by the super-insulated concrete slab foundation; the outer wall is non-load-bearing. The wall is filled with 12 inches of blown-in dense-pack cellulose insulation. The Grace Ice & Water Shield drainage plane, installed over the outer wall sheathing, also serves as a combined water and vapor barrier for the house, reflecting the designer's assessment that exterior bulk water (wind-driven rain) represents the greatest moisture threat for the building in the Vermont climate. The system is designed to dry to the inside through the Intello Plus membrane. (The house is equipped with an energy-recovery ventilator for heat and humidity control.)

(B) Where the wall meets the roof assembly, the Grace Ice & Water Shield laps over the edge of the roof sheathing. Projecting eaves are framed onto the edge of the roof and sheathed after this wall-to-roof seal is formed. Then, a fully adhered PVC membrane roof is installed over the Advantech sheathing of the low-slope roof, maintaining the home's air and moisture barrier at the exterior face of the building.

(C) The house is built on a reinforced concrete slab foundation, poured in a super-insulated forming system supplied by Branch River Plastics, in Smithfield, R.I. The vapor barrier under the slab, a 15-mil Stego Wrap polyethylene sheet, wraps under the 1/2-inch plywood bottom wall plate, extends up the wall sheathing, and is adhered to the wall sheathing with peel-and-stick membrane, integrating the sub-slab vapor barrier with the wall's exterior drainage plane and vapor barrier.

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Portable Miter-Saw Stands

The most popular models, plus some nifty homemade options

BY BRUCE GREENLAW

Need help choosing a miter-saw stand? Unfortunately, unlike for other tool reviews, we can't just round up all the models, compare them, and recommend a favorite. Of the roughly 50 stands on the market, many have entirely different personalities, and not one is universal. The best stand for you depends on the work you do, your need for mobility, storage space and transportation, and other factors.

For this article, we reached out to scores of working stiffs—from home builders and remodelers to trim carpenters and deck builders—to identify the most popular manufactured stands. Eight models stood out: the DeWalt DWX723, the Ryobi A18MS01, the Trojan Workcenter, the Bosch T4B, the Ridgid AC9945, the Festool Kapex UG, the FastCap Best Fence series, and the Lee Unlimited Complete Power Bench. But we also learned about several homemade stands that are practical, economical, and easy to build.

MANUFACTURED STANDS

These stands cost $100 to $1,000 and collectively cover all the bases, from no-frills utility to absolute precision and unlimited support with varying degrees of mobility (photo above). Five of the models have quick-release saw mounts that bolt to your miter saw's base and let you pop the saw on or off the stand. The mounts have non-marring feet so you can set the saw on a finished surface when you don't need the stand.

DEWALT DWX723

DeWalt's DW723 sawhorse-style folding stand earned high marks back in our August 2002 issue for its portability, light weight, easy setup, rugged construction, and stability. Most builders I talk to are familiar with it, and many have been using this stand for years. For instance, Sim Ayers, owner of SBE Builders, in Discovery Bay, Calif., has used his DW723 for the past decade for everything from stick and metal framing to interior finish, and it's still going strong **(1)**. His biggest complaint is that the non-marring shoes keep falling off. DeWalt's latest version, the DWX723, is almost identical to the one Ayers owns, but the shoes are now secured by screws, user-friendly levers have been added, and the quick-release saw mounts are supposed to be more secure.

Made of aluminum, the 35-pound DWX723 folds into a slender, 6-foot-long package that totes easily and doesn't crowd a pickup bed. Setup is a simple matter of squeezing release levers and swinging out the legs before securing the saw. The stock supports have flip-up stops and are 12½ feet apart when fully extended. The supports can easily slide into the main beam to hold shorter stock.

Steve Demetrick, a residential remodeling contractor in Wakefield, R.I., constantly moves his miter saws around jobsites and owns several DWX723 stands. He likes them, but notes some shortcomings: The stops aren't accurate enough for finish work; the "universal" brackets don't accept all saws without modification; and the material supports on top of the extensions will eventually connect loosely if you overtighten the securing knob. Demetrick also uses DeWalt's DWX724 model, which is similar to but shorter than the DWX723.

Some builders, including John Spier of Spier Construction, on Block Island, R.I., occasionally mount two saws on the sturdy main beam of the DeWalt stand so that they aren't constantly flipping stock end-for-end or tilting the saw from side to side when cutting lots of compound miters **(2)**. DeWalt makes this easy by offering extra mounting brackets (DW7231) as an accessory. Spier always bolts the quick-release mounts to a piece of plywood and then bolts the plywood to the saw, which eliminates compatibility issues and anchors the saw more firmly to the stand. He also bores a hole in the plywood, where he stores his blade wrench.

Other useful DeWalt stand accessories include wide supports with stops (DW7029), wide roller supports (DW7027), and adjustable legs (DW7028) that prevent the arms from sagging under heavy loads **(3)**.

DeWalt DWX723 / $200 / 800.433.9258/ dewalt.com

Photo 1: Sim Ayers; photo 2: John Spier; photo 3: DeWalt

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Photos 4 & 5: Ryobi; photo 6: Philip Herzegovitch; photo 7: Trojan Quality Tools; photos 8 & 9: Mitch Greenlaw

RYOBI A18MS01

In a recent *JLC* Tools & Equipment forum, several contributors, including Connecticut remodeler Phil Herzegovitch, said they liked Ryobi's A18MS01 miter-saw stand. Herzegovitch has now been using two of these stands for more than five years. The Ryobi stand is half the price of the DeWalt DWX723, and it's about 17 inches shorter when folded up. The support arms are 3½ feet shorter when fully extended **(4)**. Made of steel rather than aluminum, the Ryobi weighs in at 42 pounds. This stand comes with stops and quick-release saw mounts.

Unlike the DeWalt, which has a support beam, the Ryobi uses two parallel 1½-inch-diameter support tubes spaced 3½ inches apart **(5)**. That feature allows Herzegovitch to add a simple plywood work platform keyed with a 2x4 block that slips between the rails. A 1-by cleat locks the platform in place. The open design lets dust and debris fall through. Though he likes the wide work supports, the extension arms sag when loaded with anything bigger than a 2x6. But the stand itself is sturdy; he mounts his thickness-planer on them, complete with infeed and outfeed supports. Folded up, the stands easily fit into his work-truck compartment **(6)**. But he said he'd like the stands even more if they were a couple of feet longer.

Ryobi A18MS01 / $100/ 800.525.2579 / ryobitools.com

TROJAN WORKCENTER

The Trojan Workcenter has been around longer than some carpenters **(7)**. Mitch Greenlaw, owner of Greenlaw Construction, in Twain Harte, Calif., has had his Workcenter for 20 years and still uses it almost every day. The concept is simple: Two pairs of collapsible legs firmly clamp to a 2-by rail, which you supply; there's an MDF saw table and two adjustable support rollers that clamp to the top of the rail. Your choice of lumber determines the height and length of the stand, so it's incredibly versatile. Assembly takes minutes, and the individual parts minus the 2-by can store on a shelf.

When the clamping screws stripped on Greenlaw's saw table, he cut a larger top, so it could hold other tools, and replaced the stock mounting bracket with two opposing pairs of shelf brackets that slide over the 2-by rail. Now he just screws or clamps the table to the rail **(8)**. The Workcenter doesn't include stops, so he made a simple, dependable one that he clamps to the rail **(9)**.

Two leg lengths are available, and you have the choice of either an imported or a (pricier) domestic version.

Trojan Workcenter / $228 to $310 / 800.466.6385 / trojantools.com

BOSCH T4B

Bosch wheeled out the T4B Gravity-Rise stand **(10)** six years ago, and it's proving to be a workhorse for carpenters of all types. The steel and aluminum stand weighs 90 pounds, but it's just over 4 feet long when collapsed, storing upright with the saw mounted on it. Universal quick-release saw mounts come with the stand.

Setup couldn't be simpler. Unlock the adjustable leveling leg, turn the release lever, and gently lower the handle. The wheels roll toward you until the saw swings up and locks into position. Reversing the process is just as easy. The extension supports spread about 8½ feet apart and include built-in stops that raise into position for repetitive cutting.

Josh Dunlap, production manager of Consolidated Design & Construction Group, in St. Louis, says one person can load the T4B into a van without removing the saw **(11)**. He says that the supports sag when fully extended but you can re-adjust their height to compensate.

Michael Davis, owner of Framing Square, in Conifer, Colo., also gives the T4B a thumbs up. "I can roll onto a jobsite and be set up in seconds. End of the day: fold 'em up, roll 'em off, and I'm gone."

Bosch T4B / $300 / 877.267.2499 / boschtools.com

RIDGID AC9945

According to the specs, the Ridgid AC9945 Miter Saw Utility Vehicle **(12)** weighs just 57 pounds and extends to an overall length of about 9½ feet. That's about 33 pounds lighter and a foot longer than the Bosch T4B. The Ridgid also costs about $100 less than the Bosch. To set it up, you position the folded stand upright with or without the saw mounted, step on a foot pedal, and pull the handles down until the stand locks into the working position. Like many other popular stands, it has quick-release saw mounts.

Dan Miles, owner of Miles Construction, in Bucks County, Pa., says that he and his crews have used many Ridgid models—mostly for cutting deck railings and exterior trim—and the stands typically last about two to three years tops. But replacement stands are as close as the nearest Home Depot, and the price is competitive. Miles likes the AC9945 better than the older models. He describes the setup as "two clicks and it's open." One person can easily load the stand into a pickup with the saw attached, and the tubular frame is convenient to grab for lifting. Miles had to tweak the universal quick-release brackets to make them work for his Makita saw **(13)**.

Ridgid AC9945 / $200 / 800.474.3443 / ridgid.com

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Photo 10: Michael Davis; photo 11: Josh Dunlap; photo 12: Ridgid; photo 13: Dan Miles

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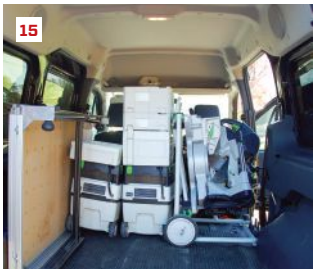

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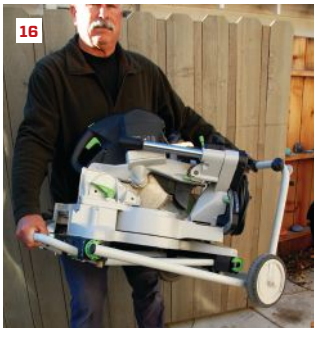

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Photo 14: Festool; photos 15–18: Jesse Wright

FESTOOL KAPEX UG

The Festool Kapex UG Mobile Miter Station is designed to pair with the Kapex saw that many high-end finish carpenters like to use. The two extension wings give continuous support and provide extra work surface that is ideal for trim work, and simple flip stops allow repetitive cuts **(14)**.

Jesse Wright, a finish carpenter with Architectural Molding, in Concord, Calif., has been using the UG for two years for cutting everything from giant crown moldings to bevel siding (not to mention occasionally cutting 2-by framing lumber). He really likes the compact footprint, mobility, accuracy, and durability of this stand. With the saw mounted and the wings removed, the folded stand occupies minimal space in his Ford Transit van **(15)**. He has rolled it on and off jobsites over pavers, power cords, and gravel—and even up concrete stairs—every workday for a year with ease. The base and saw together weigh just 69 pounds and are easy to grip when folded, so they can be carried around obstacles or between floors **(16)**. Setting up is a snap: The saw quickly swings up into the cutting position **(17)**, the wings easily connect by hand, and a single leg swings down from each wing for support at the ends. The legs pivot if necessary to align the wings with the saw table.

Each wing is 48 inches long and includes a metric tape measure and a flip stop. A second-stage fence with a stop at the end extends an additional 36 inches from the wing to allow longer repetitive cuts, but the extension can't support much weight **(18)**. When cutting longer stock than the wings can handle, Wright supports the ends with Ridgid's FlipTop portable work supports (model AC9934). He commonly works in metric measurements, so the metric scale works well for him. The saw can also be used solo, on its padded quick-release brackets.

Stephen Klug, owner of Fine Building & Finish, in Yarmouthport, Mass., has been using a UG stand for about two months for trim and Azek railings. He would like to see larger wheels, a sturdier second-stage fence, and the option of locking the saw in the closed position. But he says that the stand is worth its premium price.

Festool Kapex UG / $825 / 888.337.8600 / festoolusa.com

FASTCAP

Many finish carpenters swear by the Sawhelper Ultrafence because it provides continuous and expandable work support, doubles as a work table, and has an integral tape measure and flip stops for exceptional accuracy. Too bad it's no longer available. The FastCap Best Fence series is now helping to fill the gap. At the moment, the lineup includes the Pro, Pro 1, Pro 2, Pro 3, and Pro 4, all of which build upon the same folding stand **(19)**.

The basic Pro model has no wheels and comes with one continuous 64-inch wing with a metric or imperial scale and a flip stop. The rest of the stands have four wheels for better mobility **(20)**, and progressively include from one to four quick-connect wings and more accessories. Because the system is modular, you can expand any of the stands incrementally to provide all the support and features you need **(21)**. FastCap also sells kits for attaching its wings to the Bosch T4B, DeWalt's sawhorse-style stands, and the Festool Kapex UG, or for simply setting up a workbench cutting station.

According to FastCap president Paul Akers, the Best Fence system changes almost weekly on the fly in response to customer feedback. That's mostly a good thing, but it can have its drawbacks. For instance, the latest Best Fence stands have adjustable legs, onboard fence storage, and a fold-down lumber rack so you don't have to set your trim on the ground or use extra sawhorses. The latest accessories include an onboard ballistic nylon accessory bag, a cut-list stand, and a small work table. But Virginia remodeling contractor Andrew Polski recently purchased the new Pro 4 after using an older version and was disappointed to find that it no longer has a quick-release saw mount or an optional backstop to make it easier to cut crown. Although the latest version isn't a perfect fit for him, he still calls it a "phenomenal" design.

Massachusetts remodeling and restoration contractor Lou Hale owns a 3-fence wheeled model. He calls the stop system a "home run," and says that the big pneumatic tires roll easily over rough ground. But, he adds, it takes two workers to safely load the stand into the truck. He had to add a piece of plywood to mount his Hitachi saw to the Best Fence stand, which was a minor nuisance. The bottom line: Hale says he would buy the stand again.

Matt Arnold, a residential remodeling contractor in Southern California, also uses a 3-fence model for his finish work. He says it was a great buy and that FastCap's customer service has been first-rate.

To see how these stands work, view the videos at fastcap.com.

FastCap Best Fence / $400 to $1,000 / 888.443.3748 / fastcap.com

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Photos: FastCap

Photo 22: Zach Fluto; photos 23 & 24: Power Bench

LEE UNLIMITED POWER BENCH

This stand won a Editors' Choice Award from Tools of the Trade magazine in 2002 because it unfolded in a minute to become a long and sturdy 18-inch-wide stand, and it had an adjustable deck height to accommodate almost any saw. In addition it sported adjustable legs for working on uneven ground or for customizing the working height, offered extra extension tables and a stop rail, and was manufactured by a South Dakota carpenter. But I had forgotten all about it until Tom Harrington, co-owner of Premium Decks,in Fargo, N.D., recently praised it on Professional Deck Builder magazine's Facebook page.

Following up, I spoke with Zach Fluto, co-owner of Harrington's deck company, who told me that they bought a Complete Power Bench six years ago and have added a few more since. He says that most saw stands are too light-duty for deck builders, while the 125-pound steel Power Bench is exceptionally stable and can easily support wet treated lumber and the heaviest composite decking **(22)**. "We use them every day, never a problem, and I don't foresee one," Fluto says. The large table also allows carpenters to stack cut lumber on it as they work.

The Complete Power Bench **(23)** includes two wings that create a 9-foot-long bench, plus a 56-inch extension table that can attach to either side. It also includes a stop rail for making repetitive cuts. Saws normally bolt or clamp to the stand and must be removed before you can fold and roll. The stand folds to about the thickness of a stepladder and tilts up for compact storage and transport. As for the setup, Fluto compares it to a Little Giant ladder infomercial: "Click, click, click, and it's up."

The Power Bench can also serve as a table-saw stand, a welding table, and so on. It accepts various extensions, and a dolly attachment allows you to tote your saw and other tools along with the stand like a hand truck **(24)**.

Lee Unlimited Complete Power Bench / $790 / 866.299.2371 / powerbench.com

Homemade Stands

Many carpenters make their own saw stands, which they can tailor exactly to the work they do. These stands are their workbenches, and because the stands are wooden, users can nail or screw their accessories anywhere. Here are five noteworthy examples.

ELEGANTLY SIMPLE

JLC executive editor and veteran carpenter Clayton DeKorne simply clamps or bolts his miter saw to a slab of plywood and sets it on sawhorses or another stable surface. The outboard work supports consist of plywood L-brackets that are ripped to the same height as the saw table **(25)**. For production cutting, he clamps a taller wood scrap to the bracket, which serves as a stop.

COMPACT WORK CENTER

Risinger Homes, in Austin, Texas, uses this basic 7½-foot stand for most of its finish carpentry **(26)**. Made of ¾-inch plywood, the lightweight stand is easy to carry and fits in a pickup bed. The stand sits on sawhorses, and solid tables on either side of the saw provide several feet of continuous support. A power strip mounted on the back of the stand allows it to double as a workbench. The saw's fence aligns the workpiece, so no additional fences are required.

PRECISION HYBRID

Gary Striegler, a trim carpenter in Fayetteville, Ark., devised a simple but high-tech stand that combines portability with precision **(27)**. The straightforward 8-foot table uses just one sheet of ¾-inch plywood. The stand starts with a wide plywood-box base with a 12-inch-deep table on top that's backed by a fence. The extra room gives him a place to stack pieces that he has cut. But Striegler incorporated several Kreg components (kregtool.com) that really bring this stand to life. Each fence is capped by a length of Kreg Top Trak with a self-adhesive tape measure applied to it. Two types of stops with built-in lens cursors ride in the tracks for making accurate and repeatable cuts. On the table below, he mounted a ¾-inch-thick Klamp Trak that accepts any Kreg Bench Klamp, converting the entire table into a versatile workbench. Striegler normally adds wheels to one end of the stand so he can roll it back and forth from the truck or between rooms. He says that he can build the stand in about two or three hours.

SUPER FLYWEIGHT

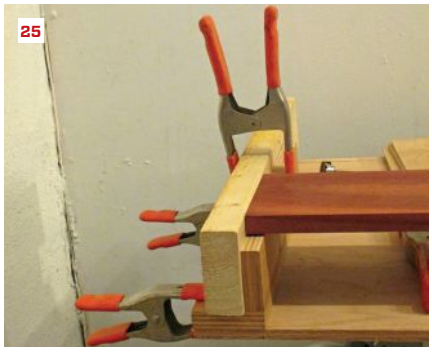
Expert finish carpenter, Gary Katz, loves his Festool Kapex miter saw, but he doesn't like the Kapex UG stand because the wings are too narrow for the work he does. Instead, he mounts his saw on a four-legged stand and quickly attaches a 1-foot by 5-foot wing to each side of the saw using the Kapex-Sawhelper connecting brackets that sell for $88 per pair at multiblades.com **(28)**.

Katz says that you could also use wide butt hinges to attach the wings to any saw, and then just pull the hinge pins when you need to collapse the wings for transport. The lightweight wings are made of ½-inch Baltic birch plywood with mahogany banding, and have adjustable 1-by outboard legs that hinge underneath. Katz attaches a homemade fence and flip stop to one wing when making repeat cuts.

STAND PLANS

The Paulk Miter Stand was designed by Ron Paulk, a home builder and finish carpenter in Anacortes, Wash. Made of ½-inch and ¾-inch AC plywood, it features a roomy 18-inch by 78-inch top with a place for the saw to mount in the middle. Each side is a box with multiple openings for convenient tool storage, and you can attach an ingenious homemade flip stop to the fence. Extension wings dovetail into both ends of the table for supporting longer stock, and everything is supported by adjustable-height plywood sawhorses that double as convenient lumber racks **(29)**. Though it's designed for the Festool Kapex saw, Paulk says the stand can be modified to fit most other brands. It takes about six hours to build and the materials cost about $100. For $10, you can order the plans at paulkhomes.com and receive them by email. View a demonstration by searching "Paulk Miter Stand" on YouTube.

Bruce Greenlaw is a contributing editor to JLC.



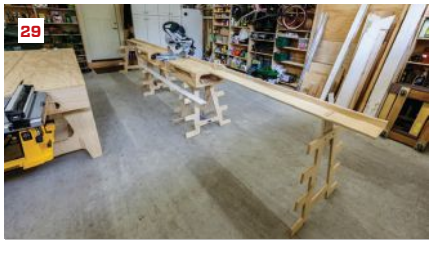


Photo 25: Clayton DeKorne; photo 26: Mark Epler; photo 27: Gary Striegler; photo 28: Gary Katz; photo 29: Ron Paulk

Photo: courtesy FEMA

Second Acts

Life as an insurance adjuster after a career as a contractor

BY FERNANDO PAGES RUIZ

On the heels of the Great Recession, I had to find a job. With 20 years of home building behind me, there was little else I knew well enough by which to make a decent income. Want ads for experienced home builders didn't exist, but I found that skills honed in construction and remodeling provided a good base for careers in real estate sales, building inspections, and property insurance adjustments. I explored all three.

If you're looking for a career change today, it's likely not because of a sluggish construction economy; things have picked up. But your knees and elbows may need a break, or you may have other reasons to trade in the toolbox for a briefcase. Let's face it, construction is a younger man's game. It's also fraught with risk and uncertainty, even in good times. After I switched careers, my stress level diminished, my bank account recovered, and I have no warranties to worry about or employees to pay on Friday.

INSURANCE ADJUSTMENTS

The most satisfying and lucrative work I found involves adjusting insurance losses after catastrophes, such as 2013's Moore, Okla., tornado and Superstorm Sandy. You're helping people in need, and you make a percentage of every loss you adjust. Working 16-hour days while on storm duty, you can earn $750 to $2,500

a day, on average. Since 2008, I have been deployed 30 to 60 days a year, and in that brief but intense time, I make about half my annual income.

But it's not an easy job, and you do earn the money. Big natural disasters are chaotic, the workload is overwhelming, the phone calls are incessant, and you never know when you'll be deployed. Notice comes in two phases: First you receive a text alert that deployment is likely, then a call a few days (or sometimes hours) later telling you where to go for orientation. When that call comes, it means leaving within 24 hours. I keep two plastic totes with all of my supplies ready to load in the trunk, and I pack my suitcase on first notice.

Licensing. To become an independent catastrophe, or "CAT," adjuster, you have to obtain a license. Check with your home state's department of insurance to find out what the requirements are (see map, page 52). You would begin by applying for an "all lines" or casualty and property adjuster's license in your own state. Some states, such as my home state of Colorado, don't require a license, but without one, nobody takes you seriously.

Licenses from Texas, Florida, and Indiana are among those that enjoy the highest level of reciprocity. Having one will allow you to obtain a license in most other states just by paying the fee—no tests or classes required. (The exceptions are Arizona, California, Hawaii, and New York, which require separate licensing.)

If your state does not require a license, you can obtain a nonresident license in Texas, Florida, or Indiana and designate it as your "home state" license to enjoy most of the benefits of reciprocity. Texas offers the greatest number of approved adjuster license courses, many of which are online. Its license is the most widely recognized in the industry, so it's generally the one recommended for those starting out.

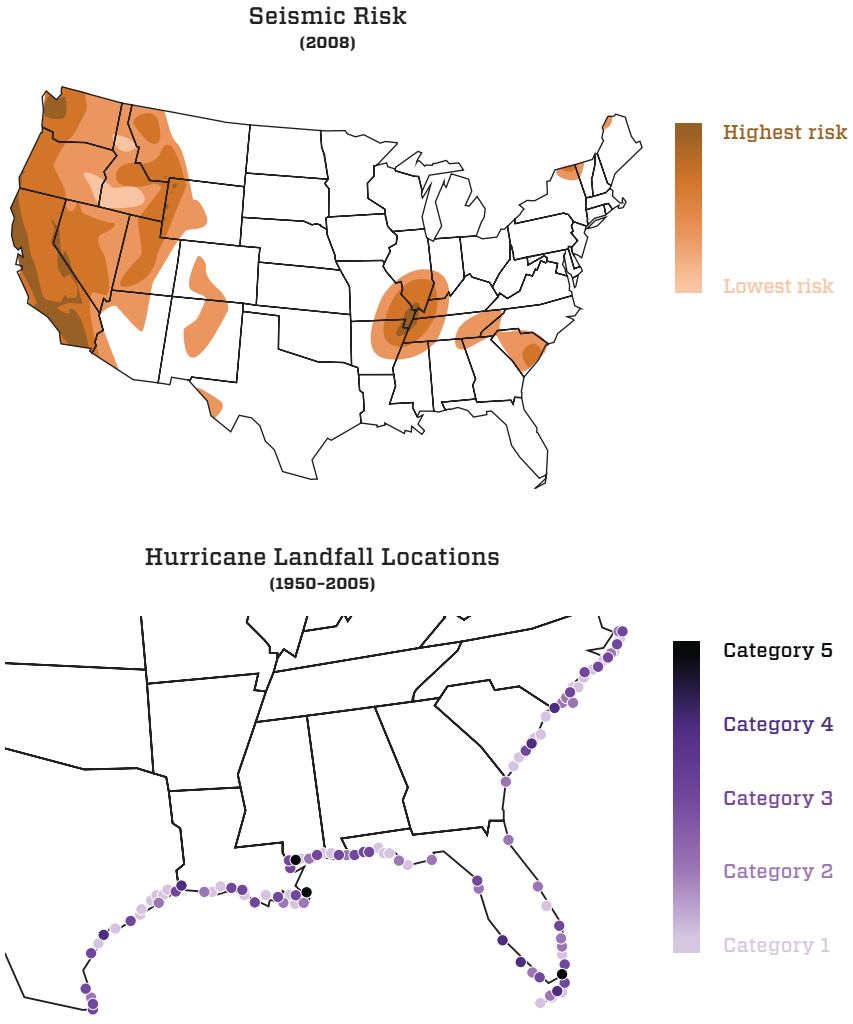
Another reason to get a home-state license is that insurance companies prefer to deploy adjusters already licensed within the disaster area in the first wave, before a state of emergency is declared. And they often employ locally licensed adjusters to stay afterward to handle any additional damage discovered after the initial claim. That said, states often waive their license requirements in a state of emergency, granting temporary emergency licenses to out-of-state adjusters.

For a license, you'll need to complete the 40 hours of required training, pass a test, and submit your application to the regulating authority. For Texas and Florida, this entails fingerprinting and a criminal background check. Usually you will receive your license within a few weeks. Indiana currently does not require fingerprinting, and its process takes less than one week.

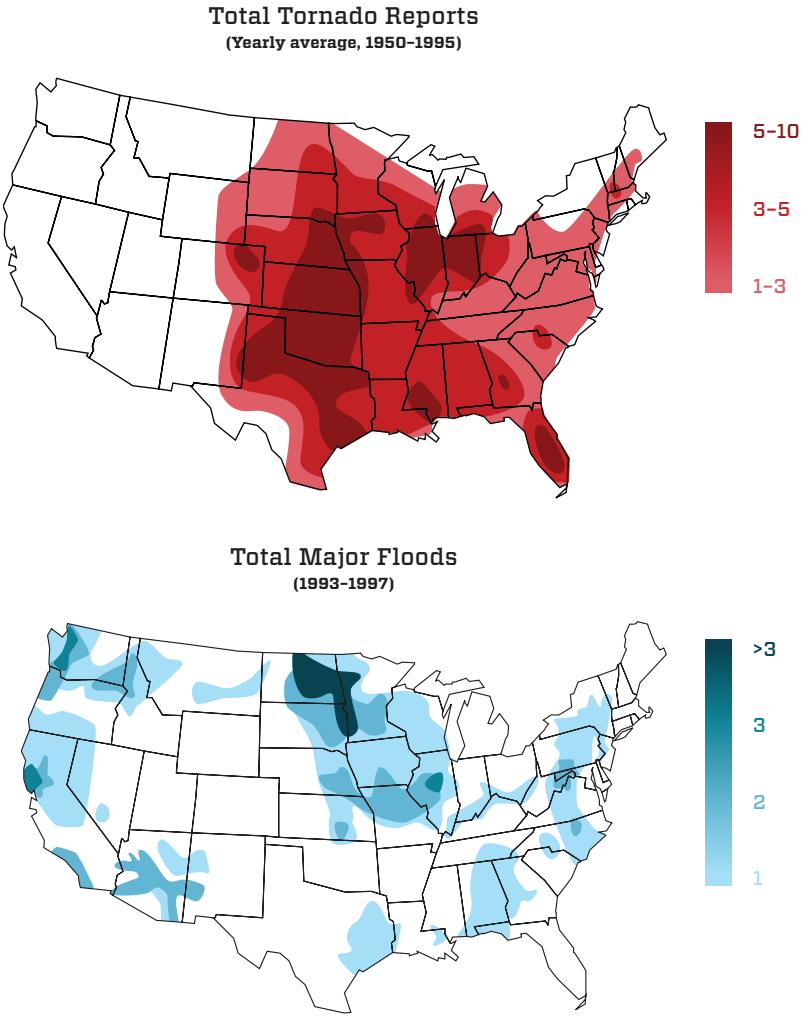
Once you have a home-state license, it's a good idea to get licensed in areas where big storms occur, such as along the Atlantic coast, or in underserved areas where few independent adjusters have licenses, such as Arizona. In every instance, you'll need to take continuing education classes to maintain your primary license.

Training. Your background in construction establishes a good foundation for this type of work because one of the job's two basic skills is creating estimates, which you already know how to do; the other is determining how the insurance policy responds to the specific loss, which will be a new area of expertise.

After obtaining your license, you'll need to learn to use Xactimate (xactware.com),



Seismic hazard data: USGS; hurricane data: NOAA



Tornado map data: NOAA SPC; flood map data: FEMA

the estimating program used by 75% of the insurance industry. You can learn the basics online, but I highly recommend week-long classroom training with plenty of practice. It's a big, powerful program that's complicated at first but so well-tailored to the industry that you'll marvel at its capacity. Two of the largest and best-known training companies are Vale Training Solutions (valetrainingsolutions.com) and Adjuster Pro (adjusterpro.com). You can view a list of approved Adjuster Licensing Providers on the Texas Department of Insurance website (tdi.texas.gov). For a full listing of adjusting firms, large and small, see the directory at catadjuster.org.

Price of admission. Pre-licensing courses that satisfy the basic requirements for obtaining a resident or non-resident state license are available in the classroom or online. The online format can be boring, but the courses are inexpensive ($150 to $350) and convenient if you need to stretch the training out over time.

Classroom courses are less flexible but are more engaging and quicker to complete—you can finish in about three days. They also offer a broader perspective on the industry, but are considerably more expensive at $500 to $750.

License fees vary from state to state in the $50 to $500 range. Some states require an annual payment; others, biannual. Also figure on spending $100 to $150 every two years to complete approved continuing education classes to maintain your license.

Additionally, you can attend adjuster's school online or in the classroom, which is worth considering if you have no background in insurance restoration, such as mitigating water damage, assessing roof damage, and understanding policies. These classes cost from $450 to $1,450, with the online version at the lower end.

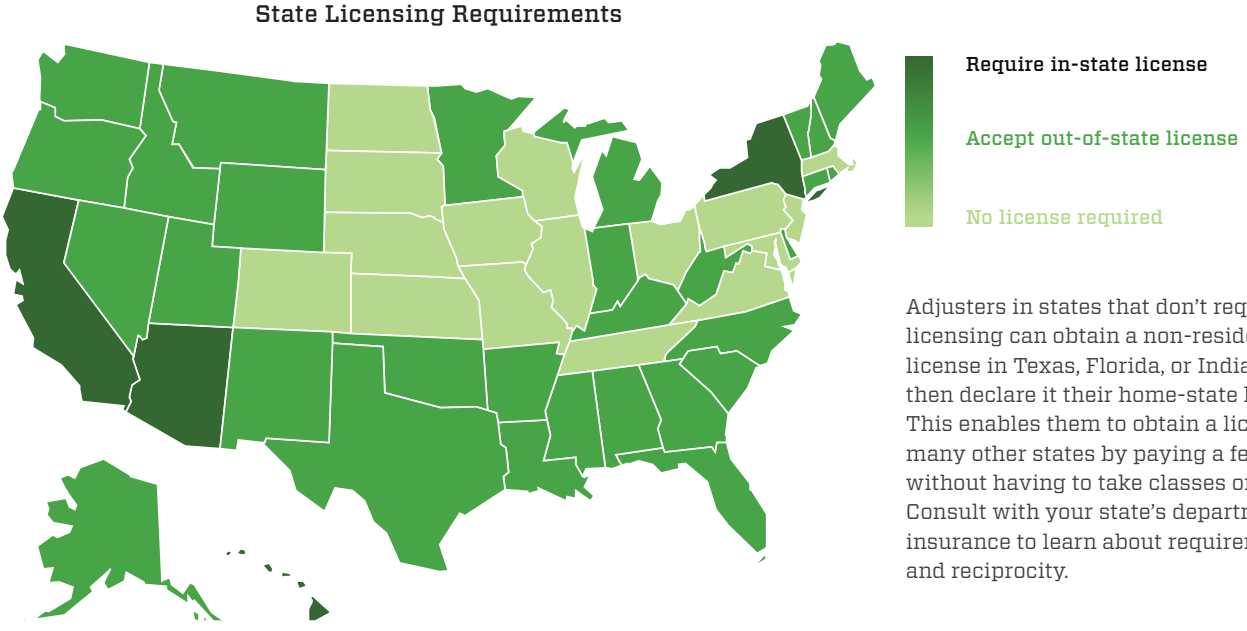
Depending on the demand for adjusters, you may get the training you need from your employer. If you go to work for one of the four major independent adjusting firms—Worley Catastrophe Response (worleyco.com), Pilot Catastrophe Services (pilotcat.com), Eberl Claims Service (eberls.com), and E. A. Renfroe & Co. (earenfroe.com)—you may get the training you need for a small fee or gratis, or you may even get paid a day rate (about $600) to attend classes.

GETTING WORK

Insurance adjustment work is unpredictable. It comes and goes with the weather, and it fluctuates year to year. When a huge hurricane makes landfall or several storms hit back-to-back, it's easy to get hired. Otherwise, you may get licensed and trained, then wait two years for your first deployment. But in my opinion, it's still worth it: In a banner year, top-level adjusters can earn $200,000 or more.

A few major adjusting firms, such as the four mentioned above, and many small ones as well, keep a stable of qualified adjusters eligible and ready to deploy in the event of a catastrophe. Every year, tropical storms, hail storms, tornadoes, and floods provide deployment opportunities. Whether you sign up with one large company or several, the goal is to generate a steady stream of deployment requests that you can accept or decline at your discretion.

Certifications. Disasters occur everywhere, and your adjuster's licenses allow you to adjust most claims, from hail to hurricanes. But some claims require specialized certification. I worked flood claims during Superstorm Sandy and found the niche rewarding. It is paperwork intensive



Adjusters in states that don't require licensing can obtain a non-resident license in Texas, Florida, or Indiana, then declare it their home-state license. This enables them to obtain a license in many other states by paying a fee, but without having to take classes or tests. Consult with your state's department of insurance to learn about requirements and reciprocity.

because most flood insurance is underwritten by the Federal Emergency Management Agency (FEMA), but the pay is about a third more for the same dollar value. The claims process is also cut and dried because there's only one policy to learn, unlike in the general insurance market, which has a dozen or more polices to deal with.

The other certification to consider is for earthquake claims in California. They don't come often, but when large earthquakes do occur, there's a lot of work to be done.

BUILDING INSPECTION

The only problem with CAT adjusting is that you have to wait for a storm, so most adjusters have a second job to fill in when the weather is calm. One option is municipal building inspection. The gig comes with benefits and a steady paycheck, but positions open rarely and fill quickly, and anyone used to self-employment will struggle with the bureaucratic environment. Also, you won't be able to take off with three days' notice whenever a storm hits the area.

The alternative I found was working as an independent commercial property inspector performing annual mortgage inspections for banks. Lenders were hammered during the recent recession, with bad loans on properties in extreme disrepair. In response, regulators ratcheted up due diligence requirements so that lenders must now inspect their collateral regularly to make sure it is being taken care of. A few large national companies get the bulk of the third-party inspection business and delegate the field work to a small army of qualified inspectors. By qualified, I mean a high-school diploma, considerable knowledge of building trades, and familiarity with commercial and large multifamily properties.

For certain types of inspections—principally of properties underwritten by Fannie Mae and Freddie Mac—commercial property inspectors must have certification. This comes with an eight-hour class and an exam. You also need decent computer skills because the reports (and there are many) require knowledge of programs such as Microsoft Excel and Word. You don't need to be a computer whiz, but most jobs require computer literacy and a facility for learning new programs.

The basic routine involves setting appointments, requisitioning documents, (such as rent rolls and market reports), and meeting with property contacts to walk the site. You take photographs, ask questions, and make note of deferred maintenance. Looking at the rent roll, you may notice that the lease for an anchor tenant expires at month's end, so you ask if the tenant has renewed. You also may notice that the parking lot needs resurfacing and the roof needs to be replaced—both items that represent important information for the lender. Back at the office (your kitchen table or a spare bedroom), you fill out the necessary reports.

Overall, I like the job because it allows me to do other things. I set my schedule and I can limit the number of assignments I do in a month. There's plenty of work, so if you want more, it's easy to be busy. Property inspection pays about a carpenter's wage, but it serves me well, filling the gaps between other assignments.

Previous to his exploration of insurance adjusting and property inspections, Fernando Ruiz was a developer and builder who specialized in affordable green housing for almost 30 years.

Licensing map data: Texas Department of Insurance

The Adjuster's Tool Kit

Adjusters are on the road for days or weeks at a time, so you'll have to carry everything you need—ladders, boots, probing and measuring tools, work clothes for every season, and accessories, such as gloves, that work whether it's very hot or very cold. You'll also need a toolbox for storing and transporting everything in your car (below, left), as well as a lightweight toolbelt to hold essential tools while estimating and clambering on roofs. I set up a simple mobile office in my car—with a laptop desk, as well as power inverters to plug in laptops and printers—and a complete office in my hotel room, including a portable scanner and printer, cables, extension cords, and general office supplies. I pack a jump rope too; you spend a lot of time in the car and need to get a little exercise now and then.

Here's my list of "must have" tools for insurance adjustment work, along with the approximate cost of each. Assuming you already have a vehicle but need everything else, this startup kit will cost you about $4,000.

MUST-HAVE TOOLS

1. A fuel-efficient vehicle, $25,000
It needs a good heater and air conditioner, and room for all the stuff on this list.

2. Navigation device (GPS), $175
When road signs are missing, maps won't work; a GPS can better orient you to your surroundings.

3. Laptop computer, $1,500; portable printer and scanner, $350
You need a lot of memory—Xactimate is a huge program and you'll be taking and storing lots of pictures. At the moment, the software that insurance companies use won't run in Windows 8, and insurance platforms won't work with browsers newer than Internet Explorer 7 (Google Chrome, for instance).

4. A good telescoping ladder, $300
I like the Xtend&Climb Model 780P Pro Series ($280, below, middle). It holds up to 300 pounds, extends to 12½ feet, weighs just 32 pounds, and is compact when collapsed (19¾ by 32¼ by 4½ inches).

5. A compact digital camera, $125; smartphone, $600; Bluetooth hands-free device, $85
A smartphone can take pictures, but a camera is easier to set up and has more memory, and spare camera batteries (which I carry with me) are easy to find. Also, if I drop my $120 camera off the roof (and I have, three times), I can pull out the memory card to save a day's worth of photos, and buy another camera at the nearest Wal-Mart. But if I drop my $600 phone, I waste a day finding a Verizon dealer to get the photos out of the old phone and buy a new one.

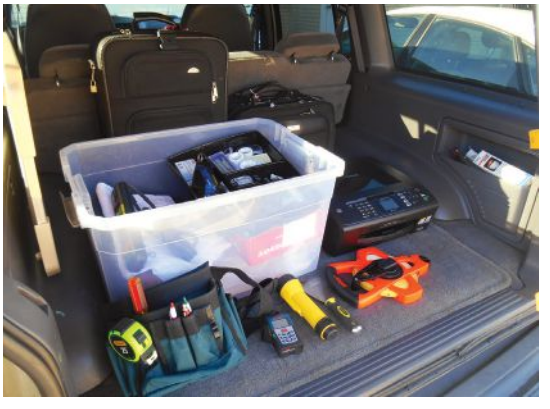
6. 25-foot tape measure, $15; 100-foot reel measure, $35; digital measuring device, $325
I like the Bosch Digital Distance Measurer ($90), although more expensive models are available (see "Laser Distance Measurers," Jan/13).

7. Toolbelt, $100
I use an electrician's pouch, but specialty adjuster belts are available that include a place for a clipboard and tablet, tape measure, and roof tools. One example is the CatManDo (customtoolbelt.com), which is designed to hold most of the tools an adjuster needs to carry.

8. Shingle gauge, $45; angle finder, $15; stiff putty knife, $8; chalk (to mark roofs for hail damage)

9. Roofing shoes, $145–$165
I like Cougar Paws, which are designed for walking on roofs (below, right). Although any nonslip shoe will work, you'll want to feel safe, and nothing works better than these specialized shoes with Velcro-grip soles.

10. Miscellaneous: gloves for heat or cold, $30; multipurpose knife, $75; slotted and Phillips screwdrivers, $25; flashlight, $25



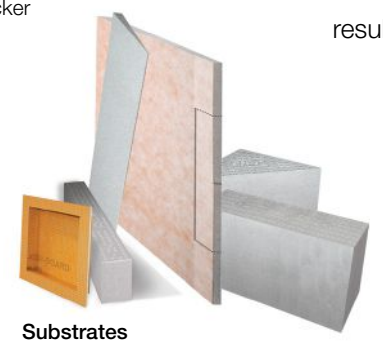
Photos, from left: author, Xtend and Climb, Cougar Paws

Waterproofing
Membrane or tile backer

Build your own custom design with tile-ready building panels, or opt for prefabricated, easy to install shower substrates that will create the bathroom of your clients' dreams. Incorporate beautiful linear floor drains into the décor to create an open concept, barrier-free bathroom.

With Schluter-Systems' Next Generation Bathroom components, no matter how you build the bathroom, moisture management is included, resulting in durable, spa-like retreats built to last a lifetime.

Drain
KERDI-LINE linear drain with 3 grate designs



Substrates
Tray, curb, bench, ramp and niche

Encapsulating ducts with at least 1 1/2 inches of closed-cell spray foam substantially improves HVAC performance in all U.S. climate zones. Burying the encapsulated ducts in loose-fill attic insulation improves performance even more.

Photos: Steven Winter Assoc./CARB

Buried and Encapsulated Ducts

Why is it so common—particularly in warm climates—to find air conditioning ducts, and even air handlers, in the attic? Isn't it hot as hell up there? It seems counterintuitive to route the cool air intended to condition a home through that space.

It is, in a way. But as I've learned, there are good reasons for running the AC through the attic. The obvious ones: It's easier to run supply ducts throughout a house that way, and it's more affordable—attics on a house with a sloped roof typically don't cost anything extra. (Compare that with running the supply ducts through basements—common in the Northeast. Though convenient, this option is a super-expensive way to run heating ducts.) But it also makes more sense to locate cooling supply outlets up high—in the ceiling or high on the wall—than in the floor. Cool air wants to fall and will cool the whole volume of a room on its descent. When cooling supply ducts are in the floor or located low on the wall, the air tends to stratify, with the coolest air staying near the floor and the warmer air up high—not the most comfortable distribution in a room.

But for all of the convenience and logic in favor of distributing cool air via the attic, we pay a huge penalty for running that air through the hottest space in the house. R-8—the highest-R flex duct typically available—offers only minimal help when there's a 65°F or greater difference between the air in the ducts (around 55°F) and the attic air (120°F or more). And then there are all the duct leaks of a typical install: supply leaks through which cool air is lost to the attic, and return leaks through which hot air is sucked into the system. System inefficiencies are greatest during peak demand conditions when the attic is hottest and system run times are longest.

The issue is not simply energy loss, though. There can be comfort issues, as well. When the HVAC system isn't running, the air inside the ducts heats up or cools down substantially, depending on the season. When the system kicks back on, this hot or cold air is pushed into the conditioned space—an unpleasant blast of air that increases the space-conditioning load.

It's no wonder that energy professionals have been telling builders and designers for years to run HVAC

ducts inside the building envelope. Valiant efforts have been made to incorporate ducts in dropped ceilings and soffits ("fur-down" model), or to employ custom "plenum trusses" that provide a duct chase above the ceiling ("fur-up" model). But adoption of these methods has been slow going, especially among production builders, says Bill Zoeller, project manager for the Consortium for Advanced Residential Building. (CARB is one of the research teams in the U.S. Department of Energy's [DOE] Building America program that works with builders to improve home energy efficiency.)

CARB's work on ducts started when one big builder it was working with pushed back on recommendations to drop the ceiling so that ductwork could be run inside the insulation and air barrier. The builder wasn't willing to sacrifice ceiling space, Zoeller says, but was willing to run the ducts close to the ceiling plane in the attic and pile more insulation over them. Doing just this improved HVAC performance enough that the DOE asked the CARB team to run some metrics to quantify the improvement in energy savings in all climate zones.

Work in hot, humid climates revealed a problem. While the added insulation provided lots of thermal resistance to prevent the hot attic air from warming the air in the ducts, it lowered the temperature of the duct jacket, allowing it to fall below the dew-point temperature. This allowed condensation to form on the outside of the ducts when attic humidity was high. The solution: Spray at least 1½ inches of closed-cell foam on the outside of the duct. (Note: At least 1½ inches of mineral fiber insulation is required as an ignition barrier over spray foam, unless the foam is approved for use without an ignition barrier. See "Making Sense of Spray Foam and Ignition Barriers," Nov/12.)

In CARB's field studies, during which the team monitored temperature levels, the combination of burying ducts in loose-fill insulation and encapsulating them in closed-cell spray foam showed no potential for condensation. The tests demonstrated that encapsulating the ducts brought the existing R-4.2 flexible ductwork to values between R-9 and R-13, depending on duct size. Burying *and* encapsulating ducts increased R-value to levels between R-16 and R-31. In addition, the spray foam substantially reduced duct leaks, bringing the leak rate to a level comparable to that in houses with air-handling units in the living space. Zoeller recommends that ductwork be sealed with mastic prior to insulating, even when encapsulating. It's the sort of belt-and-suspenders approach that makes most energy measures work.

Duct encapsulation. Top: before drywall; bottom: after drywall.

Zoeller reports that adoption rates for installing buried and encapsulated ducts both in new construction and in retrofit applications have been promising. Most HVAC contractors need a little direction the first time through when routing ductwork near the ceiling plane. "The problem," Zoeller says, "is that a lot of contractors don't think about it. They just start running duct, and the result is often a confused mess." Offering a little direction in advance forces them to think more carefully about it, which by itself is bound to improve duct performance.

Clayton DeKorne is executive editor of JLC. *For more information, search for the "Building America Measure Guideline: Buried and/or Encapsulated Ducts" at the EERE Library (www1.eere.energy.gov/library).*

BY CHARLES WARDELL

Rock Touch
According to the manufacturer, you can safely lay a hot pan on Pyrolave's Enameled Lava Stone Countertop. Quarried from the crater of an inactive volcano in France, the stone is glazed with hard enamel in 32 colors and comes in 30, 40, 60, and 80mm thicknesses and lengths up to 9 feet. Retail price: $330 per square foot. Pyrolave, 919.788.8953, pyrolave.com

Modular Towel Rack
Vola's new Modular Electric Towel Warmer hides the technical elements behind the wall for a clean look. Each installation can have between three and 20 bars placed 4 to 12 inches apart. A timer automatically shuts the heat off after two hours at full power. Pricing starts at $3,970 for a chrome three-bar unit. Hastings Tile & Bath, 212.674.9700, hastingstilebath.com

Hidden Power
The Pop-Out Outlet conceals three electrical sockets behind a flat wall plate. The spring-loaded outlet emerges with a simple push. Wiring is the same as for a standard 15-amp outlet. Prices vary by finish: a single-gang model ranges from $40 (white) to $48 (magnesium). Wall plates are separate and start at a cost of $5 for white. Legrand, 877.295.3472, legrand.us

Best LED Yet
Compared with an incandescent, the Infina LED Bulb is the same size and shape, but heavier and more solid, with a tad warmer light. It screws into standard fixtures, turns on instantly, and is dimmable. It comes in 40- and 60-watt equivalents and costs from $10 to $20. The company claims a 25,000-hour service life. Switch Lighting, 888.978.4110, switchinfinia.com

Easy Access
Available on soaking tubs, air bath, whirlpool, and combo massage models, American Standard's Walk-in Bath has a watertight outward-opening door. This leaves more room inside the tub when the door is open, offering easier access to the tub seat, especially for wheelchair users. A Quick Drain pump drains the tub in about two minutes. Prices range from $7,900 to $11,000. American Standard, 800.442.1902, americanstandard.com

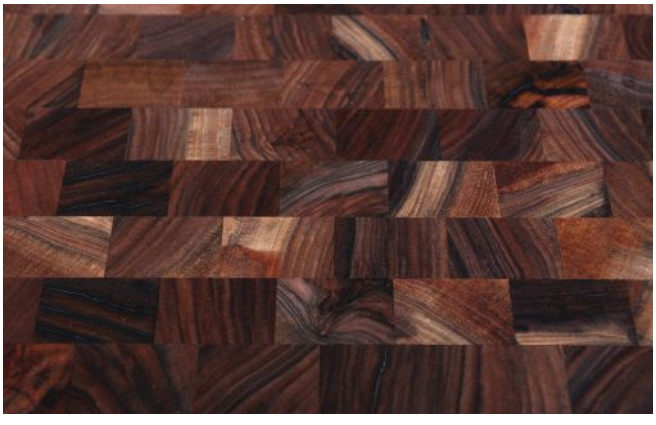
Against the Wind
Although Atlas' new high-performance or HP Technology Shingles are no thicker than other architectural shingles, they are warranted to withstand 130-mph winds with four nails per shingle and a 6-inch exposure. A double sealant line offers better adhesion and a 14-inch width creates a 1 1/4-inch nailing area. Cost: $22 to $30 per bundle (three bundles cover a square). Atlas Roofing, 800.388.6134, atlasroofing.com

Integrated Shade
Invisible when retracted and fully integrated into the frame, Marvin's Automated Exterior Shading System has a low-voltage motor—controlled by app or switch—that can be programmed to adjust shade height throughout the day. Jamb depth with the shade is 6 3/4 inches, so it needs a 2x6 wall. A typical casement with this system retails for $3,000 to $4,000. Marvin Windows and Doors, 888.537.7828, marvin.com

Preventing Tank Leaks
Contemporary toilets have smaller tanks than older models, so placing a new toilet on an existing flange can leave a gap between tank and wall. Leaning on the tank will strain the bolts that connect the tank and the bowl, deforming the gaskets and causing leaks. Secure-A-Tank plastic brackets hook over the lip of the tank to add the missing support. Cost: $20 for a three-unit pack. Vadco Innovations, 800.699.8232, secureatank.com

Mix-and-Match Trim
Design-A-Column is a line of half-round column elements for cabinets and other surfaces. It includes columns, caps and bases, center spindles, and end blocks in maple and cherry, each pre-sanded and ready to paint or stain. Column pieces come in 4- and 8-foot lengths and in 1½- and 2½-inch widths, with prices from $9 to $48. Caps, bases, and center spindles cost between $4 and $16. Outwater, 201.498.8750, outwatercatalogs.com

Standing Tall
Available in custom widths and in heights up to 8 feet, Signet foam-filled, hand-stained Fiberglass Entry Doors have 2 5/8-inch finger-jointed 3-ply hardwood hinge stiles and 4 1/4-inch 4-ply hardwood strike stiles. Options include style, color, and finish (cherry, mahogany, fir, and oak). Shipping time is about two weeks. List price for a prehung, prefinished door is around $3,200. Provia, 800.669.4711, proviaproducts.com



Scratch-Resistant Counters
The same characteristics that make end-grain cutting boards popular also make the material good for countertops. Oregon Black Walnut End Grain Countertops, made by fusing the end pieces of wood strips, are made to order in sizes as large as 3 feet by 8 feet, with curving and shaping also available. About $148 per square foot. The company ships nationwide. Windfall Lumber, 360.352.2250, windfalllumber.com

Sea Hue
Fans of coastal architecture should warm to the cool undertones of Trex's new Pebble Gray Decking and Railing, part of the company's Select Composite system. Deck planks are made from a stain- and mold-resistant shelled composite material, with a grooved or square-edge profile. Railing is installed with an external bracket system. Pricing is $2.50 to $2.75 per linear foot. Trex, 800.289.8739, trex.com

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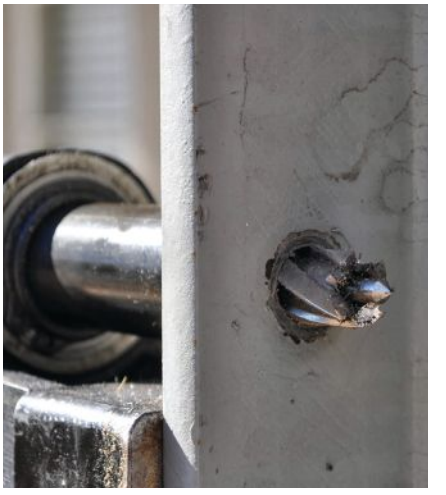


Hougen HMD904 Mag Drill

BY SIM AYERS

As residential and commercial builders and remodelers, we install a mind-boggling amount of steel to meet the stringent seismic requirements of the California building code. To make mechanical connections, we drill ½-inch- to 1-inch-diameter holes through steel I-beam flanges up to ¾ inch thick and steel plates up to 1 inch thick. Until 2009, we bored these using standard high-speed-steel twist drills. Each took about an hour, and we could go through hundreds of dollars' worth of drill bits per job. Then, following the lead of local ironworkers, we started using a Hougen HMD904 portable magnetic drill with Hougen Rotabroach annular cutters.

At 27½ pounds, it's one of the lightest magnetic models on the market and can bore holes from 7/16 inch to 1½ inches in diameter, up to 2 inches deep. To use the drill, you position it on the material, press the rocker switch to turn on the magnet, push an adjacent button to turn on the motor, and rotate the feed handle to power the bit through. We squirt cutting fluid on the cutter before drilling each hole.

With the HMD904, we now drill an average hole in about two minutes. The annular cutters are reasonably priced (an 11/16-by-2-inch cutter costs around $50). They typically drill more than 100 holes before they dull, and they can be resharpened. Like hole saws, the annular bits cut a plug out of the material (photo, above right), which means they convert far less solid steel into chips than standard twist drills do.

When using this tool, we always keep a handhold, in case the tool lets go. If working high up, we strap it to the work with the included chain. We learned that lesson the hard way: A mag drill once fell 20 feet when its power cord unplugged, smashing onto the rocks below.

HMD904 Specs

Weight (by mfr): 27.5 pounds
Amps: 8
Max. hole size with annular cutter: 1 1/2-inch diameter by 2 inches deep
Price: about $925
Warranty: 1 year

Hougen / hougen.com

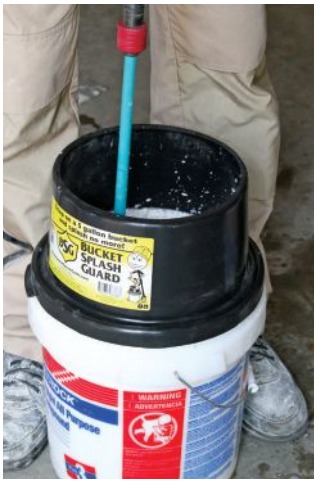
Sim Ayers owns SBE Builders, in Discovery Bay, Calif.

Photo, bottom: Linda Ferguson

SPLASH CONTROL

During a recent indoor demo at a drywall yard, I was about to mix a full 5-gallon bucket of joint compound with my power mixer when a store employee handed me a Bucket Splash Guard to snap onto the bucket. He said he wanted my opinion of the product, but I think he also didn't want me to make a mess. Made from recycled plastic, the guard is about 6 inches tall and tapers slightly toward the top, which has an inner lip. The guard popped on and off the bucket easily and did such a good job of containing splatters that I now often use one when mixing buckets of compound and paint where I need to keep the floor or my clothes clean. Cost: $14.95, plus shipping and handling, at bucketsplashguard.com.

Myron Ferguson is a drywall contractor in Middle Grove, N.Y., and presents the Drywall Trade Secrets clinic at JLC Live.



RUST WARRIORS

It's hard to imagine a more corrosive environment than the northern California coast, where I live. Rust Free and Boeshield T-9, two products manufactured by PMS Products (boeshield.com), have been working well for me to both remove and protect against rust on vulnerable tools and equipment.

To remove light rust, simply spray on Rust Free, allow the acidic solution to penetrate, then wash it off. Remove heavier rust with multiple applications and abrasive pads. T-9 is a solvent and paraffin-wax formula developed by Boeing to lubricate aircraft components while defending against rust and corrosion. It displaces moisture and dries to a thin film.

I've used the two products to remove rust from my thickness planer's cutterhead, for example, and to keep it rust-free—which used to be a chronic headache. And SawStop just told me over the phone that T-9 is a good choice for protecting the cast-iron surface of its contractor table saw. The products shown cost between $13 and $16, but other containers and sizes are available. *—Bruce Greenlaw is a contributing editor to* JLC.

Hitachi NV50AP3 Cap Nailer

BY JOSH DUNLAP

Like many builders, we used to use hammer tackers to staple up housewrap, felt, and other siding and roofing membranes. Hammer tackers are fast, but they can cut through the material, the staple holes can leak, and foot traffic or wind can tear the material off the staples.

Using capped fasteners can eliminate those problems, which is one reason why many major manufacturers of housewrap and synthetic roofing underlayment now recommend or require them. Plastic caps increase a fastener's surface area, thereby increasing its holding power. As a result, the membrane is much less likely to tear out from underneath the fastener, especially when exposed to wind—even a light breeze can pressurize housewrap and underlayment, causing tears around staples and ordinary roofing nails.

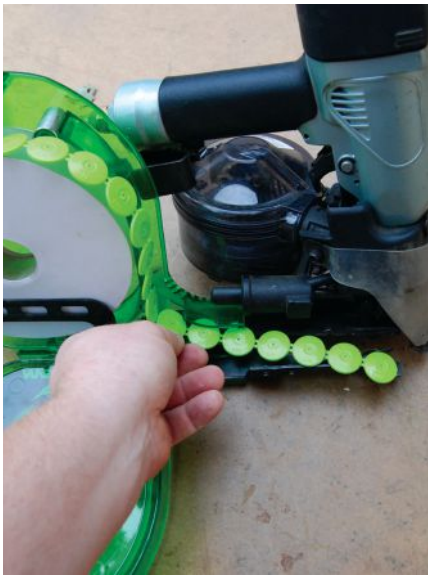
We switched to hand-driven plastic-cap nails a few years ago to comply with the new manufacturer recommendations. The fasteners work well, but only a small number can fit into a nail bag, and hand-nailing is awkward and slow. Hoping to dramatically speed up the work, we bought a pneumatic Hitachi NV50AP3 coil cap nailer. That was almost a year ago, and so far, we've been happy with that decision.

NARROWING THE FIELD

We initially considered buying a pneumatic cap stapler, but quickly switched our focus to cap nailers because nails are more dependable in high winds and are approved by more synthetic-roofing underlayment manufacturers. Also, the most powerful cap-nailer models can drive longer fasteners.

Based on my research, we shortened the list to two options: the Bostitch N66BC and the Hitachi NV50AP3. The Bostitch can drive cap nails up to 2 ½ inches long, so it can be used to attach 2-inch-thick foam. It holds 300 coiled nails, but only one cylinder of 100 string-collated plastic caps, which means you have to reload the caps three times per nail coil.

The Hitachi, on the other hand, drives cap nails up to only 2 inches long but conveniently holds 350 coiled nails and a matching reel of 350 plastic or metal caps. Also, we've owned more than 20 Hitachi



nailers during the past 13 years with almost no complaints, and the NV50AP3 is a third-generation model that has been on the market since 2005. Although the Hitachi cost about $180 more than the Bostitch, we bought the Hitachi.

THE VERDICT

We've used the NV50AP3 to install Tyvek HomeWrap, ¼-inch fan-fold foam, #30 roofing felt, and RhinoRoof synthetic roofing underlayment—driving more than 30,000 1¼-inch-long plastic-cap nails. Hitachi sells them by the case for about $52, packing 2,800 caps and nails into a sturdy cardboard box with dividers that keep the rolls from uncoiling.

I'd estimate that using the tool is at least five times faster than hand-nailing. Once we dial in the driving depth, the NV50AP3 consistently sets nails to the desired depth even in foam, which is hard to do when hand-nailing. Although we've used the tool in temperatures down to 15°F, it has misfired only occasionally—when a cap hadn't completely severed from the roll. It was easy to clear the problem and get back to work.

As advertised, the tool is well-balanced and feels lightweight. The cap magazine is bulky but doesn't prevent us from nailing into tight spots. The cap and nail magazines are both easy to load one-handed while we're working out of a nail apron on a roof or ladder, holding the tool with the other hand. We also appreciate the translucent magazine covers, which let us check the contents at a glance. You can easily adjust the exhaust vent so it doesn't blow air in your face, and a simple switch toggles between bump and sequential firing.

On the downside, the tool doesn't have a rafter or belt hook, and you have to install your own 3/8-inch NPT male plug at the air inlet. But overall, Hitachi's cap nailer has been a great tool that's paying its way in labor savings.

NV50AP3 SPECS

Weight (by mfr): 5.52 pounds
Nail lengths: 7/8 inch to 2 inches
Nail capacity: 350 (1 coil)
Cap capacity: 350 (1 reel)
Price: $500
Warranty: 5 years, 30-day satisfaction guarantee

Hitachi / hitachipowertools.com

Josh Dunlap is production manager for Consolidated Design & Construction Group, a residential design/build remodeling contractor in St. Louis.

HEAVYWEIGHT CATALOG

The 2013–2014 Grainger catalog just landed in my mailbox with a thump: Its 4,674 pages weigh about 8 pounds and offer more than 570,000 products. There are hand tools, power tools, and accessories, plus loads of safety gear, from eyewear to fall protection. But you'll also find motors and bearings, circuit breakers and thermostats, hand trucks and casters, hoists and winches, thermal imagers and video borescopes, ladders and scaffolding, nuts and bolts, lags and deck screws, pneumatic hoses and couplers, pumps and water heaters, gate valves and check valves, airless sprayers and welding supplies, and so on. There's also useful technical information, such as an LED lighting guide on page 661.

I can't remember if I've ever ordered from Grainger. I've always found lower prices for power tools elsewhere. But I've used the catalog as a problem-solver and idea book for years, even consulting it for terminology. Order the free catalog at grainger.com or by calling 800.472.4643. You can also view it online. *—B.G.*

BY JON VARA

About the only thing Vermont Windows have in common is their positioning: The jambs run parallel to the roof planes they are sandwiched between. Despite the absence of any special drainage details, these windows seem to hold up as well as conventionally installed double-hungs.

Vermont Windows

For a farmer-carpenter looking to add a wing to a house without doing any complicated roof cutting, the path of least resistance is to build off a gable-end wall, with a new ridgeline parallel to and lower than the existing ridge. Unfortunately, that sharply reduces the natural light available to the upstairs bedroom in that end of the original house. Lowering the new ridge enough to add a full-size window in a normal orientation would help, but would also eat up valuable space in the addition.

The solution: Recycle one of the old gable-end windows by tilting it at a rakish angle and squeezing it into the narrow strip of wall between the old and new rooflines. The result—often termed a Vermont Window—is a common sight in the Green Mountain State. Occasional examples also turn up in adjacent New Hampshire and Maine, but it's a window placement that's rare elsewhere.

And, one might think, rightly so. By any normal standard, a diagonal window a few inches above a roof plane would seem to be a recipe for slow-motion disaster. It's subject to being buried by snow and soaked by rain splashing off the roof. Any moisture that runs off the glass flows naturally to the bottom corner, where it's liable to permeate the sash, trim, and framing.

But surprisingly, none of the half-dozen or so Vermont-based window restoration contractors we spoke with could recall ever having to make extensive repairs to a Vermont Window. Most speculated that the gable-end overhang typical of Vermont vernacular farmhouses—fairly generous in size and seldom more than a foot or so above the window's upper edge—provides enough protection from weather to make up for the design's obvious shortcomings.

"I'd also guess that orientation makes a difference," says Sally Fishburn, a historical-window expert in Danville, Vt. "I bet you'd find that most of those windows are on the side of the house that faces away from the weather." If true, that could be the happy result of good planning on the part of the original builders—or it could simply mean that the badly oriented examples have long since rotted away and been boarded over.

Jon Vara is a writer in Cabot, Vt.

Photos: Jon Vara

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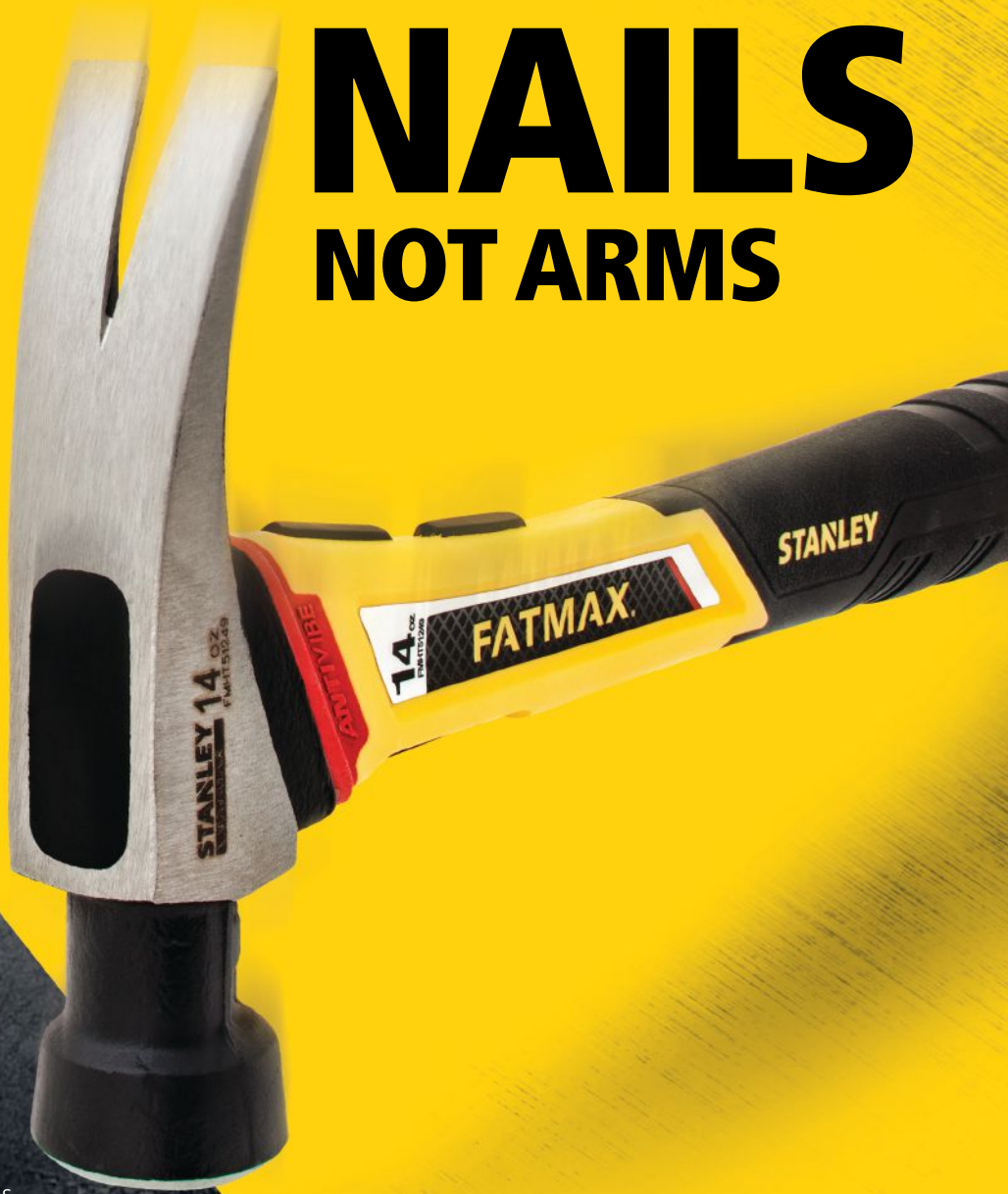

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