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On the cover: As a 250-ton house in Babylon, N.Y., is lowered onto its new raised foundation, a carpenter on Rich Sangiorgi's crew scrambles to cut out a high sill plate. Photo by Clayton DeKorne.

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THE JOURNAL OF LIGHT CONSTRUCTION (ISSN 1056-828X), Volume 32, Number 4, 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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Q I have a kitchen remodel with a dining room addition in an older home with board sheathing over 2x8 joists. The client wants uninterrupted tile throughout both rooms. The floor of the addition will be I-joists, but how do I join the two floors without putting down a mud layer?

A Michael Byrne, a veteran tile installer and consultant, and the moderator of *JLC*'s Ceramic Tile Forum, responds: I don't recommend installing tile over any floor with 2x8 joists, and the 1-inch diagonal subflooring is not much help.

The whole purpose of beefing up the floor is to eliminate flex, which can crack or loosen the tile over time. If you want to avoid spreading a mud layer over the entire area, here is what I would recommend. First remove the existing board sheathing and then screw and glue down ¾-inch plywood or engineered-lumber subflooring to the joists, with the face grain of the subflooring running perpendicular to the joists. When you build your addition, install the floor so that the ¾-inch subflooring over the I-joists abuts the new kitchen subfloor at the same level.

Now instead of ⅜-inch or ½-inch plywood underlayment just screwed to the subfloor, glue and screw ⅝-inch or ¾-inch plywood underlayment to the subfloor. To fasten the underlayment, first cover the entire subflooring surface with Type I or II glue using a toothed trowel. Then screw down the underlayment every 6 inches around the perimeter and every 8 inches in the field. Run the underlayment perpendicular to the joists, but stagger the end seams by 4 feet and the side seams by at least 8 inches from the subfloor layer. If the kitchen and dining room subfloors are the same level, you should be able to run the underlayment across both floors uninterrupted. You now have 1½ inches of consistent underlayment to support the tile, which is the bare minimum I'd recommend for the kitchen floor.

With any substrate assembly like this, install the tile with a latex-modified thinset mortar, but I'd suggest first installing a load-bearing, crack-isolation/waterproofing membrane over the underlayment. The membrane minimizes problems related to the expansion differences between the subfloor and the tile, and it protects the substructure from water damage in normally wet areas such as a kitchen. If the new floor is already installed, you can adjust the thickness of the underlayment to give you some flexibility when trying to match the height of the two floors. But keep in mind that ⅝-inch is the absolute minimum required thickness for plywood underlayment for ceramic tile installations—any less and the installation will fail.

Also realize that these configurations may only apply to ceramic tile, and not to stone or glass, which usually require a thicker and stiffer substrate. For best results, consult the tile manufacturer's substrate requirements, as well as the requirements for all of the materials that you use.

As a final point: Depending on the overall size of the floor, you may have to install a network of movement joints. In section EJ171 of the TCNA handbook (tcnatile.com), movement joint requirements are spelled out and must be followed for both tile and membrane installations. Without the correct network of movement joints, any tile installation may fail even if the best materials and practices are used.

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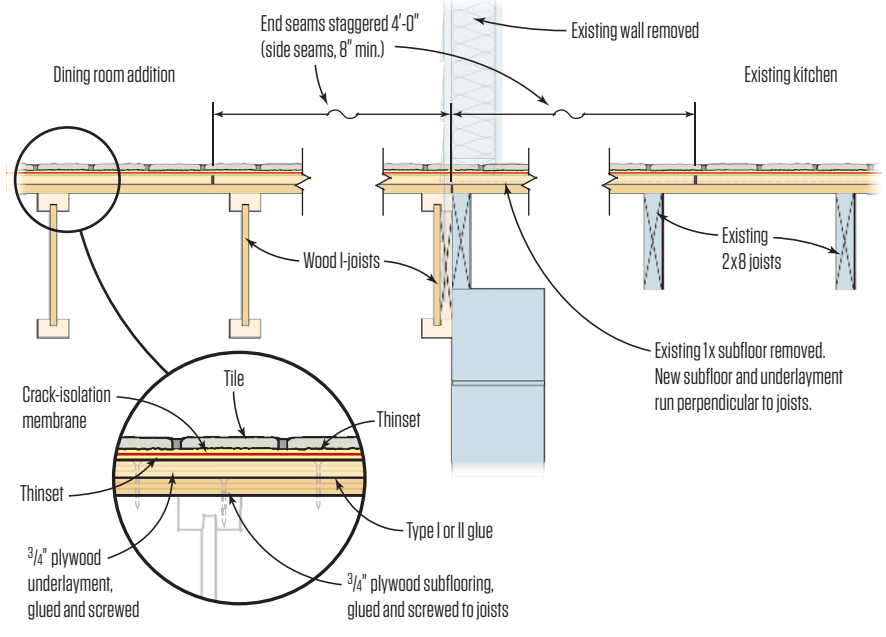

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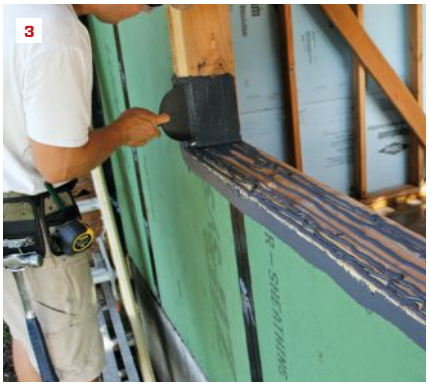
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On Site With Liquid Flash

Recently, I used Huber's Zip System Liquid Flash for the first time. It was on a remodeling project where we installed Zip System R-Sheathing on the walls (see *JLC* Oct/13) and 5/8-inch-thick Zip Panel on the roof. Huber designed Liquid Flash to be used in areas where Zip tape might not be easy to apply, such as pipe penetrations and window openings.

This liquid-applied "membrane" comes either in 20-ounce sausage packs or in 29-ounce cartridges and is covered by the same 30-year warranty as Huber's full system. It is relatively new—available since last summer—and we wanted to try it out on a few windows that we were installing, as well as on pipe penetrations, to see how it performs.

Sill pans. After making sure that the rough sills were free from debris, wood splinters, and other contaminants, we started off by running a thick bead of Liquid Flash at the corner of the rough opening **(1)**. Next, we applied it in a serpentine pattern a minimum of 6 inches up the jambs, then across the sill in straight, parallel beads, filling in any irregularities by squeezing out a little more product. Last, we ran a bead on the outside face of the sheathing **(2)**. We then spread the product out evenly using a disposable putty knife, being careful to spread it a minimum of 2 inches onto the face of the sheathing.

Liquid Flash is fairly sticky and has a tendency pull away from itself, so it's important to use enough product for proper coverage, especially at corners **(3)**. Because it self-levels a little bit, we didn't have to overwork it. You can tell when you've achieved the minimum thickness of 12 to 15 mils: when you can no longer see the substrate underneath.

Photos: Kyle Diamond

We used one 29-ounce cartridge to complete the sill pan on this 5-foot-wide window—framed in a 2x6 wall with 1.5-inch-thick R-Sheathing panels **(4)**. Liquid Flash is a moisture-curing product; low temperatures and low relative humidity slow the drying time, while high temperatures and humidity accelerate it. The day we applied Liquid Flash was moderately humid and in the 70s; it took about 45 minutes to skin over and 4 hours to dry.

One more thing: Be sure to use Huber's recommended sealant for setting the window nailing fins. Initially, we tested Lexel, a solvent-based co-polymer rubber sealant, on some scrap Zip panel coated with Liquid Flash and it didn't cure. After talking with Huber, we ended up using 100% silicone sealant, though butyl and polyurethane are also acceptable.

Penetrations. At the roof, we sealed gaps around vent pipes **(5)** and a PVC flue **(6)** as a precaution until the self-adhering membrane, flashing boots, and shingles were installed. At the flue, we followed Huber's specs, which call for backer rod in gaps wider than ½ inch. At wall penetrations, which were blocked out for the siding, we put a bead on the top of the block, tooling it to create a fillet **(7)**, again as a precaution until the flashing and siding were installed.

Costs. For a sill pan, Liquid Flash is more expensive than tape—$34 for one 29-ounce cartridge compared with less than $10 for 12 to 15 feet of 6-inch tape. (Liquid Flash took about 5 minutes less to apply than tape.) However, I'd highly recommend it for flashing mechanical penetrations.

Kyle Diamond is a partner with New Dimension Construction, in Millbrook, N.Y. To see a video of this project, go to the online version of this article.

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Dressing up Porch Posts With PVC

BY EMANUEL SILVA

I've renovated many porches that have treated 4x4 or 4x6 posts supporting their roofs. Those posts seem spindly and out of proportion with the scale of the porch, so I have a system for wrapping PVC trim around the posts to give them the appearance of being more substantial while also making them look infinitely better than the bare treated wood.

To make this process fast and efficient, I create all the components on my workbench. Instead of buying stock sizes, I rip all the parts from a sheet of ¾-inch PVC using a track saw **(1)**. Doing so is less expensive, and it gives me the flexibility to create the exact sizes I need. To join the edges of each component, I use butt joints instead of miters. Butt joints are faster and easier to make than miter joints, and they all but disappear when sanded and finished.

Treated posts can move and twist over time, so I like to give them ½ inch of wiggle room on all sides when I make my wraps. The posts in this project were 4x6s, so I ripped the narrow part of the main sleeve at 6 inches: 3½ inches for the post, ½-inch space on each side, plus ¾ inch on each side for the intersecting sides of the wrap. The wide sides of the sleeve were 6½ inches: 5½ inches for the post, plus ½ inch on each side for the extra space. For length, I measure from the porch floor to the beam overhead and subtract a couple of inches to account for the part of the post that will be covered by the base.

First I pre-assemble three sides of the sleeve on my workbench **(2)**. Every joint in the wrap is glued and screwed, and for consistency, I lay out the screw locations using a marking gauge and measuring tape. I've tried different fastening systems over the years, and using countersunk screws with plugged holes gives me the most dependable, long-lasting results. I pre-drill the holes using a Fuller countersink (wlfuller.com) and tapered bit with a depth collar that leaves a perfect ⅜-inch hole. I drill and fit the fourth side temporarily without gluing it. Then I set the sleeve aside to help me fit the other components as I make them.

The base comes first, and I rip the widths I need and cut them to length. As before, I glue and screw three sides together and screw on the fourth side temporarily. I bevel the top of the base to shed water, so while it's still all together, I set the bevel angle on my table saw and run the piece through on all sides **(3)**. Then I remove the fourth side and set all the pieces aside.

The top collar is thicker and wider than the other components, so I stack two layers of ¾-inch PVC glued


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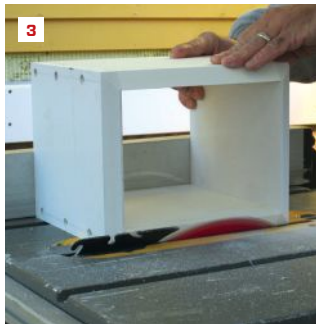
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Photos: Carter Silva


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and screwed face to face. Because this band is purely decorative, I glue and screw three sides together with simple butt joints **(4)**. Again, the fourth side is screwed on temporarily so that I can ease the edges using a round-over bit in my router. I also give the edges a quick sanding to even them out and to smooth the "end-grain" of the PVC. Instead of removing the fourth side completely, I leave a screw in one end that will let me slide the collar over the post wrap and swing the fourth side into place. The final component is a simple square-edge support band that I make and pre-assemble like the other components.

Sleeving the posts. Now I can bring all of the parts for the wrap onto the porch. I start by slipping the pre-assembled part of the sleeve around the post **(5)**. With the final side of the sleeve already pre-drilled, I glue and screw it permanently to the pre-assembled part. At this point, the sleeve is just floating around the post, and the space I built into it allows me to plumb it in both directions.

I slide the sleeve up as high as it can go and drive screws on all sides at the bottom, securing it with a space between the sleeve and the post. Next I plumb the sleeve in both directions and drive screws near the top to anchor it **(6)**. At this point I can use my screws to micro-adjust the sleeve for plumb. When it is plumb, I drive screws into the pre-drilled holes on all four sides from top to bottom, taking care not to distort it by overdriving the screws.

Installing bases. I install the bases by slipping the pre-assembled part of the base around the post **(7)** and then screwing and gluing the final side in place. Once the base is complete, I just slide it down to the porch floor and screw it to the sleeve on all four sides.

The top collar is the only component that can be installed in one piece. I swing the free side out of the way as it slips around the sleeve **(8)**. Now it's just a matter of swinging that side back into place to complete the assembly. The supporting band is last and is installed much like the base; I slide it up along with the collar and attach it to the top of the sleeve **(9)**.

Plugs. Depending on my schedule for installing the wraps, I can plug the holes on the bench or after the wrap is installed. The PVC plugs are made from leftover scraps. I cut them with a ⅜-inch Fuller plug cutter chucked into my drill **(10)**. I always cut a lot of plugs—on this project, there were more than 90 holes to plug in each post wrap.

I dip each plug in PVC glue before tapping it into the hole **(11)**. When all of the plugs are in, I go back and trim them flush, using a thin, flat saw **(12)**. I sand the faces to smooth over the plugs and to remove any remaining saw marks. Finally, I caulk all the joints using 100% acrylic latex caulk. The wraps are now ready for paint.

Emanuel Silva owns Silva Lightning Builders, in North Andover, Mass.

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Ways to Optimize Your Website Navigation

In the new world of SEO (search engine optimization), it's becoming more about what you say than all of the technical ways that you say it. The new post-Panda and post-Penguin Google rankings, for example, are focused on finding subject-matter experts on certain topics who are asked to write about that topic across multiple websites. The search engines are looking for rich, varied content on your core subject within the body of your website.

In our series about SEO, we've focused on how to pare down your expertise to one of a handful of keywords (or topics). Now it's time to optimize your website navigation to help your audience—as well as the search engines—find your valuable content more easily.

What Is Navigation?

Your site navigation is how you choose to organize the content on your website. Most of us understand the concept of creating folders and directories to help organize our offline files. Organizing your website is no different. The catch is that most business owners create their website navigation directory structure before they've thought strategically about what their core focus areas for that content will be. For example, navigation for many sites is organized into these standard categories:

- Home
- About Us
- Products and Services
- Contact Us
- Blog

And there's nothing wrong with this structure from the standpoint of user experience, but it isn't optimized for a specific product or service that a visitor to your site may be interested in or how that visitor may have arrived at your website. Someone searching for "wicker patio furniture," for example, may need four or five clicks—Products and Services, Furniture, Outdoor, Patio, Wicker—to get to the section they want).

And it's not much clearer to a search engine. Nowhere in your navigation process do the words "wicker patio furniture" appear in one string. (In the example above, the last page with all the search results might be called http://randomstore.com/products-and-services/furniture/outdoor/patio/wicker.) If you had searched for "furniture outdoor patio wicker," this page might have appeared on the first page of search results. But that's not how people normally search.

Illustration: Michael Austin

Content Marketing Changes Everything

These days it's more about how helpful you are to your end audience than pushing out your products and services. Does your content answer their frequently asked questions? Does it inspire or inform them about key industry trends? Does it position you as a trusted adviser rather than just a product brochure? If the answer to any of these questions is no, then it's time to rethink how you approach what the purpose of your website really is. You may not want to change anything to optimize for SEO and content marketing, but I promise that your competitors will.

You will always want to keep about half of the core elements in your navigation: Home, About Us, Contact Us—these are always universally used and are helpful to your audience. However, the other navigation areas should be about your core subject-matter expertise and keywords. They should clearly indicate what you want your business or your staff to be known for.

The Business Approach

If you want to focus on your business, try creating two or three areas in your navigation that sum up the core offerings that you know more about than anyone else. In the example we've been using, you might select:

- Home
- About Us
- Outdoor Living
- Dream Kitchens
- Clean Garden Spaces
- Contact Us

Once those decisions have been made, you will want to move all of your content under the most relevant section. The wicker patio furniture content, for example, moves under Outdoor Living, and you would continue to make sure that all subfolders also follow a more "semantic" or natural flow (outdoor living/patio/furniture). You would take any blog articles or photos that were posted on the website in this area and feature them in this new Outdoor Living content section as well.

The Featured Expert Approach

You can also build your website around key personalities who have deep expertise in your subject matter. With this approach, the risk is that unless those people are the business owners, they may build their own personal brands with your company, then leave to start their own company or to work for a competitor. Think of Ty Pennington, who started out as a support carpenter on the reality TV show *Trading Spaces*, and ended up creating a strong personal brand.

With this approach, your site navigation might change to:

- Home
- About Us
- Jane's Outdoor Living
- Dream Kitchens with John
- Gary's Garden Sense
- Contact Us

In this scenario, blog content will be more prominent in each of the subsections of your site. You'll also want to supplement written content with rich media, such as video or project photos. The products that you sell will be recommended by your experts, and you'll even want to go so far as to have each product include a short endorsement or story about why it's recommended.

How This Helps SEO

Organizing your content based on keywords that reinforce subject-matter expertise infuses them throughout your website. So if "outdoor living" is one of your most important keywords, then by default every page in that section of your site will contain http://randomstore.com/outdoor-living in the URL.

The old days of worrying about meta tags and keywords are gone. Search engines want to see your level of commitment to basing URLs on your subject matter.

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

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VINYL SIDING

Photo: D. Holbrook

Better Results With Vinyl

A guide to best practices for product selection, installation, and repair

BY JLC STAFF WITH MICHAEL CHOTINER

It's fair to say that most contractors and their customers are hesitant when it comes to choosing vinyl siding. On the plus side, vinyl is affordable, it installs quickly, it never needs painting, and it's supposed to last 30 to 50 years.

However, on the downside, vinyl siding products have a reputation for fragility. Vinyl expands and contracts with temperature changes more than any other popular siding material. Joints can open up, panels can buckle, and nailing flanges can tear. In extreme heat, panels can lose rigidity and can sag. In intense cold, vinyl becomes brittle and can shatter from the impact of an icy snowball. And colors, especially dark ones, can fade over time from UV exposure.

Many believe it impossible to create traditional molding and trim details using vinyl siding systems that install with J-channels and snap-on starter strips. Others think that installing vinyl siding on an older home reduces its charm and value.

But most of the shortcomings of vinyl siding are being addressed by manufacturers and by the practical, creative efforts of expert contractors and remodelers. It's easier than ever to identify better-quality products, to minimize problems by using sound installation and repair techniques, and to preserve traditional aesthetics with the selective application of vinyl and other low-maintenance trim material.

SELECTING RELIABLE PRODUCTS

Whatever you might think about vinyl siding, it's important to know that the industry is changing. The Vinyl Siding Institute (vinylsiding.org)—the top industry association—provides programs that define and continually upgrade standards for material, manufacturing, and installation, which are promoted through a number of evolving ASTM protocols.

The ASTM standards include minimum specs for rigidity, impact-resistance, wind-loading, and color retention. Products that carry the "Certified VSI" label adhere to these minimum standards. But short of immersing yourself in the technical details, you can rely on some rules of thumb that experts use when selecting vinyl siding.

Strength and rigidity

The thicker the product, the better it is for stability, rigidity, and impact-resistance. ASTM D3679 specifies .035 mils as the minimum thickness for certification, but most pros won't use products less than .042 mils thick. You can find products on the market up to .055 mils thick, but be advised that overlap panel end joints will be more visible with the thicker material. For vinyl siding that has a more substantial look and feel, you can also choose premium insulated vinyl siding with either integrated or drop-in foam backing.

Color quality and retention

Vinyl siding consists of two layers: a substrate and the capstock that holds the color. In cheaper lines, the substrate is "gray back," unpigmented material that can show through scratches in the capstock. In better grades of vinyl siding, the substrate is pigmented to match the capstock.

Look for products with acrylic capstock. In addition to retaining color better than PVC, acrylic formulations have made it possible for manufacturers to offer a broader spectrum of colors—especially the darker hues.

Whenever possible, choose vinyl siding in colors certified under VSI's Color-Retention Program. There are currently more than 350, and the list continues to grow.

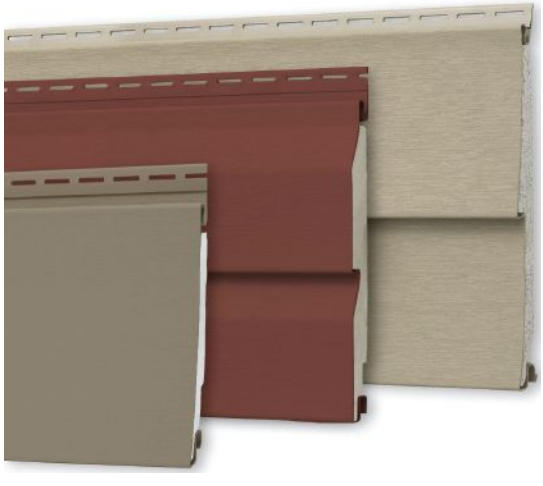
Opt for lower-luster surface finishes, which have a more natural appearance. Many vinyl manufacturers also offer textured woodgrain patterns that are taken directly from natural wood samples.

Minimize tell-tale lap joints

The joints you see in vinyl siding are actually overlaps, and there is no way to hide them with filler and paint as you do with wood. Using panels longer than the standard 12 footers—most manufacturers offer panels as long as 16 feet 8 inches—can reduce the number of joints by as much as 40%.

Avoid double- and triple-course panels on long walls. The stacked joints are a dead giveaway that the siding is not wood. Single-course vinyl planks are available in 5- and 7-inch profiles and are more easily installed with random butt joints.

Vinyl siding profiles that have broader butt edges tend to be more rigid and to stay straighter than designs that have shallower butts. The siding on the left doubles over the nailing hem completely for more strength, while the siding on the right just folds over the top edge of the hem.



Vinyl siding with integrated foam backing or drop-in foam backing keeps its shape better, offers greater impact-resistance, and adds a layer of insulation for a higher R-value.

Photos: left and center, Roe Osborn; right, Alside

SUBSTRATES FOR VINYL SIDING

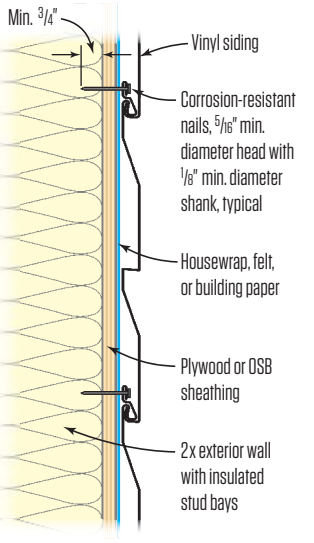
Vinyl siding must be installed over nailable wall sheathing that is perfectly flat and smooth, such as CDX (exterior plywood) or OSB. The sheathing must be protected by a moisture barrier, with seams taped to prevent water intrusion.

The Vinyl Siding Institute considers vinyl siding as part of a "water-resistive barrier system," not a water-resistive barrier by itself. By its nature and design, vinyl siding works well as a supplemental rainscreen in the system, cutting down the amount of water that gets through to the water-resistive material covering the sheathing. Properly installed vinyl siding is attached somewhat loosely to allow it to expand and contract with temperature changes, so it's always subject to some moisture penetration from wind-driven rain and similar sources of water. But because the vinyl panels are hollow and have slotted nail hems, they allow sufficient airflow as well as an escape path for moisture to easily drain off. The spaces and materials behind the vinyl dry out readily—even without strapping spacers, many claim.

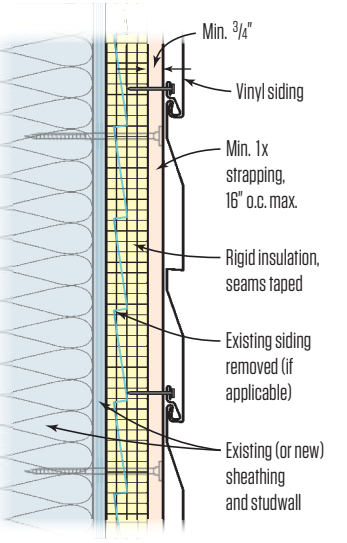
Rigid foam board insulation applied on the outside of the sheathing is becoming increasingly popular these days. With the seams properly taped, this insulation layer can also provide an effective drainage plane behind the vinyl siding. Exterior foam insulation is typically fastened in place with long structural fasteners driven through 1-by strapping and into the wall studs. The strapping then provides a solid structure onto which to nail the siding. But with the siding nailed every 16 inches, heavier, stiffer vinyl panels should be used to prevent sagging between the strapping.

Vinyl siding can also be installed over sound existing wood siding. Typically, fanfold insulation is applied over the existing siding to bridge any butt seams and to create a flat plane for the vinyl panels. In these cases, door and window casings usually need to be built out to project beyond the finished siding.

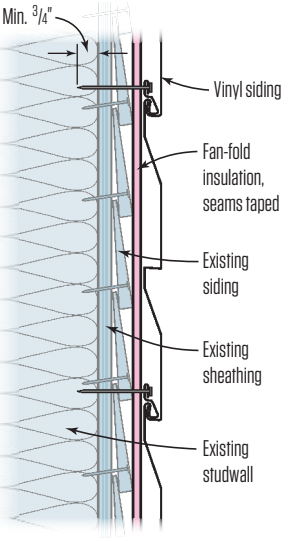
Over Sheathing



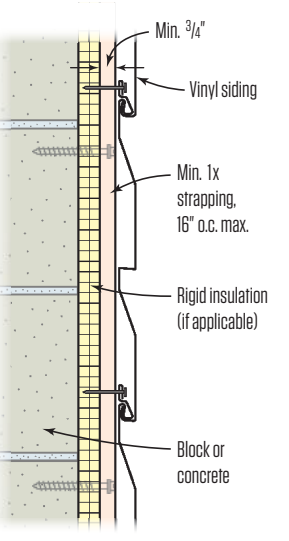
Over Rigid Foam



Over Existing Siding



Over Masonry

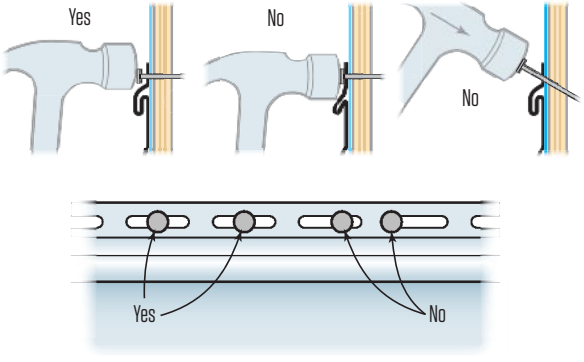


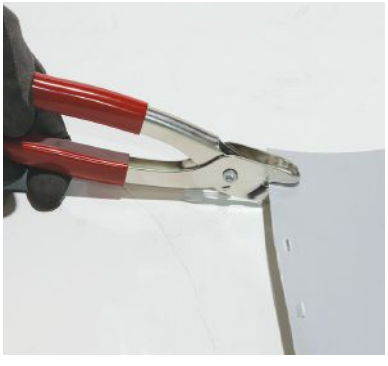
TIPS FOR FASTENING VINYL SIDING

• **Use corrosion-resistant fasteners** that are sized to penetrate at least ¾ inch into framing or furring strips.
• **Level the starter course.**
• **Leave expansion gaps** at all panel edges.
• **Overlap panels** by at least 1 inch.
• **Stagger lap joints** so that no two line up.
• **Overlap joints** away from high-traffic areas for the best appearance.
• **Lock the butt edge** of each panel into the locking strip of the panel below along the entire edge before nailing.
• **Start nailing at the center** of each panel and work toward the edges.
• **Drive fasteners straight and level** without pulling the panel up or creating tension.
• **Drive fasteners through the center** of the hem slots and into the framing no more than 16 inches on center.
• **Don't over-drive fasteners.** Leave a slight space between the head and the nailing flange to allow for panel movement.

USEFUL INSTALLATION TOOLS

There are two specialty tools that every vinyl siding installer should carry. A snap lock punch (photo below, left) creates raised "lugs" in the edge of a vinyl panel once the nail flange has been removed. The lugs lock into utility trim to hold the edge of the panel in place while allowing the piece to move with temperature changes. A slot punch (below, right) makes an elongated hole for a fastener that allows the siding panel to move under the fastener head.





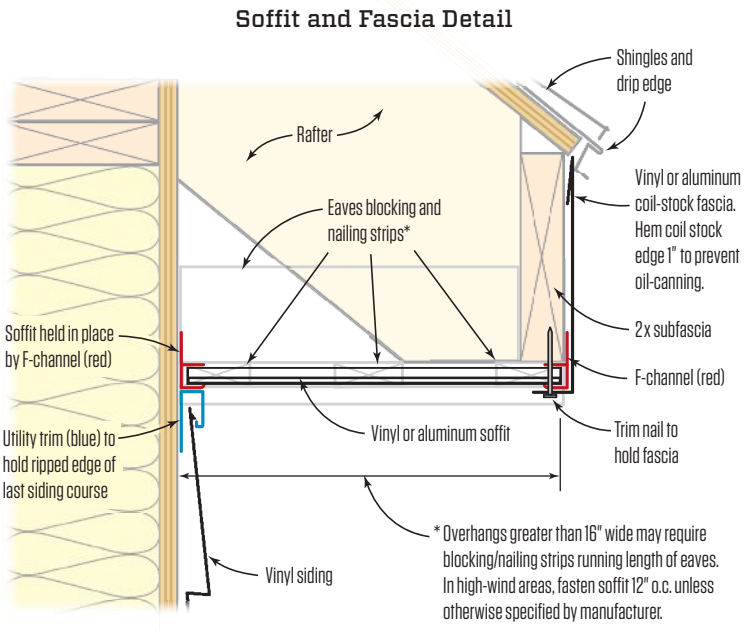
SOFFIT AND FASCIA

Complete soffit and fascia details before installing the siding. Soffit panels come in many styles and colors, and may be vented or unvented; many contractors combine the two types, depending on the overall venting strategy for the home.

F-channel or L-shaped fascia captures outer-panel edges. At the wall of the house, panel edges can fit into F-channels or can be hidden by J-channel or a utility or finish channel that captures the top edge of the siding. Soffit panels come in 10-foot lengths but are usually cut to fit across the soffit, so nailers may be needed depending on the rafter spacing and the overhang depth.

There are many low-maintenance options for fascia, including aluminum coil stock that can be fabricated on site. Vinyl fascia is available as well, and PVC trim boards offer yet another alternative.

Soffit and Fascia Detail



Photos: Roe Osborn

FASTENING VINYL SIDING TRIM

Once the substrate has been properly prepared and the soffits finished, specialty trim pieces called accessories are installed. These pieces either hide the edges of the siding or help to hold the siding in place.

Installation begins by establishing a level horizontal layout line around the perimeter of the house for starter strips (use a laser, a water level, or a chalk line with line level). The starter strip holds the bottom course of siding **(1)**. If more than one length of starter is used on a wall, be sure to leave an expansion gap (see "Starter Strip," at right).

Next, install inside corners **(2)** and outside corners **(3)** up to the soffits, leaving a ¼-inch expansion gap at the top (see "Corner Posts," at right). Snap vertical chalk lines to keep the corner trim straight then fasten the trim from the top down.

Use J-channel **(4)** to capture and cover the ends and edges of siding panels. Specific details for using J-channel around windows can be found on page 28. J-channel can also be used below the soffit to hide the edges of the panels. Another place for J-channel is along a roof-to-wall connection, which is detailed on page 29.

A specialized trim piece called a "utility" or "finish" channel **(5)** is spring-loaded on one side. It locks the cut edge of a siding panel in place when lugs have been created on the panel edge using a snaplock tool (see facing page). The lugs keep the edge of the siding from popping out as the material expands and contracts.

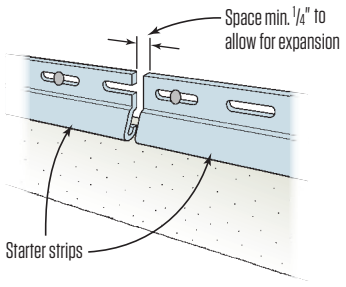
F-channel **(6)** is most commonly used as part of soffit detailing, where it captures and supports the edge of the soffit material while leaving a finished edge.

There are many other specialty profiles for installing vinyl siding, from crown and cove profiles to wider window casing, brickmold, and even decorative corner profiles. In addition, many cellular PVC trim manufacturers make profiles that have an integral edge channel that can be used in corners, for casing, and even for a decorative water course **(7)**.

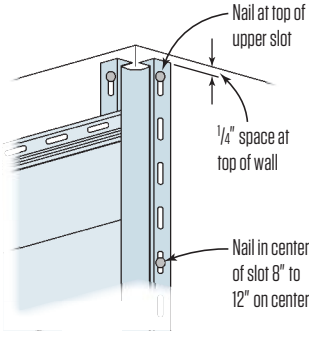
When installing any vinyl trim or siding panels, always remember to leave a ¼-inch gap at each joint for movement due to temperature changes.

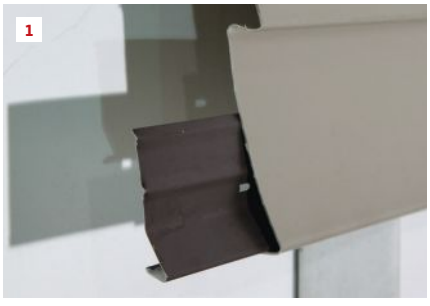
Photos: 1–6: Roe Osborn; 7: left to right, courtesy, Certainteed; Tapco Group; Kleer Lumber

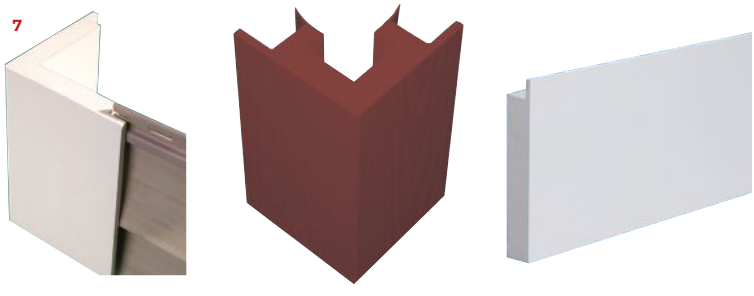
Starter Strip



Corner Posts







FLASHING AND TRIMMING WINDOWS

Like other types of siding, vinyl allows some water to penetrate behind it. Consequently, windows and doors have to be sealed as part of the water-resistive barrier system before the vinyl siding and accessories are installed.

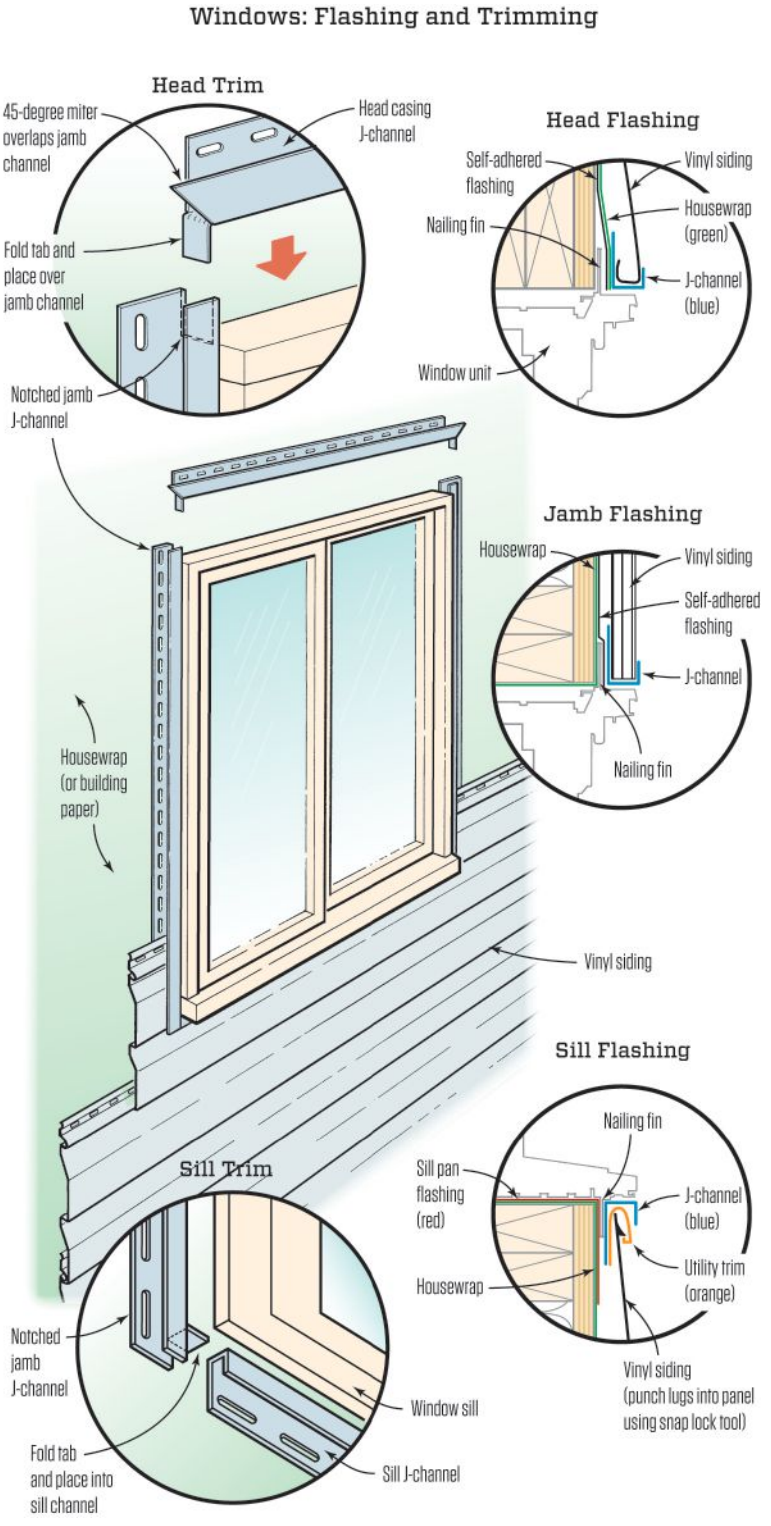
Flashing. Vinyl trim accessories help to move water away from the building, but they are not a substitute for flashing. For new windows or existing windows not properly flashed, use peel-and-stick membrane at the perimeter, starting with a strip at the sill, then strips along each jamb, and finally a strip at the head (see "Flashing a Flanged Window," *JLC*, Jun/05).

Trimming. First, install utility or finish molding inside J-channel underneath the window sill (see illustration, right). Next, run J-channel down each side jamb of the window, extending it past the undersill trim; notch it as shown and fold the tab under the sill trim. At the top of the window, extend the jamb trim past the head jamb the width of the J-channel, and notch it down to the top of the window as shown. Finally, cut J-channel to run over the window head, extending over the jamb trim. To install, snip back the nail fin and cut a miter on the finish fin. Finally, create a tab that slips over the notch in the sidewall trim as shown.

When installing vinyl siding over existing siding, it may be necessary to build out window and door casings, which makes it possible to align the J-channel on the same plane as the siding.

Siding. Where the siding wraps around the bottom of the window, mark the material that needs to be removed, and cut out an additional ¼ inch in each direction to allow for movement. Create lugs along the cut edge with a snap lock punch (see page 26), then slip the cut edge into the utility channel while feeding the rest of the panel into the J-channel along the jamb.

Always try to align the bottom of a siding course with the top of the window. When this is not possible, most installers shim behind the ripped edge of the siding to maintain the proper profile as it spans across the window. A piece of foam or a length of utility trim installed upside down can be used as a shim behind the siding.



RAKES AND ROOF-WALL INTERSECTIONS

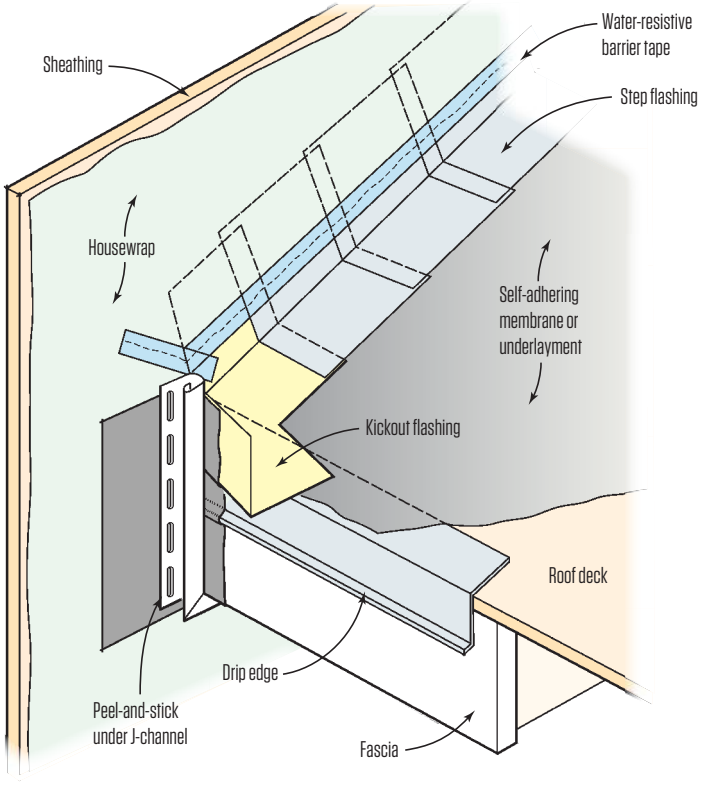
Install J-channel against the rake soffit, or against the rake trim if there is no overhang or if no space has been provided behind the rake trim to tuck the siding. Overlap the pieces if more than one length is needed to make up a run, and for the best appearance, miter the exposed edges of adjoining pieces where they meet at the gable peak. Cut the roof angle on the edges of the siding panels and slip them into the J-channel, leaving ample space at both ends for movement. At the peak, slip the uppermost panel into place and anchor it using a stainless fastener driven through the face.

Kickout flashing. Where a roof plane meets a wall, protect the wall with a properly-installed moisture-resistive barrier, integrated with step flashing woven into the courses of roof shingles. At the lowest shingle course, install a kickout flashing in place of the first piece of step flashing (see "Kickout Flashing," right). Apply peel-and-stick membrane to seal the joint between the moisture-resistive barrier and the vertical leg of the kickout flashing.

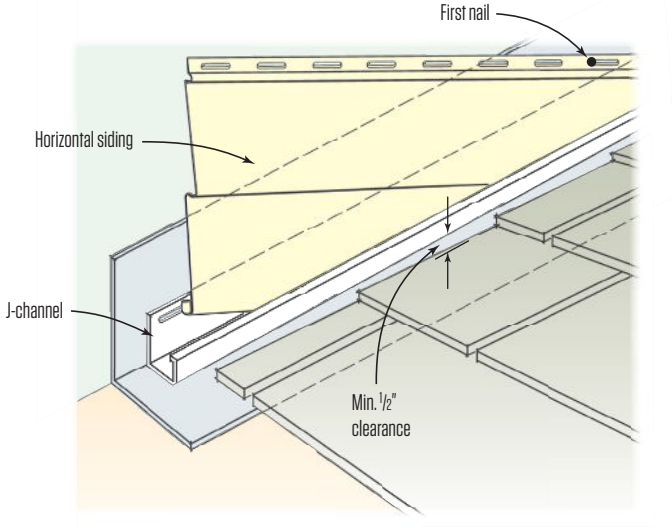
Extend J-channel from the soffit vertically over the fascia to the top of the kickout flashing. When applying the vinyl siding at the kickout, slit the panel so it slips over the vertical leg of the kickout and J-channel, then caulk both sides after the panel is attached.

Siding the roof-to-wall connection. Run a length of J-channel along the roofline, keeping it at least ½ inch above the roofing, and fastening it every 8 to 10 inches. When fastening angle-cut siding panels along the roofline, leave space for movement, and also drive the first fastener at the "downhill" side of the nail hem slot to ensure that as the siding expands, it moves away from the roof and the J-channel.

Kickout Flashing at Roof-To-Wall Connction



Siding Details at Roof-to-Wall Connection



REPAIRING VINYL SIDING

For contractors unfamiliar with vinyl siding installation, making simple repairs can seem mysterious. But cutting, removing, and replacing a section of vinyl siding—as when swapping out a damaged panel or filling in around a new window or door—is simpler than it looks.

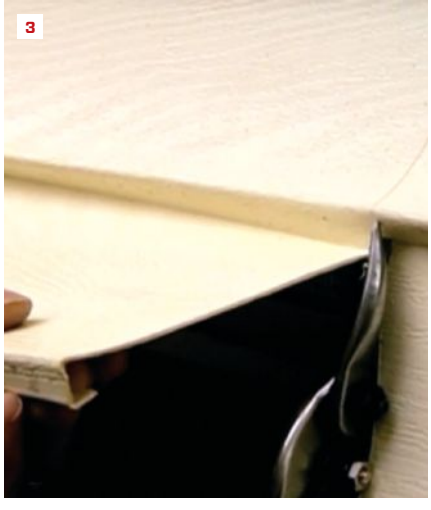
The images and description presented here are based on step-by-step instructions from *This Old House* general contractor, Tom Silva, in a short, informative video titled "How to Repair Vinyl Siding." (Thanks to thisoldhouse.com for permission to reprint images from the video, which we link to in the online version of this article.)

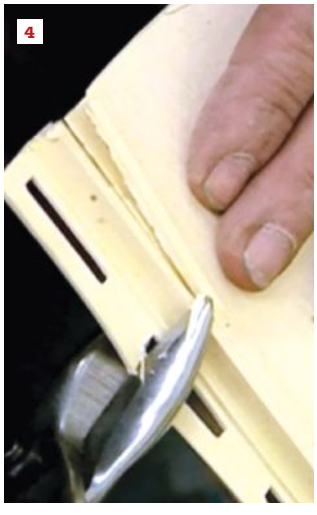
As Silva points out, the siding may have faded over the years, so when patching a highly visible area, try to use weathered material from a less visible place—such as the back of the house—so that the patch is not as evident.

To remove a section of siding, first use a utility knife against a square to lightly score the face of the panel several times, then unlock the siding from the surrounding courses by hooking a zip tool **(1)** under the interlock at the panel butt; pull down and across to unlock it **(2)**. Snip through the panel butts to complete the cut **(3)**. Lift the butt of the panel above, and pry out the exposed nails.

To insert a patch between existing panels, follow the same procedure to cut and remove a section that is a couple of inches shorter than the patch material you will be using. Before installing the patch, snip away a couple of inches of the nailing flange and the bottom J-section at both ends **(4)**; this will allow the patch to overlap the siding to either side of it **(5)**. With the patch slid into place, fasten it every 10 inches or so, driving the nails in the center of the nailing slots without pinching the panel, which allows it to move with temperature changes.

Finally, use the zip tool to reengage the patch to the panels above and below it. Hook the tool into the J-section at the butt, pull down, and slide the tool sideways while pressing against the siding with your palm to lock the pieces together again **(6).**





Images: courtesy This Old House

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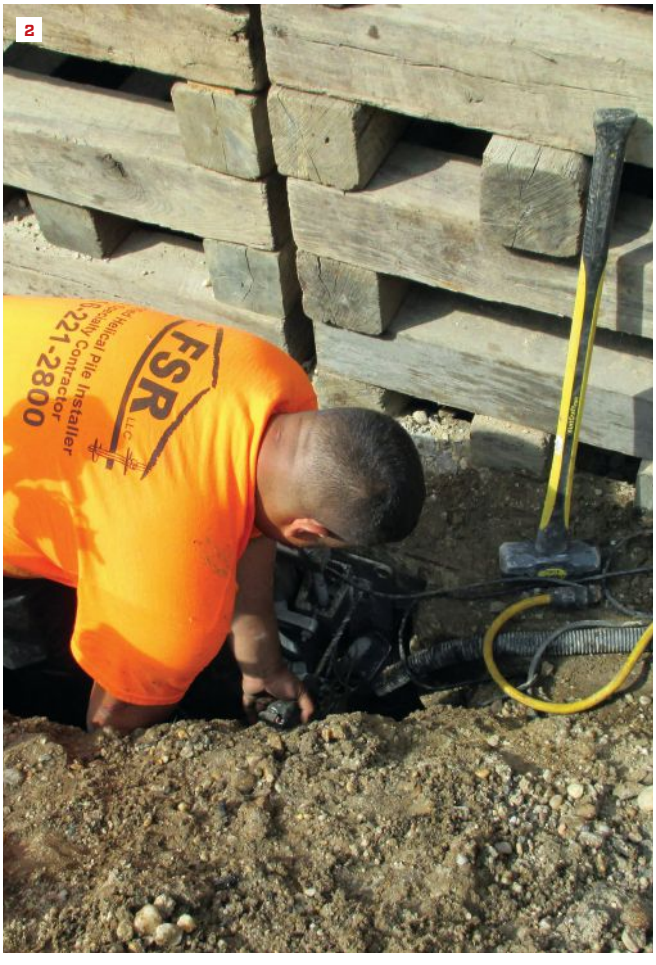
Raising 250 tons of house safely above the flood

BY RICH SANGIORGI

Just over a year after Hurricane Sandy washed through his Long Island, N.Y., home, I sat down to talk with Rich Sangiorgi, a contractor with 30 years in commercial exteriors. In addition to his thriving commercial business, Rich runs a modular house building company. And he is now teaming up with Joe DeNicholas, the sixth-generation house mover who successfully raised Sangiorgi's waterfront home 11 feet higher than it stood a year ago.

We sat on the unheated second floor while a vibrating plate compacted fresh fill beneath the house. It was the final phase of elevating the home, yet the project was far from finished. Sangiorgi's crew had only just started renovating the gutted first floor, and formwork for new retaining walls surrounded the house like a fortress. Hundreds of yards of fill still needed to be placed to bring the landscaping around the 4,300-square-foot custom home up to finish grade. But the project was far enough along that Sangiorgi could breathe easy again and was looking ahead to other lifting jobs for past customers who had turned to him for help in the aftermath of Sandy's surge. Not only has Sangiorgi had to become a quick student in the technical intricacies of raising existing buildings above flood elevation, but he has also had to become a master at navigating the insurance and regulatory maze that has delivered its own blow to everyone rebuilding after the storm. This article is based on that interview. —*Clayton DeKorne, executive editor*



Photos: 1 and 2, Clayton DeKorne

The big lesson for me in all this is that there's so much more to elevating a house than just house lifting. When I first started getting bids, house lifters were telling me that it would cost around $40,000. At that time I had no idea that the excavation alone would cost more than $40,000. A lifter is not going to tell you everything you have to do before and after the house is raised. You have to really plan it through.

I've been lucky in my training. In the fast-paced, competitive world of commercial contracting, you have to plan ... and then plan again. Coordinating trades and sticking closely to a critical-path schedule is everything. On a project like this, though, where at first I didn't know all the steps to take, it was different. Nobody knew the steps. Down in New Orleans, after dealing with Hurricane Katrina in 2005, I'm sure there are now lots of guys who know, but not on Long Island after Sandy. We are only now just beginning to put it all together.

Some of the important steps in a lift were clear as I began to think it through, but many were not obvious at first. Thankfully, we had good guidance from Joe DeNicholas, our lifter.

Financing. This is always the first thing on everyone's mind, and it has proved to be a very complex issue after Sandy. I was lucky in that I was able to self-finance and get all my labor at cost. I was able to move forward without waiting for the insurance company. In fact, my insurance won't cover anything but the replacement of the interior. The house took on just over a foot of water, so this meant that the insurer would replace the first 4 feet of wall finishes and insulation, and all the wiring **(1)**. When the water rises over outlet height, water wicks up the paper insulation and can damage wiring all the way to the second floor. Insurance companies aren't going to take a risk on anything that might lead to a fire, so they pay 100% on all mechanicals. But they won't cover the cost of raising the house, even if the flood elevation is recalibrated, as it was across the region after Sandy. This means that if you opt to raise the house, you

won't see a dime of insurance money until work on the interior begins. For this reason a lot of people took ridiculously low settlements—$30,000 to $60,000 to redo an entire house. In this market, you can barely put in a kitchen or bath for $30,000, let alone an entire first floor. And forget about lifting it.

"I see no point in rebuilding if you're not lifting above flood elevation." No bank will touch it in the future, so now a lifetime investment is only worth the cost of the land. No one wants to be told they will have nothing to leave their children.

My first advice to everyone was to wait. The settlements offered last year were too out of whack to last long. It has taken a while, and it was an excruciating wait for many of my customers, but it looks like it will pay off. The New York Rising Housing Recovery program finally kicked in with the first awards letters coming out this past October, a year after the storm. New York Rising was set up with federal funds to fill in the obvious shortfalls from insurance and FEMA funds. Now they are suddenly agreeing to pay up to $160 per square foot to rebuild, which begins to come close. New construction in this market is around $175 to $200 per square foot, so it's in line.

Foundation design. Permitting was not really that big a deal because we had an engineer. I had renovated the house 10 years ago and pulled out a lot of the CMU foundation, replacing it with poured concrete. At that time, we sunk 50 helical piles beneath the footings to keep them from settling. These piles had been retrofit around the perimeter and only supported one side of the footing. After taking soil samples and pulling the old pile reports, the engineer recommended adding 15 new helical piles. Most of these were placed on the inside of the footing to counterbalance the existing piles. After sinking each pile, the drive head gets cut off with a portable band saw and the pile stem is bolted to a bracket **(2)** that supports the footing edge **(3)**. On mid-span footings

Photos: 3 and 4, E. Bonfini; 5, Clayton DeKorne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running through the house, we cut out the old footing and sunk the piles dead center. These piles got a steel bearing plate **(4)**, around which we formed and poured a new concrete pile cap. The foundation walls running over these caps act as grade beams. Because they are heavily reinforced, we didn't need continuous footings running from pile to pile, but since they already existed, they certainly didn't hurt.

Lifting skills. You need to find a good lifter. I interviewed every lifter on Long Island before making a decision. Don't skimp on gaining as much information as possible.

In the end, the decision was easy. I went with a house mover that had been in the business for well over 100 years, and this company was the only one that said I didn't need to remove all the brick veneer from the house. This house also had a fireplace and chimney in the back that weighs several tons by itself, all concentrated in one point that had most of the lifters shaking their heads. But for a company that specializes in moving irreplaceable historic buildings down the throughway, lifting a house straight up and setting it back down in exactly the same spot is a no-brainer, no matter how much that house weighs. The hydraulic rig that the lifter brought to the site raises 24 jacks perfectly evenly at the same time. DeNicholas and his crew can monitor the pressure on each jack as the house goes up and can back off as soon as there's a snag that is exerting an off-kilter force on the structure **(5)**. This way there's no twisting or racking as the house is raised.

As a result of the lift, we only had one interior crack on a veneer-plastered wall. None of the brick and stucco exterior cracked from the lift except a small portion of the chimney base that we were unable to support. Everywhere else, my crews had bolted steel angle-iron to the sills when the brick was installed **(6)**. As long as the building frame was well supported by the mover's steelwork, there was no risk to the cladding.

Photos: 6 and 7, Clayton DeKorne; 8, E. Bonfini


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Photo: Clayton DeKorne

THE LIFT BEGINS

Utilities. All sewer, water, gas, and electricity lines running into the house must be disconnected. This is obvious, but chasing down all the pipes and wires can be painstaking work in a flooded crawlspace. They don't always rise out of the ground in one place, particularly in an older home with several additions. Of course, all the utilities had been shut off soon after the storm. But a simple water pipe that remains connected can create a lot of stress when the house goes up. This kind of stress is what cracks finishes. You want the house to rise up without a hitch, literally. And even though we got everything right on the lift, we still had to cut the plate out around the power main when we set the house back down **(7)**. There's nothing like experience to develop an eye for all these details.

Site work. I never expected how much site work would be involved. Any kind of deck, patio, driveway—anything attached to the house—has to come off. Look around the site. It's not just the house you need to think about. You need access all the way around it with a Bobcat, which means ripping out most of the landscaping and ramping the site. This can be heartbreaking for an owner who has invested years in developing his own little paradise. I just had to swallow it, but you'll probably want to warn your customers of what to expect. There's a lot of emotion after a flood, and the more the customer knows what to expect, the easier it will be to absorb.

Cutting the foundation. There are two basic ways to lift a house: you can either come underneath it or you can go through it. With a house on a crawlspace, most lifters will want to go underneath, and this means you have to cut through the foundation to thread a gridwork of steel beams underneath the first floor.

Slab houses are usually cut away from the slab and the floorless frame is lifted by punching holes through the first-floor walls for the lifter's steelwork. The steel is supported on headers, either existing ones at openings or new ones you frame in. As more and more lifters are gaining experience, this option is gaining a lot of traction, even with non-slab houses. It's usually much easier to pop a hole through a framed wall than through a foundation wall.

In our case, however, where I wanted to keep the brick, going underneath worked better. But cutting the concrete required a huge investment of time. We used a "cut and break" tool **(8)**, which is a lot safer and doesn't throw as much water as a concrete chain saw, but it is slow going. Each hole took a couple of hours of plunging the blade in every few inches and then snapping a chunk off. Blades ran us about $400 per set. We used more than $1,000 worth of blades to cut roughly 20 square holes that were 2-by-2-feet each.

Lifting. Before the lifter threaded his steel through the crawlspace, we had to dig below the footing elevation at every location next to a footing where the lifter needed a cradle (the stack of hardwood 4x4s that support each jack). This was to eliminate the possibility of a footing collapse due to the increased soil pressure from the intense point loads near a footing.

At the garage, where there's no sill, cradles had to be extended to the garage door header **(9)**, and the front porch had to be supported on cross beams built out on cantilevered sections of steel.

The hydraulic jacks have a throw of about 16 inches **(10)**. We needed to go up to 10 feet 7 inches. To do this the lifter has to "jump the jacks." It's kind of the way crane operators will leapfrog their way up a skyscraper, lifting one crane over itself, and when that one's set, it pulls the lower one over itself. In this case, some extended jacks support the house, while others are backed off and their cradles stacked higher, so this set of jacks can be extended, and so forth. Each time a lifter jumps the jacks, it costs more money.

Foundation rebuild. With the house lifted, it was time to install the helical piles according to the design and to form out the footings, as described earlier. We could then stand the foundation forms. For this, you need to work with a patient foundation crew. The foundation walls needed to have pockets formed out to accommodate the lifter's steel, and the crew needed to work pieces to fit around tight enclosed spaces. In some cases it's painstaking work, but care and attention will pay off when it comes time to reset the house. You don't want to be jackhammering new concrete because


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someone was impatient about setting formwork.

We used a pump truck with a 100-foot boom to get the concrete to the back of the house, and the pressure on this hose was tremendous. It was harrowing for the crew to try to bend that hose into the form with less than a foot of access between the house and the top of the forms **(11)**. If I had to do it all over again, I would have paid for another jump on the jacks to give ourselves more room. It would have been safer and a lot less stressful.

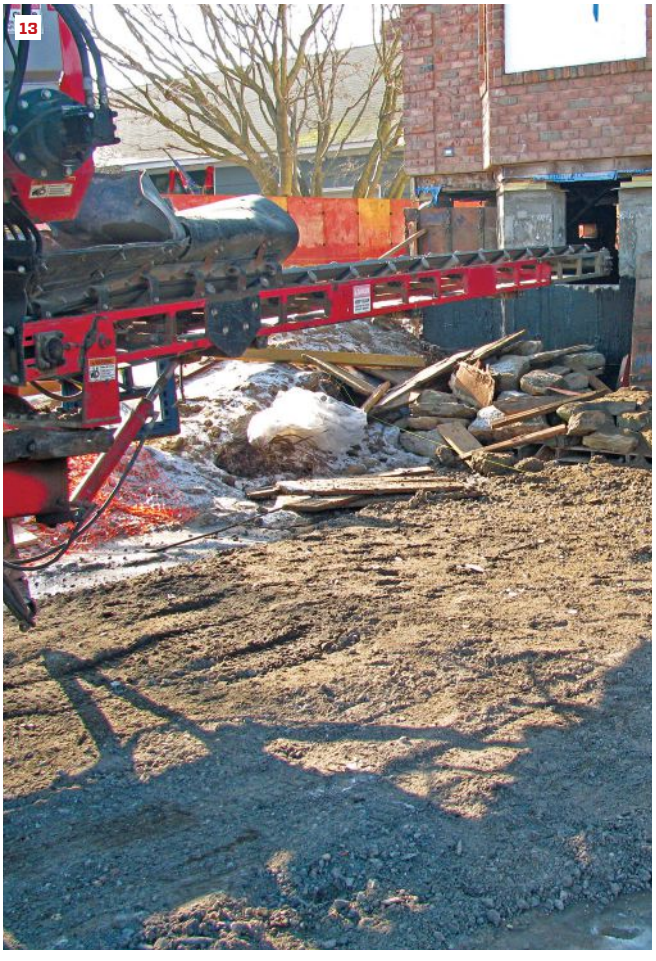
I could have gone with CMU foundation walls. You can lift to the final elevation and just build the CMU up to meet the house. While this is certainly more affordable on several counts, I have seen what wave action can do to a block wall, and I just didn't want to take the chance. A reinforced concrete wall is considerably stronger, and resisting storm surge is the whole reason for doing this work. Why skimp?

We poured 4,000-psi concrete. Code here only requires 3,000 psi, but I wanted to give ourselves a higher margin of safety. We conducted "tube tests" by pouring concrete into plastic cylinders that we stored in a box next to the foundation so they would cure at the same rate. The cylinders are then crushed to measure the cured compressive strength. We tested at seven days and at 21 days. After seven days you can begin cutting new sills, but you usually can't bolt these down tight and set the house back down until the pour samples test out near 3,000 psi.

Resetting the house. When it came time to finally set the house back down, we first had to go around and check every part of the house that would touch the sill. In several places we had to cut out parts of the old frame that would hang up on the new, leveled sill plates, and even chip out some of the form squeeze-out to avoid a hang-up as the steel work was lowered into the pockets that had been formed into the wall.

DeNicholas runs a crew of about 10 guys, so he has lots of hands on

Photos: 10, Clayton DeKorne; 11, M. Sangiorgi



deck to move cradles and jump the jacks as the house is going up. Just as many guys are needed when the house is coming down. You need eyes on every part of the floor as a house is lowered. Every time a sill or wire or part of the new foundation touches, someone calls out and the jacks are paused while the snag is cleared. The first time the floor of our house hit a new sill plate at the back of the house, we discovered that these plates were high relative to the rest of the house. I called for cutting out a short section of sill plate instead of the grim alternative: days of shimming the rest of the house to the new sill. Once this high plate was gone, the house settled perfectly into place.

Final steps. There is still an enormous amount of site work to complete, and the utilities must be connected. We now have retaining walls all along the site perimeter **(12)** and have begun the task of hauling recycled concrete fill, over which I'll lay top soil. A conveyor truck is helping to speed the work of getting sub-slab fill beneath the house, and to spread it around the site **(13)**. But at least now work can begin on remodeling the interior. Finally.

Experiencing a flood that makes you leave your house takes a toll on people. But there are upsides to the rebuilding, and customers need to be shown the value that they are getting. Things such as replacing rotted sills and eliminating the damp crawlspace. In the end you get a drier, healthier home, and a chance to fix a lot of old problems. Homeowners need to be educated about the value of these improvements.

I have no doubt that five years down the road I'm going to be better off. My home will be worth more and I'll have the option to sell it at market rate. If I hadn't lifted it, it would become a scraper. I'd get the price of the land, and no more. Customers need to know that they are not just going to survive but will thrive because of the work we put into their house.

Rich Sangiorgi runs Elite Wall Systems and Rainbow Homes based in Deer Park, N.Y.

Photos: 12 and 13, Clayton DeKorne

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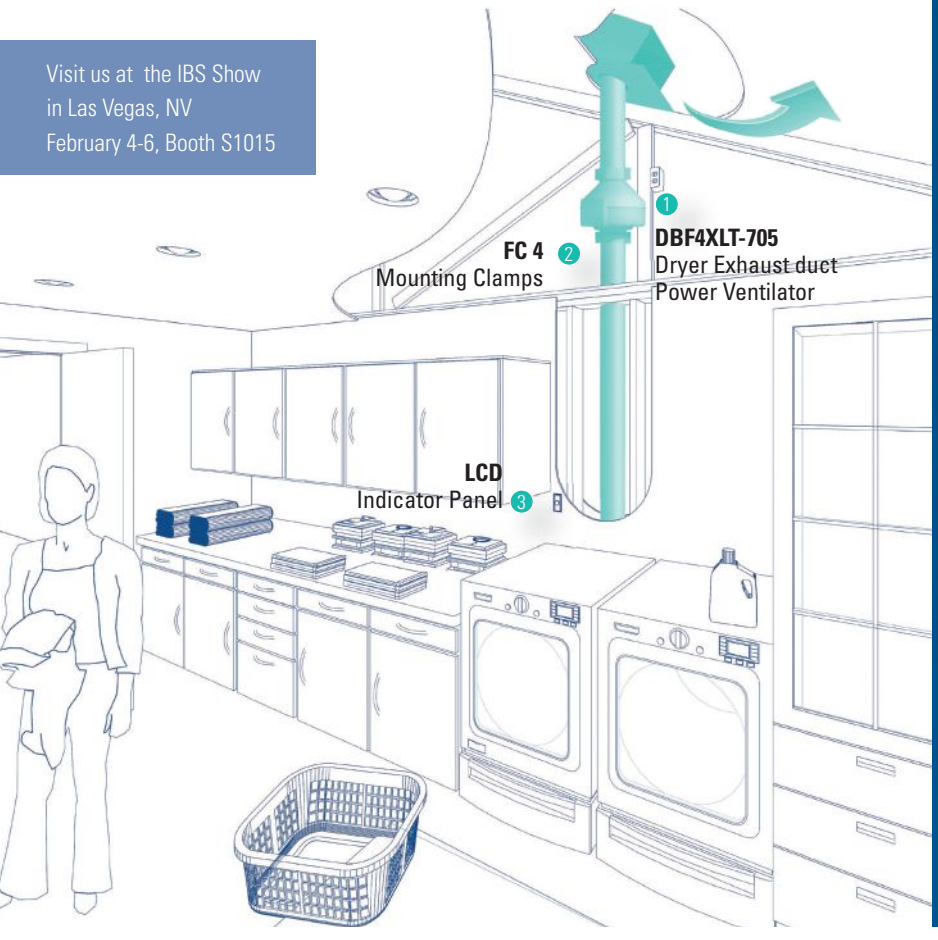

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An Efficient Box-Truck Build-Out

An organized work vehicle can save you a ton of time and effort, and it might even double as a portable workplace

BY GREG BURNET

During the three decades that I've been a carpenter, I've outfitted just about every type of work vehicle imaginable—pickups, vans, and trailers—for getting tools and supplies to and from a job, and I've learned something from each one. But it wasn't until I got serious about organization that my efforts really paid off.

My company specializes in window and door installation and repair, so we have to keep a wide variety of portable power tools and hand tools readily available. We store most of these items in Festool stackable interlocking cases called Systainers (read more about modular tool organizers in *JLC* Sep/13). These modular boxes are the key to our organization system, so we've designed and outfitted a box truck to accommodate the many Systainers that hold the equipment we need to access in our everyday work.

START WITH THE TRUCK

A couple of years ago we purchased a Ford E350 1-ton cutaway van chassis, with a 12-foot box and a roll-up rear door on the back (photo, above). We chose a single rear-wheel (SRW) model because it is about a foot and a half narrower than the dual rear-wheel version, which makes it easier to navigate the


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cramped urban areas that we frequently work in. We also opted for the lower floor height, for easier loading and unloading, although doing so meant having to work around the wheel wells on the interior. The box measures about 78 inches wide and 76 inches high, which gives it around 490 cubic feet of space. This may seem like a lot of room, but it quickly gets eaten up if everything inside is not well organized.

The walls of the truck box are made of ½-inch fiberglass-reinforced plywood (FRP) panels that attach to steel channels at the top, bottom, and corners. But the walls of the box have no additional intermediate structure, so aside from the wood floor, there isn't much to fasten anything to on the inside. To deal with this issue, we began by attaching steel hat channel to the walls using construction adhesive and ⅜-inch wafer-head screws. The channel runs horizontally to permit easy fishing of wires if we choose to add electrical circuits to the truck in the future. We then attached a single layer of ⅝-inch AC plywood to the hat channel, which gave us a solid surface for attaching our storage casework **(1)**.

BUILDING THE STORAGE CABINETS

Once the sidewalls of the truck box were lined, we were ready to build the cabinet carcasses for the interior. I spent a good deal of time laying out and refining the placement and arrangement of everything that we needed to fit into the truck. I'd sketched all of the cabinet components beforehand, so we made quick work of the carcasses, which were just open boxes made of ¾-inch birch plywood. We prefabricated the carcasses in the shop with


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simple butt joints that we glued, pinned, and screwed together, although we pocket-screwed some of the partitions to facilitate their relocation if our needs change in the future. We skinned the backs of the carcasses with ¼-inch luan plywood to give them some racking resistance.

On both sides of the box, the storage cases rest on banks of drawers, which provide enough elevation for the casework to clear the wheel wells and the fuel-filler pipe cover **(2)**. The drawers slide into their plywood carcasses without the benefit of guides (so far they seem to operate fine without them), and are secured with barrel bolts to prevent them from opening during transit. We use these drawers for various consumables such as garbage bags, visqueen, flashing tape, and fasteners. We also keep various power-tool accessories in them.

OUTFITTING THE PASSENGER SIDE

The drawer bases on the passenger side are 24 inches deep, but the storage carcasses on top are just 13 inches deep **(3)**. This depth is enough to accommodate the Systainers, with extra room at the front for our "high-tech" securing system—lengths of ½-inch electrical conduit that slip into holes drilled in the top and bottom of each carcass to prevent the cabinet contents from falling out if we take a turn too sharply **(4)**. The storage cases attach to the wider drawer base along the inside edge, leaving a space behind for sheet-goods storage.

We completed the sheet-goods rack with a shelf that sits 50 inches above the drawer base supported by a cleat on the wall of the truck box and vertical strips attached to the backs of the storage cases **(5)**. The rack amounts to nothing more than a hollow box,


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about 50 inches high by 10 inches wide by 9 feet deep. It's open on the end facing the roll-up door of the truck, which facilitates the loading and unloading of plywood, MDF, and other sheet goods. And the floor of the rack is at just about the perfect height for you to slide sheets into while you're standing outside **(6)**. The shelf above cantilevers beyond the side of the rack to accommodate larger Systainers, and we added a fiddle rail around the shelf to keep everything in place during transportation **(7)**.

We closed in the sheet-goods rack below the shelf with OSB and created a home for our sheet-metal brake on top of the storage cabinets. Although it's technically a portable piece of equipment, we secured the brake to the cabinets using three U-bolts. We make a fair amount of flashing in the course of installing windows and doors, and having a brake in the truck lets us make the flashing right on site instead of having to run back to the shop **(8)**. On the wall behind the brake, we mounted a rack for caulking and sealants.

STORAGE ON THE DRIVER'S SIDE

The carcasses on the driver's side—both the drawer bases and the storage cases—are 20 inches deep to permit storage of larger items, such as the compressor, shop vac, and table saw **(9)**. We also created a large cubby on this side for a stack of Systainers mounted to a dolly **(10)**. These contain the tools we use most often: a cordless drill and impact driver—usually the first things we need at a job. Keeping the Systainers on wheels means that all we have to do to roll onto a job is to grab the dolly and then put any additional Systainers we need for the project onto the stack—a process that takes just a minute or two.


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Next to the cabinets on the driver's side we left room for a metal mechanics toolbox. We took the wheels off the box and secured it to the truck box **(11)**. The toolbox has drawers of varying depths, all of which are mounted on ball-bearing drawer glides. The metal-framed cabinet and drawers take up less space than anything we could have made out of wood, and the metal toolbox was less expensive as well. The trade-off, of course, is less flexibility in terms of design and customization, but the box seems to work fine for holding a variety of bits, blades, jigs, and other supplies. Plus, a locking feature on the box keeps the drawers from opening during transit.

We built a miter-saw station above the cabinets on the driver's side **(12)**. Having the saw inside the truck allows us to do our cutting in a sheltered area out of the weather and keeps dust in the truck, minimizing cleanup as well as disruption to our clients' homes. The saw is mounted to a piece of plywood and secured to the cabinets below via two hold-down clamps. A quick flip of the clamps and the whole assembly can be removed for use outside the truck. Outfeed wings built into either side of the saw offer continuous stock support, while a repetitive stop system makes for fast, accurate cuts. A series of Mini Systainers are stored under the wings. These house a marking kit, clamps, and other miscellaneous small items.

TALLER STUFF UP FRONT

Directly behind the front wall of the box, we built two large vertical cabinets. The one on the driver's side was left open—we store dust poles, levels, and other long objects here **(13)**. We keep everything in place during transit using lengths of chain hooked to either side of the cabinet. On the passenger side, we took a different


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approach, carefully laying out the cabinet to accommodate specific bulky equipment that can be a challenge to store **(14)**. These items include step and folding ladders, a pair of work tables, the stand for our portable table saw, and a handful of moving blankets and drop cloths. Partitions for this cabinet are ladder frames that we made in the shop **(15)** and then pocket-screwed in place. If we should ever need to change the configuration of the cabinet, we would simply back out the screws, move the partition to its new location, and drive the screws back in.

Other than the custom cabinets for the Systainers and the work stations, we tried to make use of every available surface for hooks and holders for items such as extension cords and pneumatic hoses **(16)**. I also mounted the holsters for our heavy-duty caulking guns on the rear face of the cabinets. I even added a dry-erase board at the end of one of the cabinets so we can jot down notes about any items that we need for the job **(17)**.

Often at the end of the day, we find that we need to carry lots of stuff from the jobsite back to the shop. Having a place for all of our tools and equipment leaves the aisle in the middle of the box open for any of those items. I estimate that the build-out cost about $700 to $800 in materials and probably 30 to 40 hours of labor. But with the time and effort that being organized saves, this build-out probably paid for itself in just one week.

Greg Burnet runs Chicago Window and Door Solutions, a carpentry contracting company in Chicago that specializes in door and window installations. Burnet is also a veteran presenter at JLC Live and The Remodeling Show.

BY CLAYTON DEKORNE

Retrofit Exterior Foundation Insulation

Researchers on the NorthernSTAR team of the U.S. Department of Energy's Building America program have been working on a problem that will intrigue anyone finishing out a basement or wanting to make a real dent in the energy performance of an existing home in a cold climate: Is there a minimally invasive, cost-competitive, easily deployable method of upgrading soil-side foundation insulation in existing buildings? There's a lot packed into that question.

Minimally invasive. Adding insulation to the outside of a building foundation is usually difficult to impossible to do on an existing home. In cold climates, we are typically dealing with frost walls or a full basement, so the job will require a wide trench around the building perimeter to allow workers to damp-proof and secure rigid foam insulation or drainable fiberglass boards. Concrete steps, sidewalks, and driveways next to the house, as well as decks, porches, landscaping, attached garages, and utility connections are some of the common obstructions that make it difficult to excavate the perimeter. This is to say nothing of tree roots and unstable soils that can further complicate the excavation.


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A "water knife" (a power washer) is used to slice a narrow slot around the perimeter of a house in Minneapolis. The Building America project successfully demonstrated that exterior foundation insulation can be cost-effectively retrofitted on existing homes to boost energy savings and help control moisture migration through the foundation.

Photo: NorthernSTAR Building America Partnership

Cost-competitive. With all of these complications, the cost to excavate will almost always seem more expensive than insulating the interior walls. But there are some hidden costs to interior foundation insulation, lurking in the form of moisture problems.

Soil-side foundation insulation. In new construction, best practice favors exterior foundation insulation for the simple reason that insulating the interior of a basement in most climates, and especially cold ones, is fraught with problems. The soil will always be wetter than the conditioned interior, and the air in all of the tiny spaces between soil particles will be saturated (100% relative humidity). This creates high vapor pressure relative to the interior space that will result in a continuous flow of moisture through the below-grade portion of the foundation wall from outside to inside. Plus, water will wick up from the ground under the footing, which is below the perimeter drain and is consistently wet. To prevent condensation on interior surfaces within the insulated assembly, you will need perfect vapor barriers on both sides of the interior assembly. And perfect just doesn't happen in basements.

Exterior insulation solves most moisture problems by allowing the foundation to dry to the inside. Exterior insulation will also help to reduce the amount of water the foundation sees and will keep the foundation wall warm, which also promotes drying. Interior moisture may still need to be exhausted with mechanical ventilation, but you won't have wet walls or mold. (For a detailed discussion of interior versus exterior foundation insulation, search YouTube for "foundation insulation effectiveness.") The potential for mold and moisture may be worse if the existing foundation walls are not damp-proofed and perimeter drainage does not exist.

"Excavationless" retrofit strategy. In an exploratory study, published early in 2013, the NorthernSTAR team examined all of the variables involved with retrofitting exterior foundation insulation and considered all the options available as retrofit strategies. The strategy that rose to the top, at least on paper, was an "excavationless" approach that involved cutting a narrow slot near the

At wide spots in the trench, the foam is poured to a consistent thickness against a sheet of OSB.

Rigid foam covers the rim joist. The top edge will be capped and flashed, and the face covered with an elastomeric parge coat.

foundation and filling it with a "pourable" polyurethane foam—a low-expansion, closed-cell formulation that cures more slowly than the usual spray-applied variety. The pourable foam can be applied in a much thicker layer to fill the slot without risk of spontaneous combustion caused by an exothermic curing reaction.

To cut the slot, the technique that seemed to hold the most promise uses pressurized water to loosen soil and a truck-mounted vacuum to remove the loosened slurry through a hose. This technique, which sometimes uses compressed air rather than water, derives from an operation called "potholing" that utility companies commonly employ to sink small, deep holes when locating utility lines.

Retrofit in action. Last summer, the NorthernSTAR team got its first chance to put these ideas into practice, retrofitting exterior insulation on a turn-of-the-last-century, two-story home in Minneapolis. Using a "water knife" and a truck-mounted vacuum, the crew was able to cut a fairly consistent slot around almost half the house **(1)**. In some places, sandy backfill could be removed using just the vacuum, but this resulted in a fairly wide hole. In other places, rubble from an earlier addition caused trouble, and the sides of the trench opened up. When it came time to pour the foam in these wide spots, a piece of OSB was needed to contain the pour and maintain uniform thickness **(2)**. The slotting technique avoided most of the common obstructions near the foundations. At concrete steps and other unavoidable obstacles, the water knife was used to tunnel underneath, so the foundation could still be insulated. Penetrations from water, electrical, and gas lines were identified from inside, and the crew moved cautiously around these. But these delicate obstacles are what the "excavationless" technology was designed for, and the crew was able to clear these without damage to the lines.

Pat Huelman, coordinator of the Cold Climate Housing program at the University of Minnesota and a member of the NorthernSTAR team, admits that whatever could go wrong on this first project did. But in the end, the team proved that the techniques were feasible. Compared with any other technology—a backhoe, chain trencher, pick and shovel—the water knife was incredibly efficient. The downside was that no perimeter drainage could be installed in such a narrow slot. But it's a calculated trade-off. The home didn't have drainage to begin with, and the water-resistive nature of the foam would reduce moisture flow.

To complete the retrofit, the team extended the pourable foam with rigid foam insulation above grade to cover the rim joist **(3)**. Insulating the rim joist brings it inside the thermal envelope, which helps keep it dry. This is better than insulating the rim on the interior within the joist bay. Even when air-sealed, this isolates the rim joist to the cold exterior. If the rim sees moisture, which will inevitably wick up from the sill, it tends to rot. Huelman says that there are many ways to make the transition from the poured foam to the above-grade portion, and the method tried this first time can be improved on future projects. But overall, the project was successful in demonstrating what used to be just a pipe dream: a cost-effective retrofit strategy for insulating the exterior of basement walls.

Clayton DeKorne is the executive editor of JLC. *For more information, search for "Excavationless Exterior Foundation Insulation Exploratory Study" at the EERE Library (http://www1.eere.energy.gov/library).*

Photos: NorthernSTAR Building America Partnership

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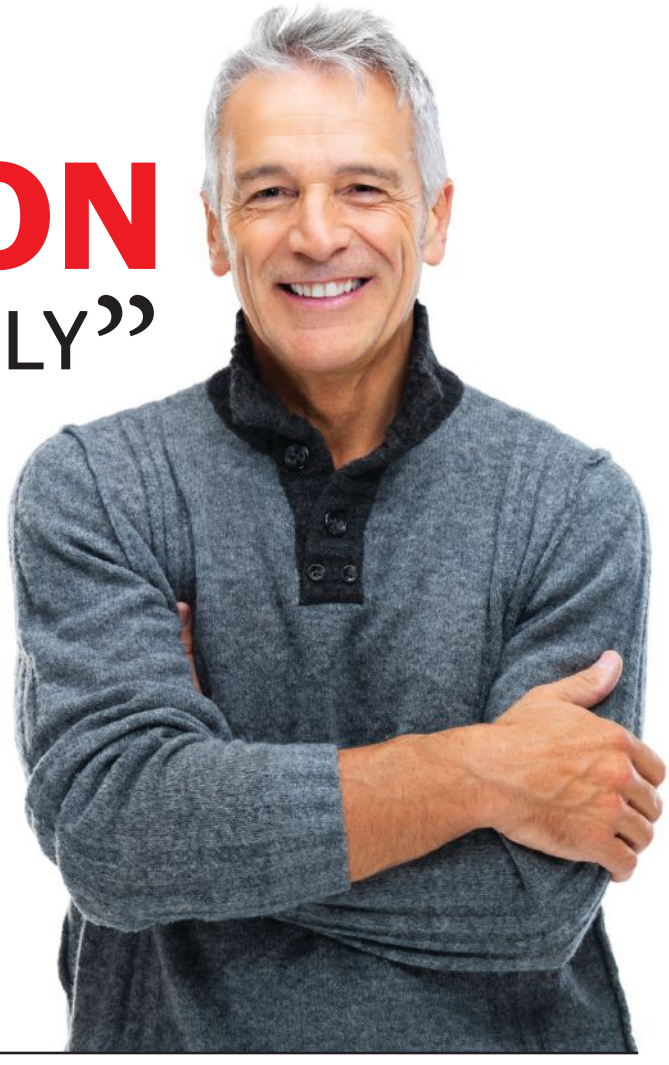

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Solid Core Designer Door
The strong horizontal and vertical elements of Masonite's solid core Hamel interior door can be left white or can be customized. Doors offer a primed hardboard finish and are available with a renewable wheat straw core or with a 20-minute fire rating. Matching bi-fold doors can also be ordered. Cost: $119 for a solid core pre-hung unit. Masonite, 800.663.3667, masonite.com

Reclaimed Space Savers
Where square footage is tight, sliding barn-style doors are an alternative to pocket doors. The Real Carriage Door Co. offers sliding door kits in several species, as well as in salvaged wood. The door shown would cost around $1,100 in salvaged, and $610 in alder. The 6-foot sliding hardware would be about $427. Real Carriage Door Co., 800.694.5977, realcarriage.com

Faux Authenticity
The Mesa Beam is made from polyurethane, with an authentic woodgrain textured surface that comes pre-primed and ready for staining. The lightweight U-shaped beam can be used on interior or exterior ceilings (a screened porch, for example). Costs start at $18 per linear foot for lengths up to 19.5 feet and a variety of widths. Fypon, 800.446.3040, fypon.com

Certified Healthy
Certainteed now publishes Health Product Declarations (HPDs), offering details about each product's ingredients, for its ceiling tiles, and has plans to do so for all of its products. HPDs will likely interest contractors concerned with indoor air quality. Installed price of the Symphony M product (shown): about $2.50 per square foot. Certainteed, 800.233.8990, certainteed.com

BY CHARLES WARDELL

Smart Cooker

The cooktop on Renaissance's 30-inch Induction Range heats only under cookware, using electromagnetic energy to stimulate a pot's iron molecules. It has four zones with 11 power settings each and pre-sets for melt, simmer, and sear. The 4.8 cubic foot convection oven can reportedly cook two 20-pound turkeys in 2 1/2 hours. Prices start at $5,300. Dacor, 800.793.0093, dacor.com

Annoyance-Free Alarm

The Nest Protect's smoke and carbon monoxide alarm offers less annoyance and more clarity—a voice alarm identifies the problem ("There's smoke in the kitchen"). If it's just burnt toast, it can be canceled with a wave of the hand. When the battery is low, a message is sent to the owner's phone. It comes in hardwired or battery models. MSRP: $129. NestLabs, 650.331.1127, nest.com

Enhanced Kilz

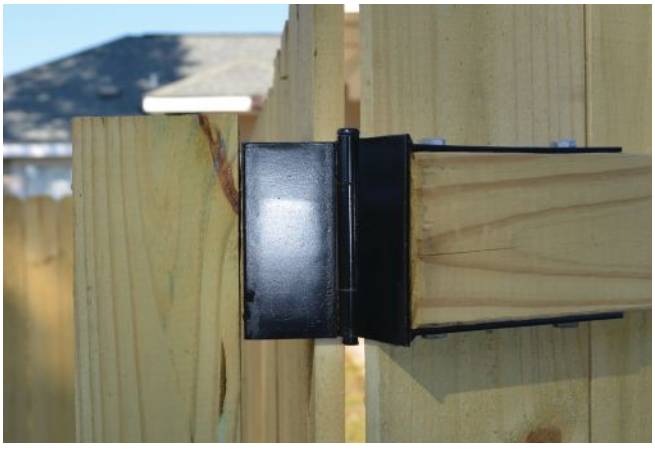
The company that makes Kilz Pro-X 100 series interior paint says that it has been reformulated for improved hide and sprayability, and easier touch-ups. Priced between $62.50 and $87.50, a 5-gallon bucket covers up to 2,000 square feet. Available in flat, eggshell, or semi-gloss. MasterChem Industries, 866.977.3711, kilz.com

Decorative Furnace

Offering an impressive 92.6% efficiency, the Energy Pro gas fireplace is a 36,000 Btu furnace that provides ambiance plus heat. A built-in heat exchanger captures fireplace heat and disperses it throughout the home, either through the HVAC ducts or ducts connected only to the fireplace. Installed cost: about $8,400. Hearth & Home Technologies, 888.427.3973, heatnglo.com

Space-Saving Fridge

The Ingenious counter-depth refrigerator/freezer squeezes 18 cubic feet of storage into a 27-inch-by-30-inch footprint. A small hatch in the curved door allows quick access to oft-used items, a Power Cool function rapidly re-cools the fridge compartment after loading groceries, and the freezer's timer-controlled Express Chill Zone quickly chills food and drinks. Price: $1,600. Summit Appliances, 800.932.4267, summitappliance.com



No-Sag Hinge

With a traditional strap-style hinge, the gate's weight can loosen the wood grain around the screws, leading to sag. By contrast, the GForce Hinge has flanges that grab the top and bottom of the 2-by rail, and the gate's weight compresses the wood grain, limiting sag. Fastening the hinge to the framing also means that the gate can be built in place, making it easy to achieve an exact fit. All Weather Fence, 850.916.0570, gforcehinge.com

Brighter Light Tube

ODL's new Energy Star–qualified Tubular Skylights have 98% reflective mirror interiors. That's up from 95% for the standard model, an increase the company claims results in 25% more light reaching the living space. The skylights come in 10-inch and 14-inch widths and include a remote-controlled solar powered dimmer. MSRP will vary between $462 and $789. ODL, 866.635.4968, odl.com

Water-Based BIN

The main complaints about using BIN, the shellac-based primer, to seal knotholes is the shellac smell and the difficulty of cleaning brushes. BIN Advanced primer and sealer uses synthetic rather than natural shellac, for a low odor, and is water-based so cleanup is easier—but that also means it must be applied in temperatures above 50° F. It should retail for 20% less than BIN with shellac. Rust-Oleum, 877.385.8155, rustoleum.com

EDITED BY BRUCE GREENLAW

Mafell Erika Pull-Push Saw

BY WILLIAM DILLON

When we bought our 230-volt Mafell Erika 70 E Pull-Push Saw with optional extension and sliding crosscut tables a decade ago, it cost almost $2,000. The current Erika 70 Ec adds power, comes with a 120- or 230-volt motor, and costs about twice that with the same accessories. For the top-notch finish work we do, though, we would still pony up for it. The saw is equally at home in our shop and on the jobsite (it hooks to a vacuum, and the legs fold up, so it can sit on a table). You usually find quality and durability like this only in a production cabinet shop.

Powering an 8 ⅞-inch Mafell blade, the Erika can rip like a table saw and crosscut like a sliding compound-miter saw, though we typically reserve it for crosscutting. With the base model, you crosscut by locking down the fence where you want it, holding the material against it, and pulling a knob up front to draw the blade through the material. It's unconventional, but it produces exceptionally clean crosscuts up to 13 ⅜ inches long. However, we usually use the optional sliding table (above, right) for crosscutting. It smoothly feeds the material through the blade and expands the crosscutting capacity to an impressive 35 ⅝ inches, which is great for trimming panels, cabinet doors, and other wide materials.

The Erika comes with a riving knife and a blade guard, but we rarely use the guard because it would interfere with most of our cutting. Also, when crosscutting, our saw never binds or kicks back, and it's easy to keep fingers away from the blade. With the guard removed, we get incomparable visibility, which helps when nibbling trim for a perfect fit.

The scale on the front rail is metric, but two marks precisely reference both sides of the blade. That allows us to align our cut marks with the appropriate reference mark and push through. Compound cuts are quick and easy; just rotate the fence to the desired angle and crank over the blade.

Erika 70 Ec Specs

Origin: Germany
Blade: 8 ⅞ inches
Weight of base model: 70.5 pounds
Cutting depth at 0°: 2 ⅞ inches
Cutting depth at 45°: 2 inches
Tilt range: -3° to +48°
Base price: $2,636 (230 volts), $2,915 (120 volts)
Warranty: 1 year

Timberwolf Tools / 800.869.4169 / timberwolftools.com

William Dillon is a project manager, co-owner, and member of the Management Committee with South Mountain Co., an employee-owned design/build firm on Martha's Vineyard, Mass.

CORDED CONVERT

Josh Dunlap, production manager of Consolidated Design & Construction Group, in St. Louis, whose crews have used cordless impact drivers for years, says that he recently bought a corded Makita model 6952 impact driver (makitatools.com). The 2.3-amp tool weighs just 3.1 pounds, generates up to 3,200 rpm, delivers 1,062 inch-pounds of torque, has a belt hook, and costs about $200.

Dunlap calls the 6952 an "absolute game changer" because it can drive deck screws all day or sink common self-drilling lag screws without overheating. It also eliminates the high cost of replacement batteries. And, unlike cordless drivers, it never peters out while driving a screw—which, as Dunlap points out, is especially problematic when driving a long stainless-steel screw because you can easily tear up its head or snap its shank when you try to finish driving it. On the downside, the 9-inch-long tool isn't as compact as most cordless models, and the cord is just 7 feet long.

Makita introduced the 6952 in 2003; recently Porter-Cable introduced the 4.3-amp corded model PCE201 (porter-cable.com). Maybe that signals the start of a new trend. *—Bruce Greenlaw is a contributing editor to* JLC.

SawStop Contractor Table Saw

BY MATT RISINGER

I vividly remember seeing the SawStop "hot dog" demo for the first time at sawstop.com. Substituting a hot dog for a human finger, the video shows what typically happens when the whirling blade of a SawStop table saw touches human skin. Instead of making a deep cut or amputating, the blade merely nicks the surface before stopping with a thunk and dropping beneath the tabletop as the power automatically shuts off.

The unique safety feature works by continuously transmitting a small electrical signal onto the spinning blade and springing an aluminum blade brake within 3 to 5 milliseconds if the signal is interrupted by a good electrical conductor. Once the brake trips, you need to replace the brake cartridge and the blade to return the saw to action. A bypass mode lets you deactivate the blade brake temporarily for cutting conductive materials such as aluminum and wet pressure-treated lumber. A separate brake cartridge is available for use with an 8-inch dado set, and can easily be swapped with the standard cartridge.

The hot-dog video is remarkable, but I initially didn't expect the SawStop to be a premium saw. My carpentry crew does high-end residential trim work, and until three years ago we only used DeWalt portable table saws. When it was time to add another saw, though, I did extensive research and decided that the SawStop wasn't just safer, but promised to be a darn good machine.

Choosing a Model

SawStop offers three base models: the Contractor Saw, the Professional Cabinet Saw, and the Industrial Cabinet Saw. Various upgrades and accessories let you tune each model to the work you do. I bought the Contractor Saw, adding an integrated mobile base along with a Biesemeyer-style T-Glide fence system that boosts the rip capacity to 36½ inches. Thanks to plenty of vibration-dampening cast iron and heavy-gauge steel, the rig weighs more than 300 pounds. The mobile base allows us to raise the heavy saw onto two wheels and two casters by stepping on a pedal, and to lower it back to the floor by stepping on the pedal and a release lever.

The 1.75-horsepower motor is pre-wired for 120 volts. To improve the performance when ripping hardwoods, I converted it to 240 volts by following the instructions in the owner's manual. Not including the saw blade, our souped-up saw cost about $2,000.

High Performance

When setting up the saw, we always bolt a homemade melamine out-feed table to its

convenient L-shaped rear rail and hook a Delta dust collector to the 4-inch dust port. This setup needs some space, so on site we often convert the living room or garage into our ripping station.

It normally takes four guys to lift and carry the saw, and it's a bit harder to set up than our DeWalts. But the saw is a pleasure to use because it accommodates long trim and wide panels and is precise, stable, and almost vibration-free. Dust collection is decent with our Delta collector, but the saw still emits a large amount of fine dust. A dust-collection blade guard is available that might be an improvement, but we haven't tried it. Also, it isn't practical to load this heavyweight into our Mercedes-Benz Sprinter van at the end of each day and take it home. Instead, we meticulously chain the saw, lock the house, and say a prayer.

Our SawStop safety system has yet to save a finger, but we know it works. One of our carpenters accidentally touched the spinning blade with an aluminum straightedge. Boom! I had to replace the blade and the brake, but the straightedge survived.

SawStop Contractor Saw Specs
Blade: 10 inches; 5/8-inch arbor
Horsepower: 1.75
Cutting depth at 0°: 3 1/8 inches
Cutting depth at 45°: 2 1/4 inches
Weight: 245 pounds and up
Base price: $1,599
Replacement standard brake cartridge: $69
Warranty: 1 year

SawStop / 866.729.7867 / sawstop.com

Matt Risinger owns Risinger Homes, in Austin, Texas. See his video blog at JLConline.com.

CAD drawing: Jacob Stoesz

SAWHORSE PLANS

I first saw Brian Campbell's three-legged sawhorses in the October/November 2013 issue of *Fine Homebuilding*. The sawhorses are made of plywood, have three legs for incomparable stability on uneven ground, and break down quickly to lay flat on your pickup bed. Brilliant. For $10, you can now buy the plans at basswoodmodular.com. *—B.G.*

MEASURING UP

My crew and I build steel-framed decks. When Milwaukee rolled out its 25-foot model 48-22-5125 magnetic tape measure last summer, most of us bought one to see if it would be a good fit. So far, we think it's great.

The tape has two powerful magnets: one at the end for butt measurements and one underneath to prevent roll-off when hooking steel framing, steel pipes, threaded rod, and the like. The end magnet is handy for pulling inside measurements from steel ledgers and rim joists (and it helps us pick up dropped screws from a ladder).

The blade extends up to about 9 feet without buckling, has "Nylon Bond Blade Protection" that resists abrasion and contamination, and is scaled on both sides so you can read measurements off the back if necessary. A 12-inch section of the rear scale doubles as an architectural scale for reading 1/8-inch and 1/4-inch prints. A finger stop lets you comfortably control the extended blade with your forefinger and prevents the hook from whacking your knuckle. And the wire-form belt clip won't fray your pants like flat metal clips do.

Other magnetic and non-magnetic versions are available. Cost: $25. milwaukeetool.com *—Robert Shaw owns Colorado Deck and Framing, in Colorado Springs, Colo.*

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2013 Index

The 2013 *JLC* Editorial Index contains listings for feature articles, selected departments, product reviews, tool reviews, and letters. References are listed by topic rather than by article title. The following codes are used to help you find information:

* — In-depth coverage
L — Letter to the editor
Q — Question and answer
P — Product information

All of these articles are available on the *JLC* Archive DVD, and most are available online at **jlconline.com**.

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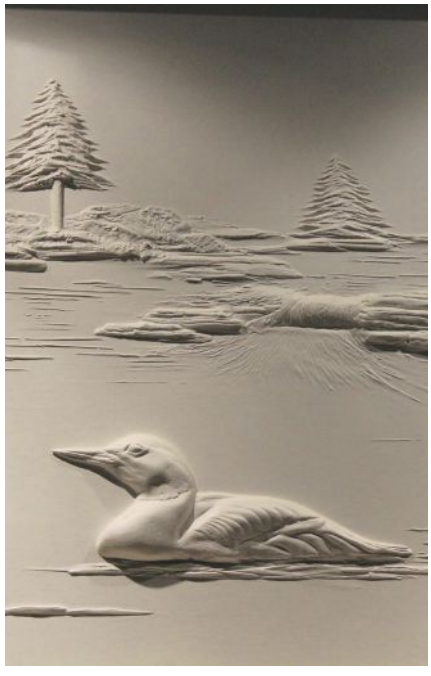
BY JON VARA



Using a variety of tools—some standard, others improvised—drywall contractor Bernie Mitchell works magic with mud.

Mud Michelangelo

Any highly skilled drywall taper is an artist of sorts, but Bernie Mitchell is an artist by any standard. An Ennismore, Ontario, drywall contractor, Mitchell has spent the past 20 years developing and refining a method of creating remarkably lifelike relief sculptures in drywall mud, many of which ornament the walls of area vacation homes.

The blank canvas for one of Mitchell's creations is an expanse of standard drywall that's been taped and given a couple of coats of primer. For the sculpted figures, he uses a customized mix consisting of standard drywall mud that's first thinned with water, then firmed up with dry setting compound. There's no hard-and-fast recipe, but the goal is a mud that's wet enough to stick when slapped onto a wall but stiff enough to resist sagging as a thick mass. The admixture of setting compound prevents shrinkage and cracking during drying.

Mitchell does a surprising amount of the tooling with a standard 4-inch drywall knife, switching to narrower knives as needed. His favorite tool for curved surfaces is the back of an ordinary tablespoon. Finer details are added using a sharp-bladed leather-working tool. He finds that dry brushes are useful for introducing surface texture, and sometimes resorts to improvised materials where a specific effect is called for. To get the fur on the figure of a wolf to look just right, for example, he recently dragged a crumpled piece of plastic bag over an area of still-soft mud.

Mitchell doesn't paint his finished sculptures, in part because paint would blur or obliterate fine detail. More to the point, he says, his work is about texture, light, and shadow—not color. "The key is to work on a wall where the light comes in at an angle," he says. "When you're done, you have something that's always responding to the light moving across it. I never get tired watching it change throughout the day."

To see a video of Bernie Mitchell in action, visit his YouTube page.

Jon Vara is a writer in Cabot, Vt.

Photos: Bernie Mitchell

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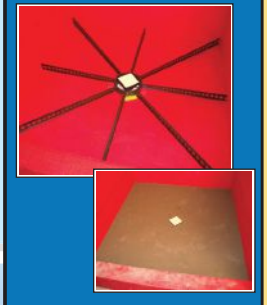

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Tools used:

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