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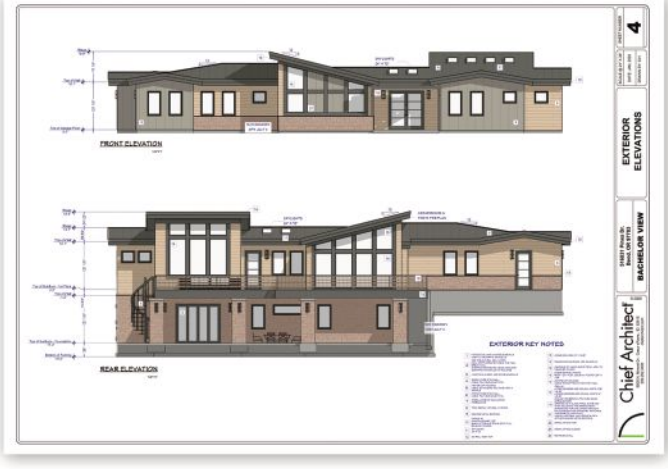

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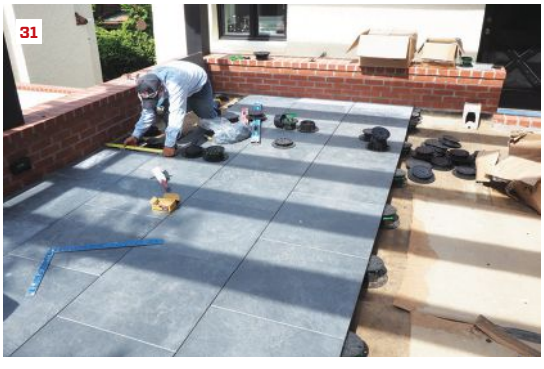

On the cover: Joe LaPietra installs Royal Building Products Celect cellular-composite-PVC shake siding, while brother Jack readies the next piece. Photo by Monmouth Vinyl and Fiberglass. See the story on page 23.

FEATURES

DEPARTMENTS

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Q I'd like to add a landing for a set of stairs leading up to the second floor of an older balloon-framed house. Is there a method for attaching a ledger for a deck or porch to the studs, rather than to a sawn rim joist or sill assembly, that is structurally sound and will satisfy the inspector?

A *Mike Guertin (on Instagram @mike_guertin), a builder and remodeler in East Greenwich, R.I., and a presenter at JLC Live, responds:* Yes, it's technically possible to fasten a deck ledger to the narrow faces of 2-by studs rather than to a solid rim joist. Unfortunately, there's no prescriptive approach in the IRC that you can follow to make the connection between the ledger and the studs. But—if your local building official approves—there is an approach you can employ that uses proprietary structural screws.

Simpson Strong-Tie's *Fastening Systems Technical Guide* includes a section called "Ledger Structural Fastening Applications" (on pages 45 to 51 of the *Guide*, which can be found at strongtie.com/resources/literature/fastening-systems-technical-supplement) that provides information on how to fasten a ledger to studs using the company's Strong-Drive SDWS timber screws. It's possible that other manufacturers of structural screws may offer similar installation details, but I was unable to find this information on any of their websites.

The Simpson Strong-Tie illustrations show different sized ledgers fastened directly to nominal 2-by framing, as well as installed over drywall—think of a landing in an interior stairwell. But the detail can also be applied to an exterior deck ledger. Included along with the detail is a table listing the allowable shear loads for the SDWS screws attaching a 2x6, a 2x8, and a 2x10 ledger to 2-by studs of common lumber species, along with a list of installation details and alternative conditions. For example, note #3 states that we can use 70% of the load in the table for lumber with moisture content greater than 19%, as one would expect for an exterior deck. Note #5 states that the ledger can be installed over a maximum 1/2-inch-thick wall sheathing.

To determine what the deck load is on the ledger board, you will need to do a tributary load calculation, and then divide that by the number of studs the ledger will be attached to.

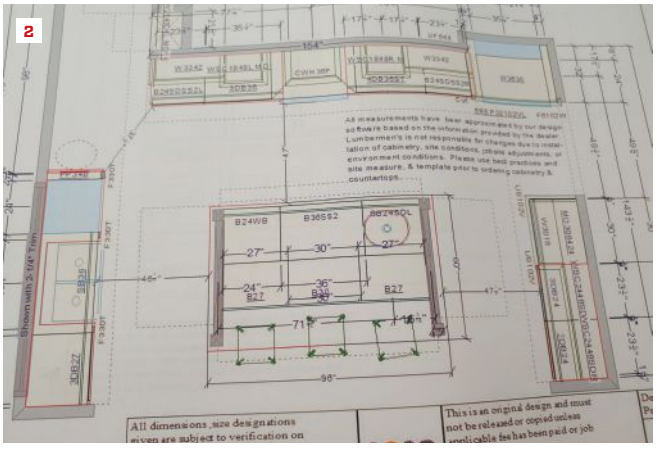
For example, for a 20-foot-long deck with joists spanning 12 feet to a beam and a standard total load of 50 pounds per square foot (10 psf dead + 40 psf live), you would multiply 20 feet by 6 feet (half the distance between the beam and ledger) by 50 psf to arrive at a tributary load of 6,000 pounds.

If the studs are framed at 16 inches on-center, a 20-foot ledger would cross 14 studs, so the next step is to divide 6,000 pounds by 14. The resulting load per stud is 429 pounds.

The shear load table is divided into columns of lumber species. Select the lowest-value species of the ledger lumber and the stud lumber. Let's say you are using a hem-fir ledger and the wall studs are Doug fir; you'd use the SPF/HF column since the hem-fir ledger has a lower value than the Doug fir studs in the assembly. A 2x10 ledger with four screws per stud has an allowable load of 675 pounds before the wet-service reduction of 0.70 (from note #3) is applied. Multiply the 675-pound allowable load by 0.70 to find the reduced load value of 472 pounds. The example tributary load per stud is 429 pounds, which is less than the 472-pound adjusted value, so it will work.

You would also have to follow the other installation details outlined in the table notes—like screw penetration into the studs and screw spacing—and account for any nonbearing studs in the wall (often there are no structural headers over windows in balloon-framed walls, for example). And be aware that the old plank sheathing in balloon-framed houses is usually thicker than 1/2 inch, so that may throw salt on this solution.

It's ultimately up to the local building official to approve the use of structural screws to attach a deck ledger to the studs. I suggest you have a plan review meeting with the building official to explain the ledger attachment system, and you bring along a printout of the SST technical bulletin. The official may require that an engineer review the attachment and sign off on the design.



Working from the designer's plans, the author marks the kitchen layout on the floor to make sure that the cabinets will fit and rough-ins are correctly located **(1, 2)**. Prior to base cabinet installation, he projects a level line on the walls with a laser to find the high and low points in the floor **(3)**.

Foolproof Kitchen Cabinet Installation

BY CHRIS KLEE

Prep work for a successful kitchen cabinet installation begins well before the cabinets arrive on site; before rough-in, even. It all starts with a solid design by a good designer who is familiar with the usual issues—and who knows how to avoid them. For example, it's the designer's job to know how the vent for a kitchen sink will be run when the sink is located underneath an 8-foot-wide window. A good designer will make sure that the installer has enough filler to prevent cabinet drawers from being blocked by 1-inch-thick back-banded door casings and that there is a spot on a kitchen island for the electrical outlets required by code. Having a good working relationship with an experienced kitchen designer is crucial and is why most builders tend to work with only one or two cabinet shops.

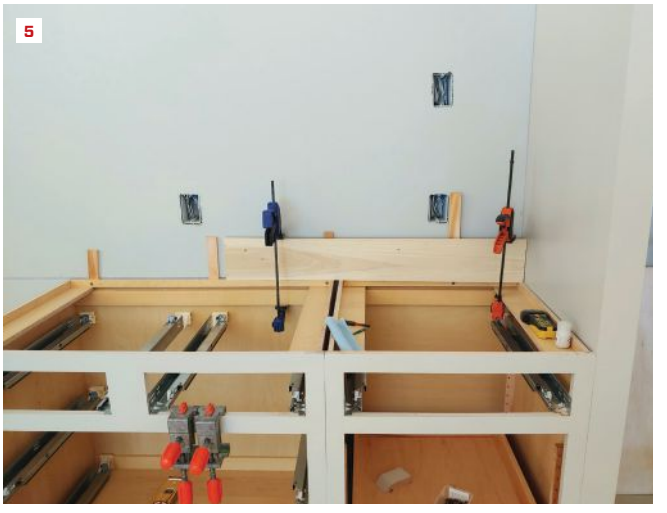
Layout. On any kitchen—whether in a new house or as part of a remodeling project—I start by laying out the cabinets in full scale on the floor with a marker prior to rough-in based on the designer's plan **(1, 2)**. This way, I can make sure that the cabinets will fit within the given space. Drawing the cabinet layout on the floor also gives the clients a chance to visualize how their kitchen will look in real space, and it's a great way to show the mechanical trades where things should go.

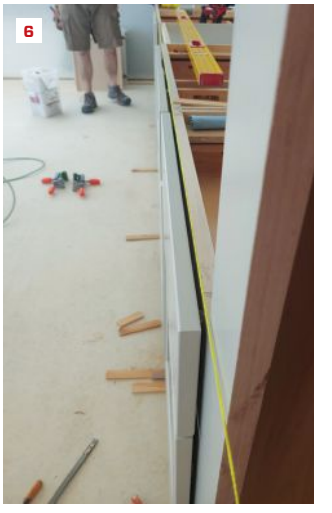
During my walk-throughs with the subcontractors, we mark the floor and walls with the locations of everything (it's helpful to work with the same company rep each time). Doing this also gives everyone a chance to double-check that things will meet code when done.

For example, we install toe-kick ducts in almost all the houses we build, and it's always a problem when the duct comes up at the seam of two cabinets. Drawing the cabinet layout on the floor and walking through the details with the HVAC installer helps avoid this situation. The process also gives other trades a chance to ask questions and find out things they need to know, like what kind of finished floor there will be and how thick of a substrate is required. I find it to be a worthy investment of time.

Adjustability. The layout is never perfect. That's why it's so important to build in adjustability for island pendant lights, sconces, and things like that. Sometimes, it's cut and dried where lights have to go, and we set the electrical boxes for lighting fixtures based on the plan. In other cases,

Photo 1 by Geoff Eldred; remaining photos by Chris Klee





Where base cabinets terminate at a wall or tall cabinet, the author shims them as needed up to the level line **(4)**. Preassembling runs of cabinets where possible and using plenty of clamps during installation helps keep the cabinets square to one another **(5)**, while a string line stretched across the faces of the cabinets helps keep them aligned as they are shimmed to the wall **(6)**.

though, we have the electrician run the wiring to the general fixture location and leave loose cable buried behind the drywall. That way, after the cabinets are installed, the cable can be fished out of the wall and the fixtures placed exactly where they need to go.

When anything like electrical cable or a pipe is buried behind drywall, it is important to note the locations on the cabinet drawings, because oftentimes the cabinet installers will not see the rough-in. I also like to document the rough-in photographically and make sure that the pictures are available for the installers. Emailing them a picture can save a lot of headaches when they are figuring out where the pipes are in a wall.

Rough-in. Once the project manager has worked out the details with the designer and subs, rough-in can begin. At this point, the most important tool that the project manager should have on site is a complete set of marked-up kitchen plans, along with the appliance cut sheets for the subs to reference. Having this and the full-scale layout the PM and subs did earlier should make getting everything in the right place pretty easy.

Except when it's not. Plumbing, for example, is usually straightforward, but on each job, certain details will need to be accounted for, such as the supply line for the ice maker in the refrigerator. Will it be a regular water line, or does the supply have to be conditioned by some sort of filter first? Does the refrigerator selected by the clients require a specific location for the water line (common with some higher-end appliances)?

The electrical rough-in can also throw you a few curves: Will the plugs work with the spec'd appliances? How will the island outlets be routed? Are any in-cabinet outlets needed? Is there undercabinet lighting? If so, our electricians typically will stub out the wiring a little higher than where the upper cabinets will meet the wall, so that we can just notch the drywall a little and pull the Romex or low-voltage wiring to the correct elevation. This goes back to building in adjustability.

Installation. When the cabinets are ready to go in, the prep work should make the installer's job go more smoothly. I always start with the base cabinets, because their location often drives where my uppers are located. First, I figure out if the cabinets need to be scribed to the floor, or if they'll need to be shimmed up. The easiest way to do this is by using a laser to identify the high and low spots in the floor **(3)**.

Next, I like to fine-tune the cabinet layout on the wall. If certain things need to be in certain spots—for example, a sink is centered on a window—now is the time to find the center of the window and work out from there. I also make sure to carefully read up on the appliance specs, making note of anything that is special about their clearances or opening requirements.

If the end run of a cabinet will show, I make the floor elevation there my benchmark. I want the ends of the runs to sit on the floor—not shimmed—which in some cases requires scribing some of the cabinet boxes to the floor. If, however, there are multiple cabinets in a run where the sides are all covered, then instead of scribing, I simply cut a little extra off the bottoms of the cabinets as needed with a track saw and shim them back up to my level line **(4)**.

Spacer sticks cut to the exact clearance dimensions of undercounter appliances and fastened to the cabinets with pocket screws ensure that the appliances will fit **(7)**. Wiring inside of a cabinet needs to be run through conduit, except where it is protected by a false back, as shown here **(8)**. Neatly filling nail holes after installing crown and other trim is a key part of the process **(9)**.

If the cabinet run is between two walls, I use the high point in the run as the benchmark and shim the cabinets up to it. The toe kick will cover up the shims. To keep runs of smaller cabinets square, I preassemble them prior to installation and use a string line to align the faces while I shim and fasten the cabinets to the wall **(5, 6)**.

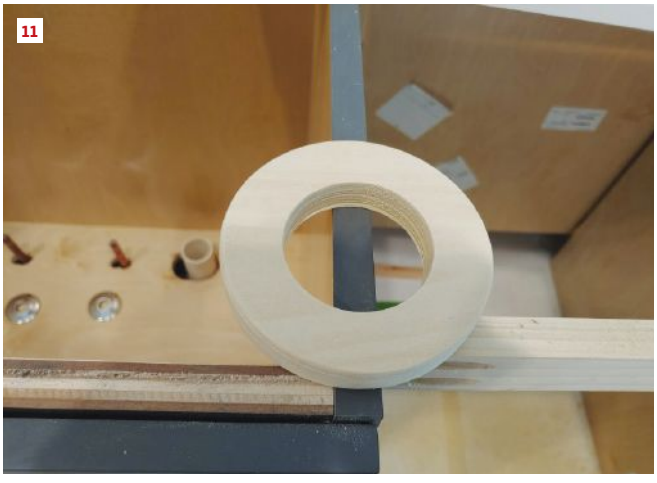
Because I've already installed the base cabinets and know they are perfectly level, I like to make a box to support the upper cabinets while installing them. It's usually just some scrap plywood or whatever is handy built to 19 7/16 inches tall. This way, I can shim the cabinets up perfectly to the line.

I use Torx-head structural-grade cabinet screws to secure the cabinets to the wall framing. Gold-colored screws blend well with the prefinished plywood finish on the inside of most cabinets. To secure cabinets to each other, I prefer to use trim-drive screws through the face frames, which require smaller, less-noticeable holes. To position the face frames where I want them, I use Jorgenson cabinet clamps, which hold tight and are fast to use. For frameless cabinets, I use Kreg vise grip–style clamps. I prefer the manual style, as I think they hold better than the automatic ones. Putting a little painter's tape over the ends helps protect the finish.

One helpful trick is to make spacer sticks for ranges, dishwashers, undercounter fridges, and the like. I size the spacers to match the appliance dimensions, and I drill pocket holes in each end so that I can use screws to hold them in place. The spacers ensure that the appliances will fit, and the appliance installer can easily remove them when that time comes. The spacers also help prevent the cabinets from being bumped during countertop installation **(7)**.

When installing a kitchen island, remember that code requires conduit for any wiring exposed within the cabinet. Often, there are false backs or space between the cabinets that can accommodate Romex, which is a much cleaner installation; otherwise, we have to run the cable through flexible conduit **(8)**.

Trim tricks. Trim like crown and light rail always finishes off cabinets nicely. For multipiece trim assemblies, I assemble as much as I can on a worktable to keep miters tight and aligned, especially when a ceiling isn't perfectly flat. To keep the nail holes small, I fasten the corners together using a 23-gauge pin nailer. If you don't want any nail holes, you can use FastCap 2p10 glue, which



A jig speeds installation of cabinet hardware **(10)**. When a cabinet that has already been drilled for plumbing lines has to be shifted slightly, a wood trim ring can be fabricated to cover the enlarged hole around a drain line **(11, 12)**.

is a fast-setting, two-part super glue that cures in just seconds, though it can be tricky to use because of the quick set-up time.

Filling nail holes isn't my favorite job, but I've found that warming up the wax stick makes it easier to place. You can hit it with a heat gun for a few seconds or put it in a microwave or even under an incandescent light bulb (if you can find one). Cutting down a Bondo spreader card makes a great putty knife for working the wax into a nail hole and removing the excess. Keeping the tool clean will be the difference between a nice, neat job and a mess on the crown, so have some rags on hand. When you finish a section, a little cleaner or paint thinner on a clean rag will remove residue and smudges **(9)**.

Hardware. Measuring out every knob and handle and doing all that math isn't fun, and there's a lot on the line if you get it wrong. To take some of the stress out of this process and to speed it up, I recently added a True Position Tools TP-1935 jig to my installer's kit. The set-up process is easy to learn, and with the jig I can set up and drill whole kitchens in an hour or two, instead of most of the day **(10)**.

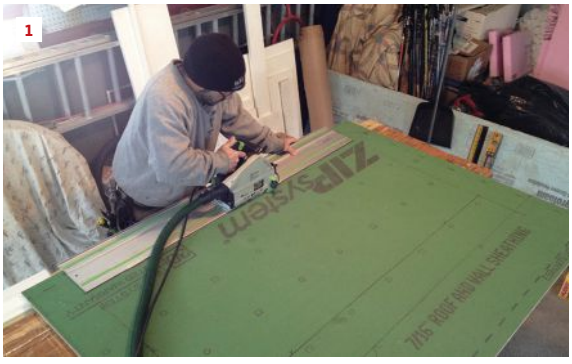
Fast fixes. During any cabinet installation, mistakes occasionally happen. Sometimes it's a math error, a measurement error, or just a bad drawing (or a good drawing with an old note that wasn't erased). Sometimes things get moved at the last minute, such as a sink base that gets pulled forward to accommodate a larger sink.

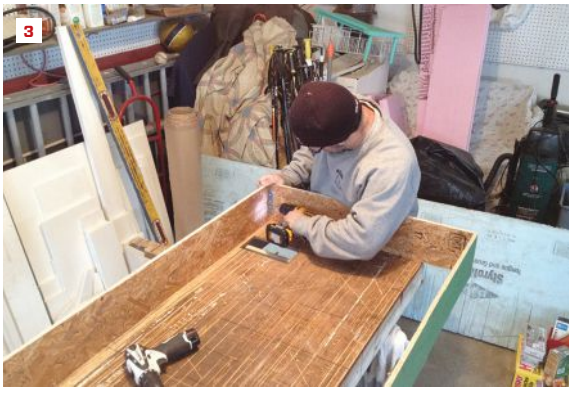
When new holes for supply lines or the drain need to be drilled in the back or side of a cabinet, the best way I've found to cover up the old holes is to make a new bottom or back out of a 1/4-inch prefinished maple plywood panel, with the holes drilled in the correct locations. The same technique can be used when an electrical outlet has been cut incorrectly or has been moved.

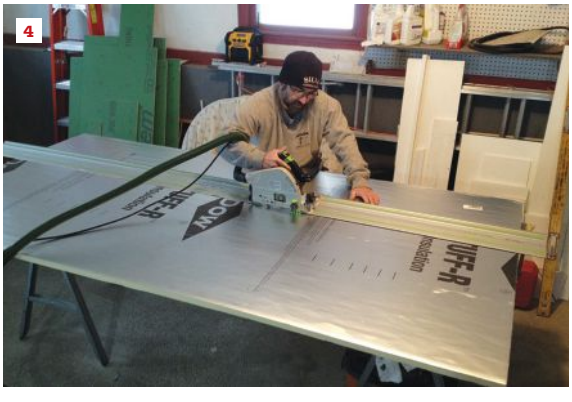
This technique works well with face-frame cabinets, but with a frameless cabinet, the edge of the plywood panel will be exposed. In that case, I sand the front edge of the bottom panel and round it over, then put some poly on it to seal it. Another option is to edge-band the panel.

Sometimes, the hole locations are off by less than an inch or so, such as when I had to move an island to account for end panels that were 1 inch thick instead of 1/4 inch thick (it always pays to read plans carefully). I couldn't find a metal trim ring for the 2-inch sink drain that would cover the gap, so I made a wood trim ring instead. I used a 4 1/2-inch hole saw to cut the outside (OD) out of a piece of 1-by, then a 3-inch hole saw for the inside of the ring (ID). Next, I ran the ring through a planer to knock it down to 3/8 inch thick and hit it with some clear coat to seal it up **(11, 12)**.

Chris Klee is a native of Northern Michigan, where he now lives with his family and works as a project manager for a Traverse City construction company.







An Airtight Attic Hatch Cover

BY EMANUEL SILVA

Oftentimes, taking on a remodeling project on one part of a client's house will lead to a completely different project on another part of the house. That was the case with the insulated hatch cover described in this article. I was in the process of fixing some rot-damaged garage framing and doors in my clients' 1960s split-level home when they mentioned that they also had a problem with the drop-down stairs leading up to the attic. Even though the stairs had been recently replaced, the ceiling opening was still very drafty. To block the cold air leaking into their upstairs hallway, they had tried cobbling together a hatch cover using rigid foam and scrap lumber, but this solution wasn't particularly effective. They were hopeful that I could cap the stairs with an insulated, airtight cover that wouldn't block access to the attic.

When I checked out the stairs, I saw that air-sealing the hatch cover would be complicated by the attic's uneven floor, which was sheathed with scrap pieces of plywood of various thicknesses. I had a good idea of how to build the hatch cover, since I'd recently built several of them for other clients, but I had to figure out a cost-effective way to even out the floor around the opening so that the hatch cover could close tightly against it.

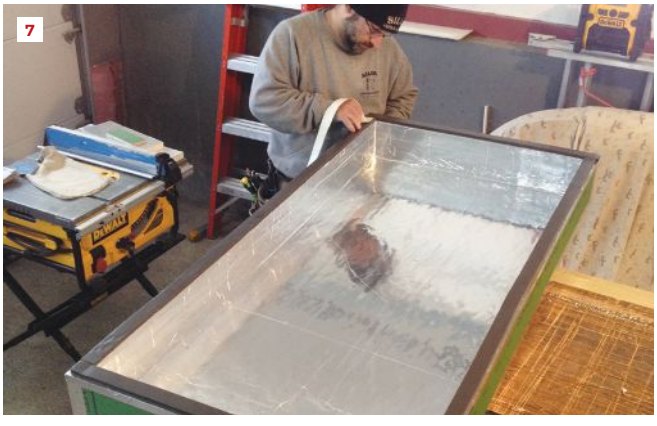
Apron. My solution was to cover the opening with an apron cut from a single sheet of Zip System sheathing **(1)**. Zip sheathing is flatter and more stable than regular CDX plywood and therefore easier to shim as needed to make it perfectly flat over the opening. Working in the homeowner's garage, I started by laying out cuts for the apron on the sheathing based on the size of the 22½-inch-by-54-inch rough ceiling opening required for the attic stairs. The apron was sized so that it would overlap the floor sheathing by 6 inches on each side **(2)**.

After cutting out the opening with my track saw and trimming the apron to length, I had enough sheathing left over to cut out the parts for the 6-inch-high, 30-inch-by-60-inch frame for the insulated hatch cover that would cap the opening **(3)**.

Hatch cover. I fastened the corners of the panels that make up the hatch-cover frame together with Simpson Strong-Tie angles and ½-inch-long #8 stainless steel pan-head screws. Next, I ripped a sheet of 1-inch-thick foil-faced rigid polyisocyanurate insulation into the sizes needed to complete the cap **(4)**. In general, 1-inch foam board is thin enough to easily cut with a utility knife, but I needed more precision for the tight fit needed on this project and instead

The author cut the hatch-cover sides **(1)** and apron **(2)** from a single sheet of Zip System sheathing, then joined the sides together at the corners with steel angles **(3)**. All of the rigid foam used to insulate the assembly was cut from a single 4-foot-by-8-foot sheet of 1-inch-thick polyisocyanurate **(4)**.

Photos by Emanuel Silva

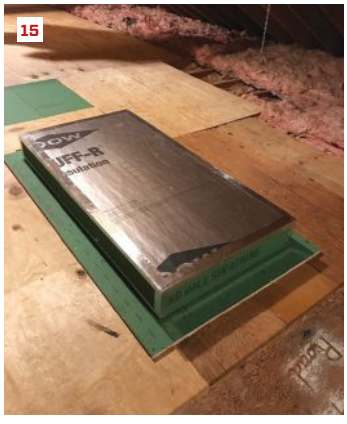


After fitting the foam top and sides **(5)** to the hatch cover, the author taped all the joints with foil-faced HVAC tape **(6)** and applied a gasket to the bottom edge of the cover **(7)**. Next, he assembled **(8)** and installed **(9)** the foam jamb extension that lines the stair opening. Before installing the apron, he applied a zigzag bead of foam insulation to the floor of the attic around the opening **(10)**.

made the cuts using both my track saw and a table saw, ensuring that the cuts were straight and the edges were square **(5)**.

I joined the foam-board top to the Zip System sides of the hatch cover using Nashua 322 foil-faced HVAC tape, first marking reference lines on the sheathing for the tape with a Sharpie **(6)**. This technique makes it easier to form straight, clean-looking taped joints, which helps prevent the tape from wrinkling. I've used this particular tape for a number of different applications and found that it works well in a wide range of temperatures (I assembled the cover in a cold garage but expect that the attic will be very hot in the summer). It's also extremely sticky, so to avoid folds and make the process more manageable, I typically apply the tape in about 2-foot-long sections.

After I taped the foam top to the sides of the hatch-cover frame,



The author shimmed the apron level **(11)** before screwing it to the attic floor, then sealed the gap between the floor and the apron with foam **(12)**. Before installing the hinges, he screwed a pair of blocks to the apron **(13)** to allow the hatch cover to remain open without a separate prop **(14)** and to close snugly without pinching the gasket on the hinge side of the cover **(15)**.

I added the remaining foam strips to the inside of the cap, taping all of the seams with foil tape. Finally, I applied a 1 1/2-inch-wide gasket material (commonly used for weatherization projects) to the bottom edges of the cover **(7)**.

Foam jamb extension. The final piece of the assembly is the foam jamb extension, an insert that fills the gap between the attic stair jambs and the framing for the opening. To create a gap-free fit between the apron and the extension, I cut the 1-inch foil-faced foam strips that make up the four sides of the extension so that the extension extends slightly above floor level **(8)**.

Before installing the insert, I filled any gaps between the wooden attic stair jamb and framing with low-expansion spray foam. I also applied spray foam to the insert before sliding it down into place **(9)**. To keep the insert from shifting upward again while the spray foam cured, I taped the joints between the wood jambs and the foam jamb extension with the foil tape.

Apron installation. Then I installed the apron over the foam jamb extension, first applying more spray foam to the floor sheathing **(10)**. After taping the joint between the apron and foam jamb extension with foil-faced tape, I checked the fit around the perimeter of the apron, adjusting as needed with shims and using my spirit level as a straightedge to ensure that the assembly was level **(11)**. Then I screwed the apron to the attic floor sheathing with coated deck screws and filled any small gaps between the apron and floor sheathing with more foam **(12)**.

Final assembly. Before installing the hatch cover, I screwed a pair of blocks cut from sheathing to the apron in the locations where I planned to install the T-hinges that connect the hatch cover to the apron **(13)**. The blocks raise the bottom edge of the hatch cover by 1/2 inch, allowing the gasket to compress evenly around the apron instead of being pinched at the hinge locations.

Finally, I dropped the hatch cover into position over the apron and fastened the hinges to the cover with more 1/2-inch stainless steel pan-head screws. I also screwed a grab handle to the inside of the cover, to make it easier to raise and lower it without being tempted to push up on the foam cover. While the insulated cover fits down snugly over the opening, it is light enough to open easily from underneath as the homeowner ascends the stairs, and the blocking underneath the hinges ensures that the cover opens slightly past 90 degrees, so the cover remains in the open position instead of flopping back down over the opening **(14, 15)**.

Emanuel Silva, a frequent contributor to JLC*, owns Silva Lightning Builders in North Andover, Mass. Follow him on Instagram: @emanuel.a.silva1996.*

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Lessons From the Pandemic

To create resilient companies, successful business owners must know their financials and make data-driven decisions

BY MELANIE HODGDON

The events of 2020 were a shake-up of business as we know it. The hit was uneven among construction contractors, with some firms seeing a large reduction in business and other firms experiencing a significant increase. Regardless of their market, though, all of the contractors I was in touch with over the past year had to work hard to adjust to changes in workflow, safety procedures, ways of meeting with clients, and most important of all, how they managed their cash flow and debt, priced their jobs, and monitored their financials. Resoundingly, all had to go back to the basics of business and take a hard, analytical look at what success would mean for their companies in the near- and long-term. This article is a summation of the lessons learned.

What approaches have contributed to your company's survival and even success? The businesses I know of that have been successful have taken the following key actions:

- Demonstrated decisive leadership.
- Made decisions based on hard data, not guesses or wishes.
- Generated systems for oversight and compliance.
- Monitored and adjusted according to current data, including targets and trends.

DEMONSTRATE DECISIVE LEADERSHIP

Leaders constantly observe current conditions, compare with the past, and take decisive action to establish future improvement. They prioritize the health of the company over the comfort of individual employees and make hard and often unpopular decisions, knowing that the short-term discomfort will likely lead to a more stable and secure future. Examples of decisive leadership include the following:

Delegate, don't abdicate. Too often, critical decisions such as setting up the financials, and even the categories for job costing, are left up to an accountant or a bookkeeper. Because neither typically has a background in construction, this rarely creates good results. The boss needs to take responsibility for making decisions on how the company will operate, and this includes structuring ahead of time to populate predetermined reports.

Monitor sales-dollars-per-employee ratios and reduce the workforce when it cannot be supported intact by current or projected sales volume.

Change suppliers or request deeper discounts on materials, negotiate more timely deliveries, or arrange for online receipts to eliminate the physical exchange of paperwork.

Adobe Stock

Survey subcontractor performance to pare down to the most productive, reliable, and professional subs. Stop hiring those who send you insufficiently detailed or late bills or who have to be chased down; your office staff has better things to do with their time.

Review marketing strategies. This might include cutting back in some areas, altering the message of what your company is about, or even expanding into new territory. This also means surveying your existing clientele to find out what kinds of safety precautions would need to be in place before they would commit to new projects. Then use this information to slant your marketing message to new prospects, who doubtless have similar concerns.

Review production methods to look for ways to increase safety. Many contractors learned how to modify practices when dealing with lead paint; similar revisions may make you more desirable to prospects in addition to reassuring your own workforce.

Review processes to look for ways to increase efficiency. This might include exploring technology that would permit existing workers to work remotely.

Review customer-centric practices to see what can be improved or eliminated. For example, some contractors (particularly those doing cost plus or T&M) spend time copying and collecting bills to provide to customers as proof of costs, even when customers have not requested this service. If you have a "difficult" customer who insists on micromanaging job costs, then you can provide this detail, but if they don't ask for it, don't offer it. Also review your post-job contacts with customers. Are you staying in their field of vision by sending birthday cards, project "anniversary" cards or e-mails including before and after pictures of their projects, inviting feedback through surveys, or offering a "reward" for consummated referrals?

Demonstrate consistency. There's nothing more frustrating to employees than having a boss come out with one "great new idea" after another. When the boss reads a book, attends a seminar, or talks with a peer, they may get all excited and want to switch to that method—right now! All too often, the impact on the company of additional work or the need to implement new technologies is ignored, and the workforce gradually becomes cynical about and resistant to new approaches. Effective leaders introduce change only after thoroughly understanding the implications to those "in the trenches," inviting contribution from those who will be impacted, weighing the cost-benefit, and setting up a specific step-by-step plan for conversion. When new practices are discovered and implemented, don't jump ship the next time something cool comes along.

Follow your own rules. We all know that kids learn by observing, and that the strongest influence is from parents. Without insulting your workforce, understand that, like kids, they will watch and match what you do. If you deny wage increases or profit sharing due to low profits and then buy a fancy new truck for yourself, the message is mixed and you will lose credibility. If you emphasize the importance of good customer relations and then are heard being rude to a customer, the message is mixed. If you stress teamwork, professionalism, and mutual respect and then publicly chastise a worker, the message is mixed.

MAKE DATA-DRIVEN DECISIONS

Many contractors rely on their accountant to tell them (at the end of the year) how things went. When used in this way—as historians rather than as collaborative teammates—accountants may get your taxes filed, but they lack the contractor-specific training and knowledge to help you improve.

Instead, either you need to find a construction-savvy accountant or financial analyst to help you understand your numbers, or you need to get training yourself so that you won't be held captive by somebody else's availability.

> Too often contractors confuse optimism with planning and hope with reality. You can't figure out what you need to charge unless you understand—and really believe—what it costs you to be in business.

First and foremost, you must have your books set up to provide numbers you can understand at a glance and then act on. This usually means setting up your books in a way far different from what an accountant without construction experience is used to. In fact, on many occasions, contractors who have been diligent about setting up and monitoring their books have gotten an unwelcome surprise after submitting them to their accountant and then finding that the accountant restructured things to make it easier to file taxes. In these cases, there are three solutions: Educate the accountant on the purpose behind the original setup, instruct the accountant not to make any changes to your accounting file but rather to file taxes based on whatever adjustments need to be made outside the software, or change accountants.

These are the things you need to monitor:

Achieved gross profit margin (the percentage of sales dollars due to profit). In the chart at the top of the next page, sales are increasing, but what is happening to profitability? Gross profit margin is probably the most important metric to track. Be aware, however, that if you are including "deposit payments" ("good faith" or "schedule place holder" money collected from customers prior to work starting and costs being incurred) in income, your gross profit figures and gross margin percentages may be skewed.

Total sales (total dollars coming in as the direct result of selling work). This figure should not include money from interest on savings accounts or money markets, money from selling that old truck on Craigslist, or money you won in a lawsuit. While profit is more important than sales volume (it's not about what you bring in; it's about what you get to keep), it's critical to keep an eye on sales volume because your pricing must be based on projections. If your projections are higher than reality, you may run out of cash.

Net income (dollars left over after you have paid all your project

ACHIEVED GROSS PROFIT MARGIN

	Reporting Periods		
	1	2	3
Total Sales (Income)	$100	$115	$140
Total Production Costs (Cost of Goods Sold)	$70	$82	$103
Gross Profit	$30	$33	$37
Gross Profit Margin (Gross Profit / Income)	30.00%	28.70%	26.43%

NET MARGIN

	Reporting Periods		
	1	2	3
Total Sales (Income)	$100	$115	$140
Total Production Costs (Cost of Goods Sold)	$70	$82	$103
Gross Profit	$30	$33	$37
Gross Profit Margin (Gross Profit / Income)	30.00%	28.70%	26.43%
Overhead	$25	$28	$31
Net Income	$5	$5	$6
Net Margin (Net Income / Income)	5.00%	4.35%	4.29%

TRENDED P&L

costs and also paid for overhead). It's easy to look only at sales dollars, see the growth, and assume that you can afford to increase your overhead, such as by adding a part-time office worker or doubling your marketing. If you do so, the effect of lowered gross profit and increased overhead will produce a double whammy (see "Net Margin," center left).

Trended reports should show you the direction in which the company is headed. Are things getting better or worse? When practical, graph the data showing multiple periods for easy visualization (see "Trended P&L," bottom left). If there is a change over time, is it consistent or are there peaks and valleys? Can these be explained? Can a downward trend be reversed? If so, how? And how long will it take? For example, if the issue is selling jobs at too low a price, and you've just sold projects that extend out the next 14 months, are you doomed to see the profit lines continue to drop, or can you take action now to reverse the trend?

Use a balance sheet in addition to a P&L statement. Everybody "gets" the P&L, but it is the balance sheet (see example on facing page) that can give you a better overall picture of your business health. A P&L shows only a period of time (such as January 1–December 31, 2020) while a balance sheet is a point in time (such as every moment of your business's existence through December 31, 2020). This report shows debt and can give you a heads up regarding cash flow as well as the degree to which your company is being sustained by borrowing.

Current ratio is based on two figures: total current assets and total current liabilities. These are outlined in green on our sample balance sheet. "Current" refers to something that occurs within 12 months. So current assets are cash or can be converted to cash within 12 months. Since you will be receiving payments from customers within 12 months of the invoice date, accounts receivable are considered current assets. Current liabilities are those payable within 12 months. These usually include accounts payable, payroll liabilities, and short-term loans such as lines of credit. You want to have $1.25 or more of current assets to pay for $1.00 of current liabilities. Therefore, the current ratio (current assets divided by current liabilities) should be 1.25 or higher. A ratio lower than that signals an imminent cash-flow crunch. In our example below, the current ratio is 1.25, signaling healthy cash flow.

CURRENT RATIO

Total Current Assets	$74,714.63
Total Current Liabilities	$59,633.32
Ratio	1.25

Debt to equity ratio is based on two figures: total liabilities and total equity. These are outlined in yellow on our balance sheet. Your total equity is roughly equivalent to the value of your company; if your liabilities are larger than your equity, then in the event of liquidation of your company, you would still owe money. Therefore, the ratio of liabilities to equity should be less than 1 (in other words, you should

have a higher amount of equity than you do liabilities). In our balance sheet example at right, the company is essentially operating on debt. Why? Should it have held off buying those trucks or gotten cheaper ones? Accounts payable looks reasonable, but the company has less than $20,000 in the bank with a line of credit of nearly $30,000.

While the current ratio of 1.25 looks acceptable, further analysis suggests that this is due in part to having a generous amount of cash. However, the cash was added by drawing on the line of credit. Based on the debt to equity ratio (below), the company is in trouble.

DEBT TO EQUITY RATIO

Total Liabilities	$149,701.57
Total Equity	$36,277.06
Ratio	4.127

PRICE JOBS CORRECTLY

It seems obvious that if you sell at too low a price, you will not make the profit you need and deserve, and eventually your company will fail. Yet too often contractors confuse optimism with planning and hope with reality. You can't figure out what you need to charge unless you understand—and really believe—what it costs you to be in business. Yet too many contractors pick a price based on some arbitrary figure (possibly what their non-construction-savvy accountant suggests, or what markup they "hear" a competitor is using, or what their prospective customer can tolerate, or what seems "fair"), cross their fingers, and that's what goes on the contract. This can be reflected in a fixed-price contract or in the details of the cost-plus / T&M contract. Then they simply go with that and fail to look at the results. Every job must be examined to determine whether or not the targets were met.

As always, what you need to charge depends on your company's costs. For example, if you offer employees generous health and retirement benefits and you profit share, your costs will be different from a company with similar volume that uses only subcontractors. This is why you can't simply copy what a company across town is doing and expect to get similar results as defined by profit.

I have written numerous columns on how to calculate what you need to charge, but in simple terms, you need to identify your overhead, your desired amount of profit, and your projected sales volume. After that, it's just math.

If you find that, overall, you are experiencing slippage (the discrepancy between what you expected to make as gross profit vs. what you actually make) on virtually every job, then you can spend a lot of analysis time trying to figure out where the overages are, or you can simply allow for slippage by marking up more to allow for it. However, bear in mind that it can be extremely useful to identify specific tasks that your crew consistently goes over budget on.

KNOW YOUR TARGET PROSPECT POOL

Effective contractors know exactly who their target prospects are. This is because they not only analyze the profitability of individual jobs but also group their jobs by category. Categories may differ among companies, but there should be some established criteria by which successful jobs can be identified and replicated. Unless you discover that bathroom jobs with moderate levels of finish that are located more than 30 minutes from the office continually fall short of meeting their target margin, you will continue to sell that kind of job.

Establish some buckets into which jobs can be dropped and use that information when tweaking marketing, pricing work, or even deciding to turn down work.

BALANCE SHEET

Assets	
Current Assets	
Bank Accounts	$19,926.18
Accounts Receivable	$54,788.45
Total Current Assets	$74,714.63
Fixed Assets	
Vehicle #1	$40,000.00
Vehicle #2	$38,500.00
Vehicle #3	$32,764.00
Total Fixed Assets	$111,264.00
Total Assets	$185,978.63
Liabilities & Equity	
Liabilities	
Current Liabilities	
Accounts Payable	$21,586.75
Line of Credit	$29,752.43
Payroll Liabilities	$8,294.14
Total Current Liabilities	$59,633.32
Long Term Liabilities	
Vehicle #1 Loan	$32,764.08
Vehicle #2 Loan	$32,505.72
Vehicle #3 Loan	$24,798.45
Total Long Term Liabilities	$90,068.25
Total Liabilities	$149,701.57
Equity	
Owner Draws/Distributions	-$3,169.22
Net Income	$39,446.28
Total Equity	$36,277.06
Total Liabilities & Equity	$185,978.63

ESTIMATE ACCURATELY

Unless you habitually practice "drive-by estimating" or have a crystal ball, you will need to estimate accurately. The topic is far too complex to delve into here, and there are gazillions of articles, webinars, and software designed for estimating. Larger construction suites allow you to take photos, drop them into CAD software, get takeoffs, and write up both proposals and materials orders all in one place. But here's what you need to remember:

Labor is the hardest component to estimate. The total cost of labor (or burdened labor) is typically far greater than what first meets the eye. For example, if you pay a field worker $20/hour, you may calculate that he actually costs you $39.85/hour (in a company with generous benefits, it is not at all unusual to find that the burdened hourly cost is much higher than an employee's hourly rate). So when you're considering how much the labor will cost in a particular project, be sure you are estimating using the burdened cost. Leaving out some of the cost of labor will mean you will underestimate the total labor cost, leading to your underpricing the job. (For more on burdened labor, see "The True Cost of Labor," Mar/08.)

REPORT JOB COSTS

You can't improve what you can't measure. So if the production team is consistently over budget on interior trim, for example, and you don't notice it, you can only expect that the trend will continue. What's more, the larger the percentage of interior trim on a job, the bigger loss of profit you can expect. It's not enough to simply know that Job X brought in $45,000 and total costs were $35,000 (gross profit = $10,000; achieved gross margin = 22.2%); if your target margin was 30%, then somewhere, things went over budget. But where? Are projects taking more time than anticipated? Is there a higher percentage of waste than expected or reasonable? What's going on?

You need to job-cost in such a way as to be able to identify the good, the bad, and the ugly components of production. How you set it up is up to you. I like job-costing by task (Framing Labor, Framing Materials, Framing Subs; Exterior Trim Labor, Exterior Trim Materials, Exterior Trim Subs; and so on), but it can be as simple (to start with) as breaking out total labor from total materials from total subcontractors. You can get more complex and detailed as your analytical skills grow and your production workforce is trained to provide the level of detail you seek.

Bear in mind that the greater the level of detail you seek in your reporting, the greater degree of complexity and need for training and oversight. You can't suddenly spring 35 labor task categories on a production team that previously only reported total hours per job and expect to get accurate results. You will need to display leadership by thinking through it ahead of time to come up with an appropriately useful list of tasks that fulfill the "sweet spot" of sufficient detail to permit you to analyze jobs without swamping your production and office workforce. Then you'll need to provide adequate training and create a plan for the transition, especially when new methods cross ongoing jobs.

You need to think through every task and be able to shoehorn it into your task list. Some things are obvious but others are not. For example, about half of my clients classify skylights with windows since they order windows and skylights together; the other half classify skylights with roofing since it will be the roofing subcontractor who installs them. Either way is justifiable and logical, but your employees need to know where to put skylights when coding time or costs.

Another example is gutters. They're attached to fascia, which is associated with roof framing so does it get put with framing or roofing? But they're part of exterior trim, so maybe that's a better place. Or since gutters are designed to direct water away from the house, do they belong with drainage? Maybe gutter installation is such a significant part of your services that it becomes a separate task group.

Arguments can be made for any answer, but what matters most is that these questions are settled before the system is put in place and that sufficient time for training is built into the schedule. If you think it's a waste of time to spend two hours training everybody on coding time and costs, compare that with spending time recognizing and recoding entries, as well as retraining to correct old habits.

Finally, be sure that if you are estimating burdened labor, you are also *job-costing* burdened labor. Keep your analysis "apples to apples." Anything other than that will lead you to underreport the actual cost of labor, which will again lead to bad pricing and overly optimistic profit reporting on specific jobs.

CREATE EMPLOYEE STANDARDS

Effective business leaders provide workers with publicized standards (everything from dress code to construction methods) and targets (expected completion times, for example) and then hold workers accountable for meeting them. Objectives are communicated clearly and consistently, and excellent performance rewarded in some tangible way, whether by recognition (lunch with the boss, an achievement certificate or plaque, or the like) or monetary reward. Those who are noncompliant or fail to meet published standards are dealt with via a process outlined in the employee manual. An exceptional leader holds him/herself to these same standards and acknowledges his/her own mistakes.

MONITOR TARGETS AND TRENDS

Effective business leaders keep their eyes on the prize. They monitor results and look for ways to improve specific metrics. They recognize that past performance is no guarantee of future results. They not only examine results and analyze the reasons behind changes but also create and implement plans for improvement, often with the input of relevant employees.

Bottom line. The essentials of good business haven't changed with the global crisis. What has changed is that the behaviors and systems employed by successful companies now, more than ever, need to be adopted by all businesses hoping to survive and even thrive.

Melanie Hodgdon, president of Business Systems Management, provides management consulting and coaching for contractors.

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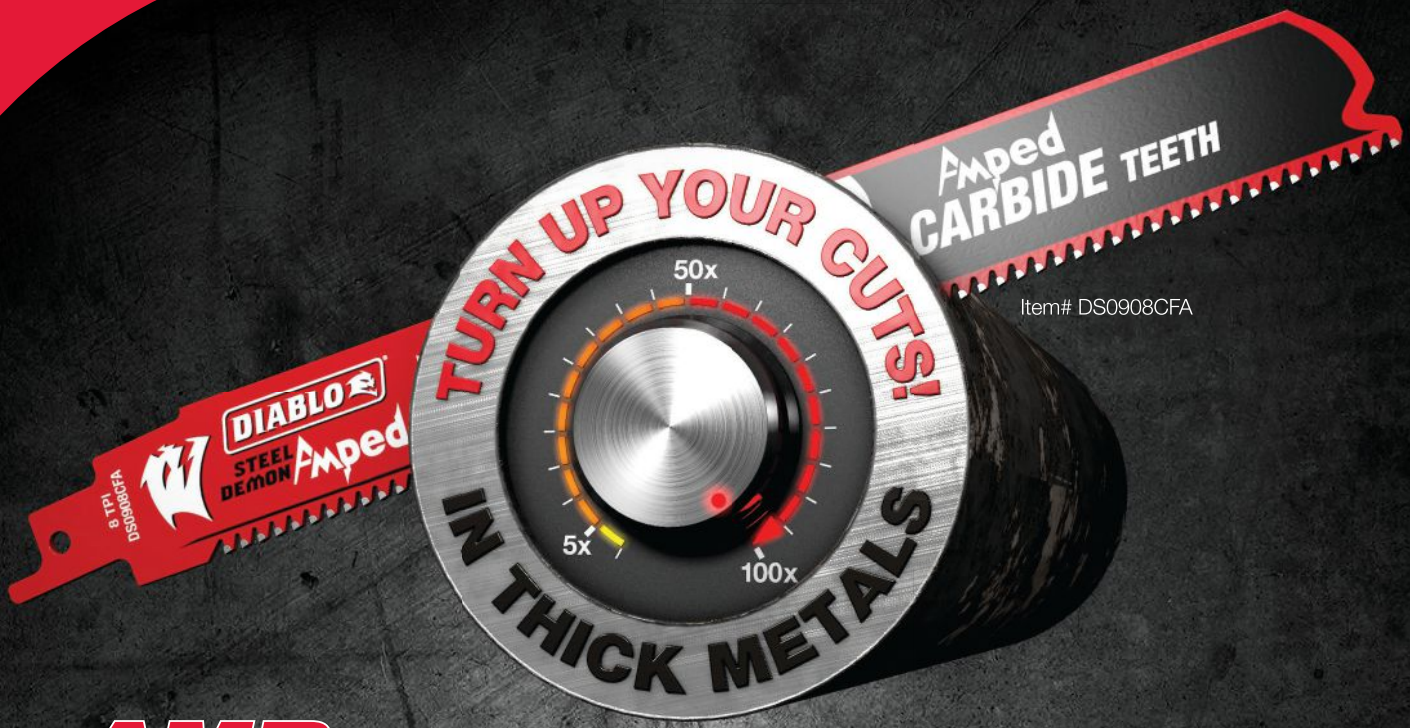

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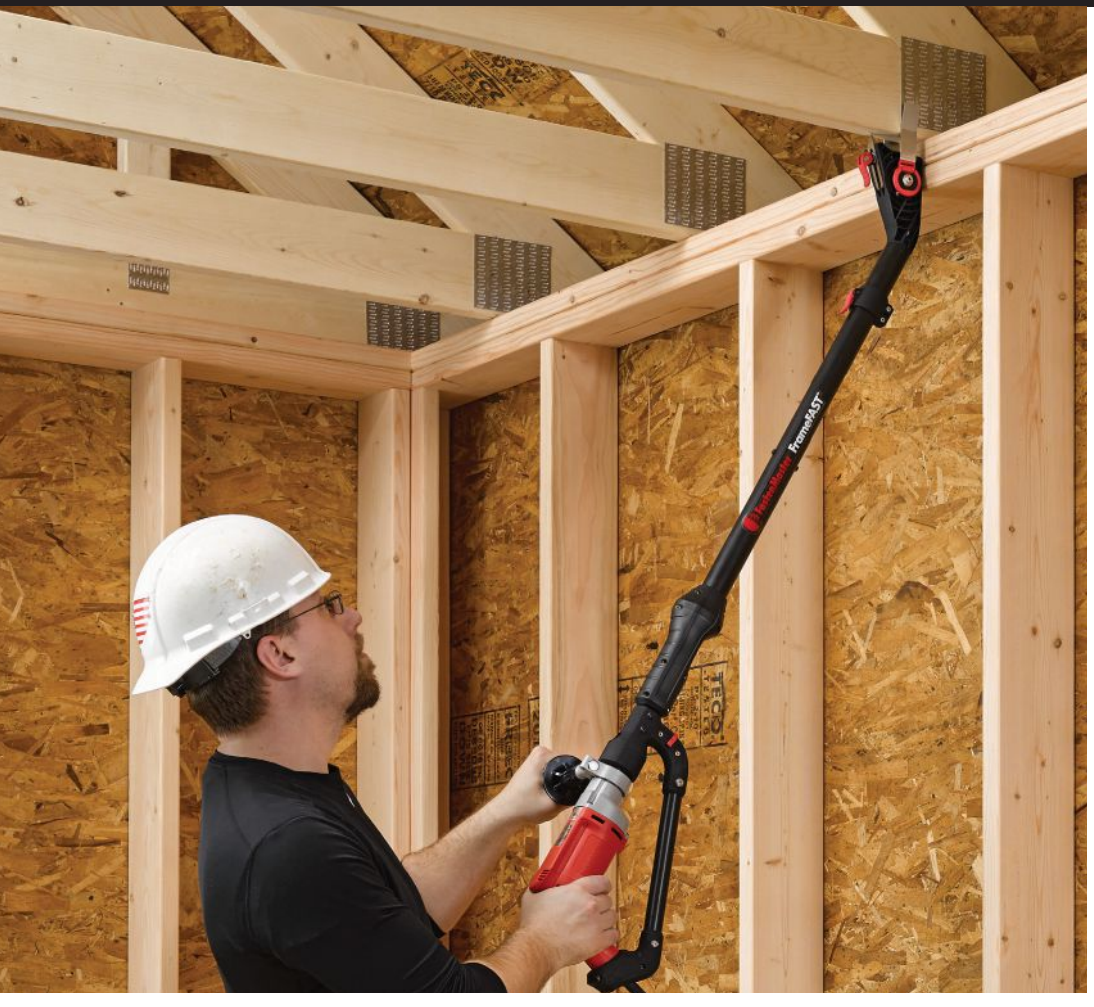

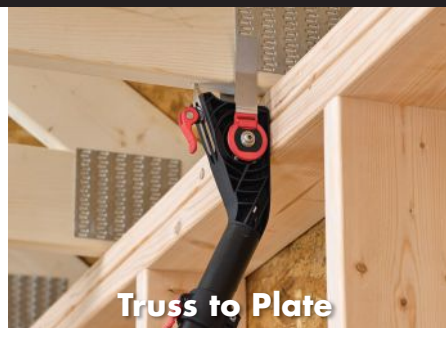

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Photos by Monmouth Vinyl and Fiberglass

Solid PVC and Composite Sidings

A veteran installer rounds up the latest in premium polymer-based sidings

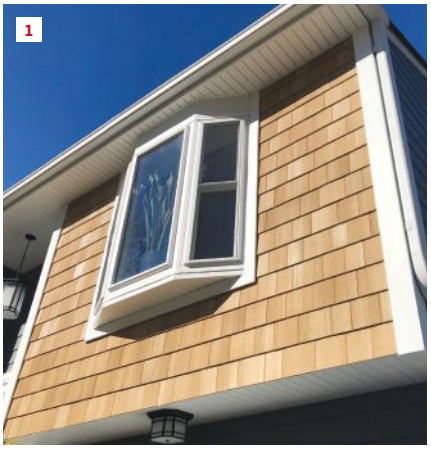
BY STEVEN LAPIETRA

Vinyl siding, like other claddings that have preceded it, has a finite life expectancy. We see this not only in terms of its performance on the wall but also in the larger scope of generational time: Siding materials come and go. As we look back, vinyl, aluminum, asbestos, beveled wood, and so on have all had their heyday. Changes from one "mainstay" to another are never clearly defined, but rather have overlapping periods. I think we are in the midst of just such a period right now.

While vinyl remains the biggest seller and cementious siding is seen as the "high-end" alternative—at least here in the Siding State of New Jersey—a new kind of siding has been making its way into the professional siding contractor's playbook. It's made of a mineral composite, cellular PVC, or a combination of inorganic materials, all of which share a key feature—they are solid materials. These new sidings are more stable and easy to handle. They cut and install much like a wood siding but have factory-applied finishes that are typically warrantied for 25 years. And they have rigidity that you just don't find in ordinary vinyl siding.

NUCEDAR SETS THE STANDARD

NuCedar Mills was one of the first cellular-PVC sidings to come to market in the mid-2000s. Its specialty (in my opinion) is the replication of shingles. Its shingles come the same way wood shingles do—individually sized in several widths, prefinished, with multiple exposures, and sold with the required accessories to match. The difference is in the upkeep. Because they are cellular PVC with



NuCedar shingles **(1, 2)** are so authentic looking, they can fool even the most experienced eye. Note that shingles can be butted against the casing and downboards, eliminating the need for "pocket installation" (J-channel or otherwise). The problem comes in finding color-matched trims—not only coil stock but also utility blocks, attic louver vents, and such. NuCedar also offers vertical siding **(3)**. When installing long vertical panels, you need one person up and one down, and they need to communicate constantly to keep the panels aligned. These boards can be used for ceilings, too **(4)**. Here, we cut the flange intermittently on the panels to allow for airflow and for any water from the small deck above to escape.

a "heat reflective industrial coating" finish (which is included in their 25-year warranty), they are virtually maintenance-free.

These shingles are a niche product though, given the cost of manufacturing so many individual pieces and the incredible variegated finish that each one has. But for clients who are looking for more than what a vinyl shake product can provide, without the upkeep required for finished cedar shingles, there is no better alternative.

Much the same can be said of the vertical sidings from NuCedar. The long, authentic cedar grain is unmatched in the industry and perfectly complements a vertical application. Vertical applications can be tricky, though. The problem is, well, gravity. You need one installer up and one down, and they have to be on the same page and communicate constantly. This is so important, because if they don't communicate well, panels start to go wavy and it's going to show.

I believe the only reasons the NuCedar products haven't been more prevalent in the field are the cost of materials and the time required for a proper installation. Not many homeowners are willing to pay for this premium material. Nor are there many siding contractors willing to put in the time to learn how to properly install it. The photo on the previous page gives you an idea of part of what's involved: Shingles must be sorted by size, dabs of Flex-and-Fill applied to the bottom corners of each shingle, and stainless nails shot to apply. The photos above provide a little bit more detail.

Two things we run up against with all new solid sidings: First, it is imperative to find aluminum trim coil that will match, or

For a brief time, Marvin **(5)** made siding from pultruded fiberglass—the same material as in its Integrity windows. Azek **(6)** made a similar type of siding. Both companies offered 7-inch-exposure clapboards, for which there is high demand. This was a superior siding material most notably because boards could be butted to trim and no caulk was necessary when they were properly flashed. The look was perfection. Unfortunately, both products have been discontinued.

nearly match, the finish sidings. Manufacturers that provide color-matched coil stock are one step ahead. NuCedar is not one of these, so we have to work at the beginning of the job to find the best match and set client expectations accordingly.

Second, we always focus on water management. Under the siding and foam underlayment, we use aluminum trim coil at all inside and outside corners over the housewrap. We like to use a drainable housewrap with stand-offs or folds to help move the water out and away. This is especially important in our market along the Jersey Shore. (Remember Hurricane Sandy? We remind ourselves of this all the time.)

A FLEETING MOMENT WITH FIBERGLASS

For a time, NuCedar was the main player in this new field of siding materials. Then, in 2012, Marvin developed a siding made of the same material as in its Integrity windows—pultruded fiberglass. It was—and still is—the finest siding I've used. It was aptly called "Apex." We used it for several jobs, as I recognized it as the ultimate answer to all things "suspect" in the vinyl, fiber cement, composite, and engineered-wood categories. But, alas, it didn't take off, and when the product went off the market, we were disappointed, as we had just been gaining momentum, with several jobs under our belt by then.

Azek followed Marvin with its own version of siding in 2016 that, I suspect, had some element of fiberglass in it, too. We did a job with it, hoping to continue our foray into this New World of sidings. But Azek pulled the plug on this one, too. (Azek has recently returned to the cladding market with a repurposed decking board formulated for open-joint and plank siding, but we have yet to use it.) I still think fiberglass is in our future. Just the fact that expansion and contraction are negligible makes the material a no-brainer. And best of all, no caulk is necessary when it's properly flashed, and no pocket or J-channel needed: The look is perfection.

ROYAL BUILDING PRODUCTS' CELECT

Sometime in 2014, I became fully aware of a new siding made by Royal Building Products. I say "fully" aware, because in 2011, a representative from Royal had visited me on one of my jobs to see what I thought of a new prototype siding. It was solid, and it had a shiplap interlock at the end of each panel. This would make it virtually seamless, which has always been a draw for me and my customers. (I believe I was contacted because of my membership in the "Seamless Siding Association," an organization in the 1990s and early 2000s that included siding contractors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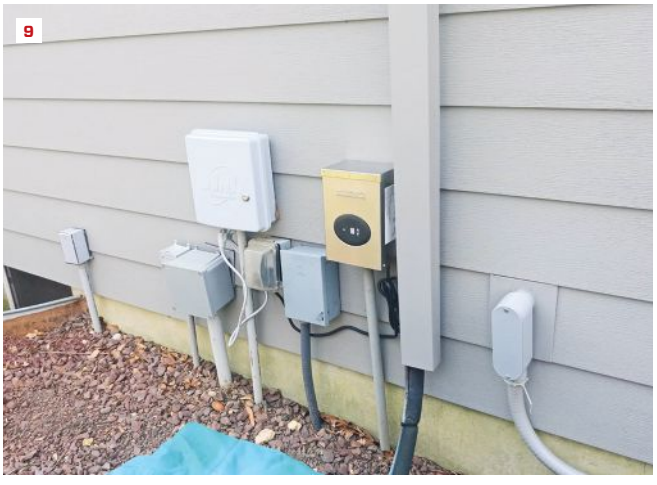
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With Royal Building Products Celect siding **(7)**, seams (butt joints) are shiplapped so each course moves in unison across the length of the wall. Note the double nails in the upper right corner. This is the center of the wall; the double nails "pin" the siding in the middle, so thermal movement happens evenly from the middle out in both directions. Because of the thermal movement, penetrations such as this vent outlet **(8)** require a deep-set pocket, which requires a wide trim. From the start, Royal has offered color-matched, heavy-gauge aluminum trim coil for detailed finish work. Here **(9)**, the AC lines are capped with matching coil stock fabricated on site—much better than the usual white leader pipe. Instead of the usual mounting blocks, a plate made from coil stock overlays a narrow block, allowing the siding to move underneath.

from the New England and mid-Atlantic states who had exclusive areas to sell and install Royal's Suprema 40-foot-long vinyl siding.) I imagine it took some time to move the prototype into production, because it wasn't until 2014 that the material became readily available in my area. Once it was a viable alternative, we knew this was a special siding.

The product is well-thought-out, and the line includes all the required accessories. We did our first job with it in early 2015. From the start, Royal has offered color-matched, heavy-gauge coil stock, as well as a line of color-matched cellular-PVC trim stock, which has been very convenient.

We have continued to sell and install Royal Celect to those homeowners who seek the "best." Installation is slower than with regular vinyl sidings, as all cuts have to be made with power tools. No snips here. And no J-channels to hide the ends. Everything fits in a high-profile trim element or custom-fabricated (out of the matching color aluminum trim coil) receiver piece. At first, all penetrations had to have a "receiver pocket," which we built following the manufacturer instructions by applying one 1-by-1 1/2-inch furring strip, and then overlaying a 1-by-3 1/2-inch trim piece. This created the 2-inch pocket that Royal calls for. Having spent many years in the seamless-siding world, I became very familiar with the required allowances for expansion and contraction. I also know that those allowances are relative to the size of the panel, or in Celect's case, joined-together panels. So, we are comfortable with having smaller pieces of siding end in 3/4-inch pockets. Many times this will eliminate an otherwise obtrusive trim.

A couple of years ago, Celect introduced a shake profile. It is a single 7-inch panel, and it comes in two different molds, which eliminates the problem of a repeating pattern that we have found with other panelized shake sidings. And the window trim materials are varied enough to make several types of casing systems. These shakes are hard-nailed (the panel has no nail holes), so we can employ a siding nail gun, helping speed up the process.

The Royal Celect line includes a shake profile in a 7-inch panel that comes in two different molds, which eliminates the repeating-pattern issue found with other shake sidings. These panels are hard-nailed **(10)** (the panel has no nail holes), so installers can use a siding nail gun. The window trim materials offered by Royal Building Products are varied enough to make several types of casing systems, including a Victorian look **(11)**. The author's crew makes up the casing units using 2P10 adhesive and Kreg hidden screws, and installs the assemblies after the siding is done **(12)**.

CHELSEA BUILDING PRODUCTS' EVERLAST

Chelsea Building Products (founded in 1975) has been a behind-the-scenes maker of specialty products in the siding market for some time now. Many major manufacturers marketed Chelsea products branded with their name for a number of years. In 2009, Chelsea introduced its own Everlast siding product in New England, and it has proven to be a viable option in this emerging sector of the siding industry.

Everlast is made of a polymer base with inorganic minerals. We especially like its authentic finish, and we also like that it has far less expansion and contraction than most other sidings in this new genre. It calls for only a 3/4-inch pocket for penetrations, so we can use standard utility blocks, such as those by Mid-America, and typical and readily available cellular-PVC trims, such as those from Azek.

Like Celect, Everlast also has a butt-joint seam; it's mechanically fastened by using a stainless steel bar that spans the panels in the upper, hidden nailing area. This bar must be double-screwed to each adjoining panel (four screws total), insuring that the seam will stay closed. The screws are short enough to allow the siding to move freely, without attachment to the wall. This becomes a bit laborious, but

Chelsea Building Products' Everlast line uses a stainless-steel bar for joining panels, and the panels have nail slots every 8 inches to help installers hit the stud layout **(13)**. Everlast, combined with cellular-PVC fascia, corner boards, and brickmold casings, creates an authentic, zero-maintenance exterior. **(14)**. Even with the sun directly overhead, shadow lines appear straight and even **(15)**; this doesn't happen with ordinary vinyl. Using narrow, 4 1/2-inch panels means more panels to handle, more seams to join, and more nails to apply, making for a more expensive job **(16)**. But the look closely matches old-style clapboards.

after a while, installers get used to it. Here in New Jersey, we often work on older homes that have fiberboard sheathing, which requires us to fasten the new siding to studs. The spacing of Everlast's nail slots every 8 inches makes this easy to do.

The siding is offered in two profiles, 6 7/8 and 4 1/2 inches, as well as in a relatively new board-and-batten panel with an 11-inch reveal. I believe Everlast has captured the look of wood with its finish. Because it is thick and not just a sheet material, the depth and character of the wood grain is much clearer than what we've seen in ordinary vinyl products. Everlast does not have as many as ancillary products as we would like. It doesn't offer color-matched cellular-PVC trim, utility blocks, or aluminum trim coil, although Chelsea does have an array of its own cellular-PVC trim materials in white, and we have had luck in matching its colors to those of other vinyl manufacturers that offer a wide selection of coil stock. Chelsea does have some basics: corners, J-channels, and a 3 1/2-inch casing in colors.

WOLF HOME PRODUCTS

Wolf is another brand of composite sidings we have used recently. Wolf Home Products is the marketer and distributor; Inteplast Group is the parent company. Regardless, the siding is fully backed and supported by Wolf, and is a well-made, solid panel. Best of all for us, it is offered in a 7-inch panel, which is in high demand today. It is also available in a double 4-inch panel, but we're not so sure there will be a call for double anything anymore, as it looks too much like ordinary vinyl.

Wolf's Baltic Blue comes with matching coil stock for fabricating the many different details that come up on nearly every job, including a receiver channel at the chimney, a false bottom course, and a capping for an extended foundation **(17)**. The Wolf system requires plates to join panel ends. These require you to apply pressure to help the adhesive cure **(18)**. The result is an incredibly strong joint. This facade **(19)**, on which the custom-fabricated gutter leader at right nearly disappears, makes a strong case for matched coil stock.

Wolf calls for a 1 1/2-inch pocket and provides a specific line of cellular-PVC trims in white only. We're hoping it will start making trims in colors to match. Not everyone wants white, especially for corner posts. With Wolf products, we have to hunt for color-matched aluminum coil material.

Seams with Wolf are handled with a splice plate. As with Royal Celect and Chelsea Everlast, which also offer a secure butt finish, this results in stable butt joint. The Wolf system, however, is a little more involved, requiring you to place glue on the plates and apply some pressure to cure. This is only a small nuisance that quickly becomes standard procedure.

While more expensive, the new composites are making inroads into more and more siding markets because they can all be accented with high-profile trims. This really sets them apart from standard vinyl sidings. No aluminum casings with unsightly J-channels clutter up the look. Solid 4x8-foot PVC sheathing panels can be used for window panels as well as the "board" area of a board-and-batten accent. Flexibility, as well as creativity, is unrestricted by the set sizes of vinyl materials. A specific width and a specific batten size are easily made with solid cellular-PVC material. All you have to remember is to seal any cut edges with acetone, to prevent them from darkening over time. And many types of moldings, even crown molding, are available. Most are available from each of the manufacturers covered here.

Steven LaPietra owns and operates Monmouth Vinyl and Fiberglass, based in Howell Township, N.J.

Decks Over Roofs

Three proven methods for building durable, leakproof decks above living space

BY DOUG HORGAN

Our Washington, D.C., metro-area remodeling company is often asked to build decks above finished spaces, and we have several reliable methods that we can use, depending on the job. Most of the time, we install these decks over pressure-treated sleepers that rest on the roofing, tapering the sleepers to follow the slope of the roof. Another approach is to support the deck with adjustable pedestals that rest on the roofing. The roof details are similar in this case, but pedestals are more suited to square or rectangular finishes, rather than linear decking, and are easier to adjust for multiple roof planes. One of the cleanest methods is to use existing parapet walls to support joists that span above the roofing. It's rare we have a building where this will work, but when we do, it's inexpensive and reliable with few complications.

This article describes our preferred methods for building decks over living space, though there are other rooftop deck solutions, such as adhered walking-surface membranes, which we have installed for some clients. This article won't cover mortar-set stone or tile applications, either. These are challenging and expensive installations, and I've covered some key details about them in a previous article, "Repairing Stone Patios Over Living Space" (Jul/16).

ROOFING DETAILS

Regardless of the decking installation method, we've learned a few lessons about decking materials and roofing details. For example,

Photos by Doug Horgan; illustrations by Tim Healey

When installing decks over living space, the author adheres to a code-mandated minimum 1/4-inch-per-foot roof slope, which can be achieved by either sloping the roof framing or using a tapered insulation system. While uniformly deep 2-by "floating" sleepers laid across a sloped roof may be installed **(1)**, most clients prefer a level walking surface, so sleepers are typically tapered **(2)**.

some types of synthetic decking change size significantly with changes in temperature, and some manufacturers specifically recommend against installation over floating sleepers (we don't normally anchor our sleepers to the roof deck, so they are "floating" on the membrane below). The one time a client asked us to use a brand that says not to do this, they were not willing to take the risk. We weren't either, so we don't know for sure if this would actually cause a problem.

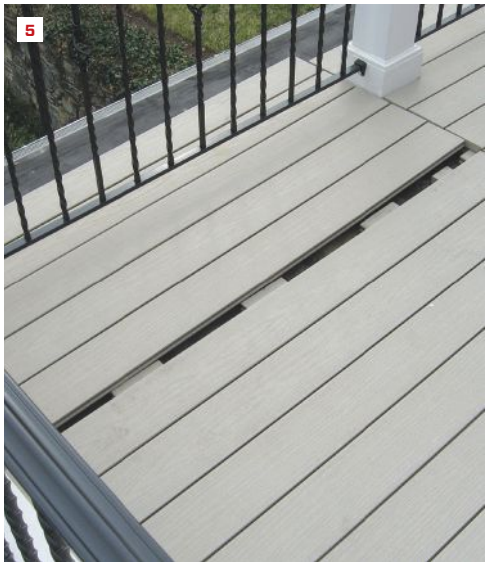
A problem we did create once was to install ipe decking over a shallow roof that didn't fully drain. The puddles of water made such a difference in moisture conditions that the decking cupped up after each rain. In retrospect, proper slope, wider spacing between boards to allow drying, or a synthetic decking would have avoided this issue.

Roof installation keys. For the roofing that goes under a rooftop deck, we've developed a set of installation procedures (see "Low-Slope Roofing Details That Work," Nov/19). First, we use a heat-seamed membrane—almost always TPO (thermoplastic polyolefin)—because the joints don't require regular resealing, unlike the glued joints of EPDM. We've seen a lot of premature EPDM roof failures, typically at seams and joints rather than in the middle of a sheet. Whether those are due to poor workmanship or material problems, it's not practical to remove a deck to fix the roofing, so we use roofing that doesn't need regular maintenance.

In addition, we always install the membrane with a minimum 1/4-inch-per-foot slope. This is code, and a good idea. Even with this much slope, complicated seam buildups can sometimes pond water, which can lead to freeze-thaw damage, smelly biological growth, and warped wood decking. One way to create the necessary pitch is to add tapered rips to the top of the framing before sheathing the roof (see Sloped Framing With Tapered Sleepers, page 34).

Another way to add the needed pitch is to install sloped roof insulation above the roof sheathing, which allows for simpler flat framing. Tapered exterior insulation can also be used to fix existing framing that doesn't have enough slope (see Tapered Insulation With Pedestal Supports, page 36). We typically use R-15 fiberglass-faced polyiso above-sheathing rigid foam, which is the code-recommended minimum in our climate zone, 4A (for other climate zones, see section R806.5 of the International Residential Code). From a building science perspective, this is a better assembly than rafter bays filled with fiberglass batts, and it's less expensive than using lots of spray foam under the roof sheathing. Our typical goal for total roof insulation is between R-38 and R-49, depending on the jurisdiction we're working in, but the approach we use also depends on the balance between air-permeable and air-impermeable insulation.

One wrinkle with common foam roof insulation, however, is that it is not strong enough for concentrated loads like sleepers. Our solution, which helps to distribute loads over a wider area, is to add strong high-density cover boards over the foam prior to roof membrane installation. I like the 1/2-inch-thick R-2 polyisocyanurate cover boards, such as GAF EnergyGuard HD, Carlisle SecurShield HD, and Firestone Isogard HD, that are available from our roofing suppliers. Gypsum-based cover boards are also available, such as Georgia-Pacific's DensDeck Prime, which has fiberglass facers that aren't mold food and a coating that the roof membrane adhesive



Though not usual, sleepers may be fastened to 2-bys laid on the flat, which helps distribute loads over a wider area **(3)**, particularly when a protection board is not installed between the roof membrane and insulation or when a roof insulation with a lower compressive strength is used. Removable access panels are recommended on the deck above both the high and low ends of the roof **(4, 5)**, to provide access to the roofing membrane for maintenance.

readily adheres to. To counter uplift, the cover boards are glued to the foam insulation with a polyurethane adhesive applied in a zigzag, 9-inch-on-center pattern.

Fastener location. One trick to installing the cover board—and any multilayer insulation—is to fasten only the bottom layer, then use glue for the layers above that. This common method is familiar to most roofers, and can be cheaper, as it saves a lot in fastener cost. The most important benefit is that it keeps the fastener heads away from the underside of the roof membrane. When we add sleepers or pedestals on top of a membrane, it's best to not have a screw head right under it, because a sleeper could rub or punch down on the screw head and puncture the membrane.

Protection layer. Once the firmly supported heat-seamed membrane has been installed with the proper slope, the next step is to put down a protective layer to isolate the roof membrane from the movement of the sleepers. This movement is caused by temperature and moisture changes, as well as by people walking on the deck. There was a time we would cut strips of roofing membrane and put one under each sleeper, but now we roll out (without adhesive) EPDM over the whole area. The full coverage provides better protection during construction, plus the black color of the loose-laid EPDM membrane is less visible through the gaps between deck boards, compared with the light-colored TPO.

SLEEPERS

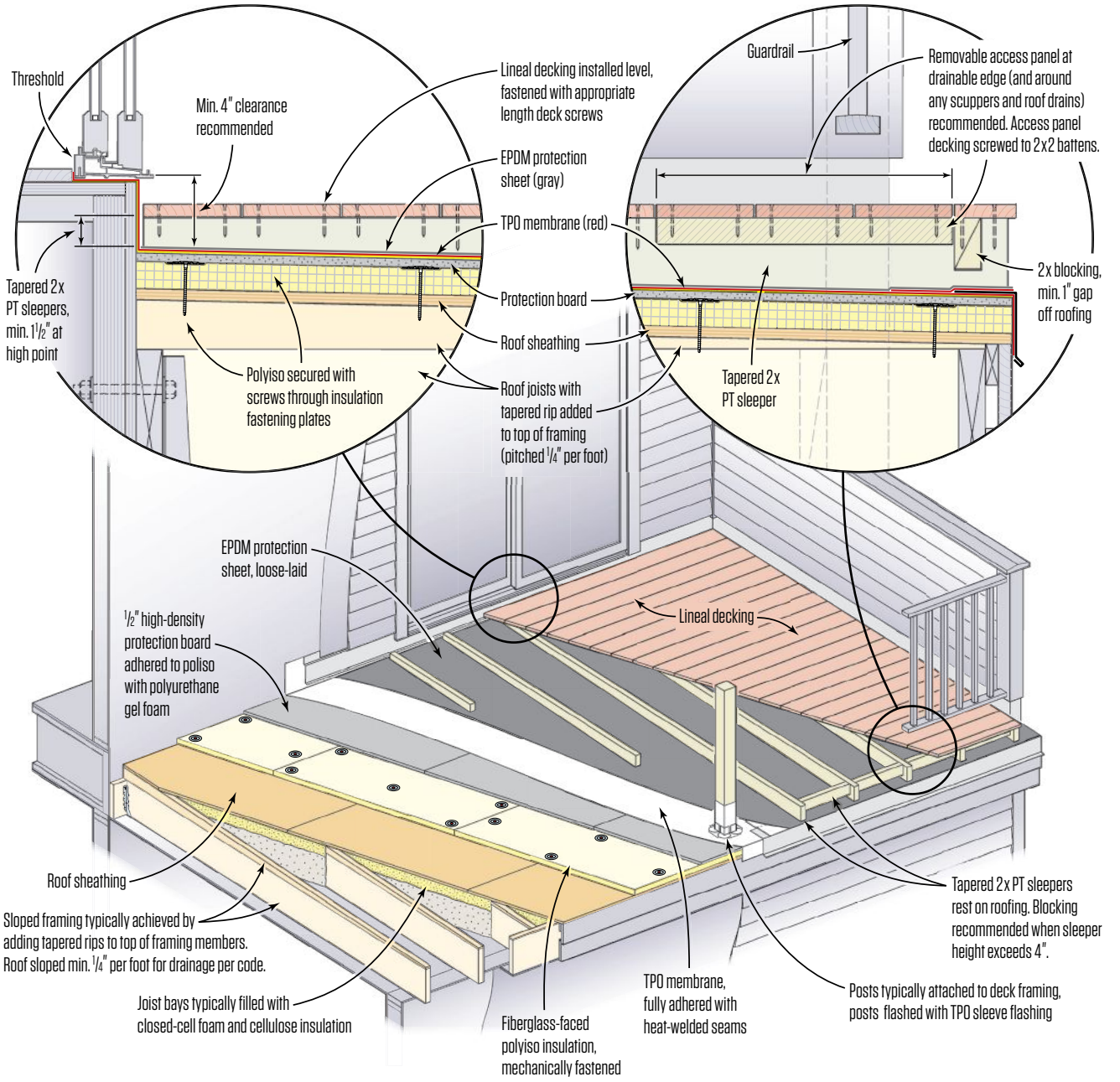
We typically cut sleepers from pressure-treated 2-by stock. Usually we taper these so the deck is level, rather than lay them flat following the roof slope below. Leaving at least 1 1/2 or 2 inches at the short end of the taper allows enough wood for the fasteners to grab, plus enough room underneath the decking to wash out debris later. Once the decking is added, the total height is around 2 1/2 to 3 inches, which places the top of the decking roughly from 1 1/2 inches below to flush with the threshold—we typically design our decks with a minimum of 4 inches of clearance from roofing to door thresholds. When sleepers are more than 4 inches high, we block between them to keep them vertical, leaving a space underneath the blocking to allow for drainage.

Guardrail posts. When the sleepers are tall and enough blocking has been added, they can be used to anchor railing posts. When the sleepers are not beefy enough, we've resorted to custom-welded steel angles. Anchoring posts to sleepers can be tricky structurally, but if our engineer can come up with a solution that meets the IRC's 200-pound load requirement (500 pounds after applying the required 2.5 safety factor), this approach prevents leaks at posts anchored through the roofing membrane to the house framing.

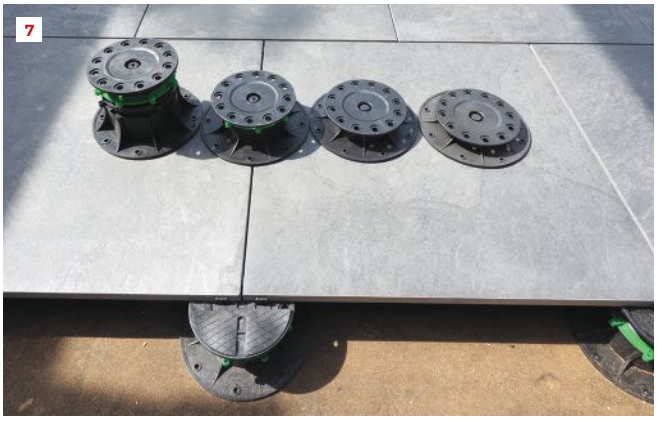
But we have also found TPO post sleeve flashing to be pretty reliable, so we're comfortable putting posts through the membrane when necessary. We definitely cover the entire post with a good WRB all the way to the top to prevent the classic "water leaked through a crack in the post" that can still happen with the best roofing job (for a post connection detail that will work with a raised parapet, see page 43 in "Low-Slope Roofing Details That Work," referenced above).

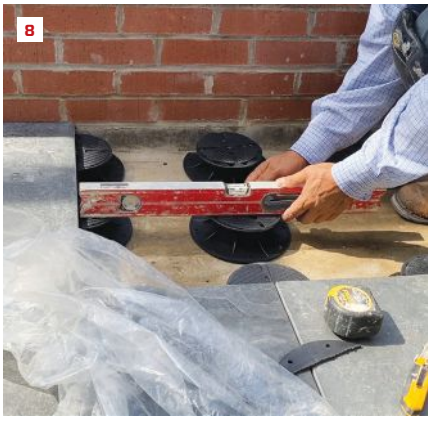
Removable deck sections. For clients to be able to clean out

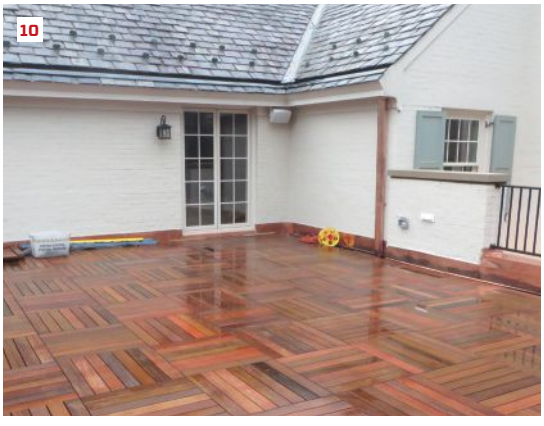
Sloped Framing With Tapered Sleepers



The scenario above shows the roof system adequately pitched for drainage via sloped roof framing. In any sleeper system, the design should accommodate proper clearances between door thresholds, decking, and roofing membrane. Here, a 1/2-inch-thick protection board is installed to protect the TPO roofing membrane from the insulation fastener plates, while EPDM sheets are "loose laid" over the TPO membrane prior to the installation of the sleepers, to isolate the roofing membrane from the sleepers.







Pedestal supports are well-suited for roof systems with multiple slopes, including tapered roof-deck insulation sloping towards scuppers for drainage **(6)**. Most pedestals are adjustable and are supplied by their manufacturers in varying heights depending on the roof configuration **(7)**. Installation is a simple matter of following the manufacturer's layout and adjusting the pedestals so that they are level with each other **(8)** as each paver **(9)** or decking panel **(10)** is installed.

drains or scuppers at the low end of the roof, access to the roof membrane is crucial. But over the years, we've found that decking screws are challenging to remove: The coated ones rust and get stuck, while the stainless steel ones are too soft and snap or cam out.

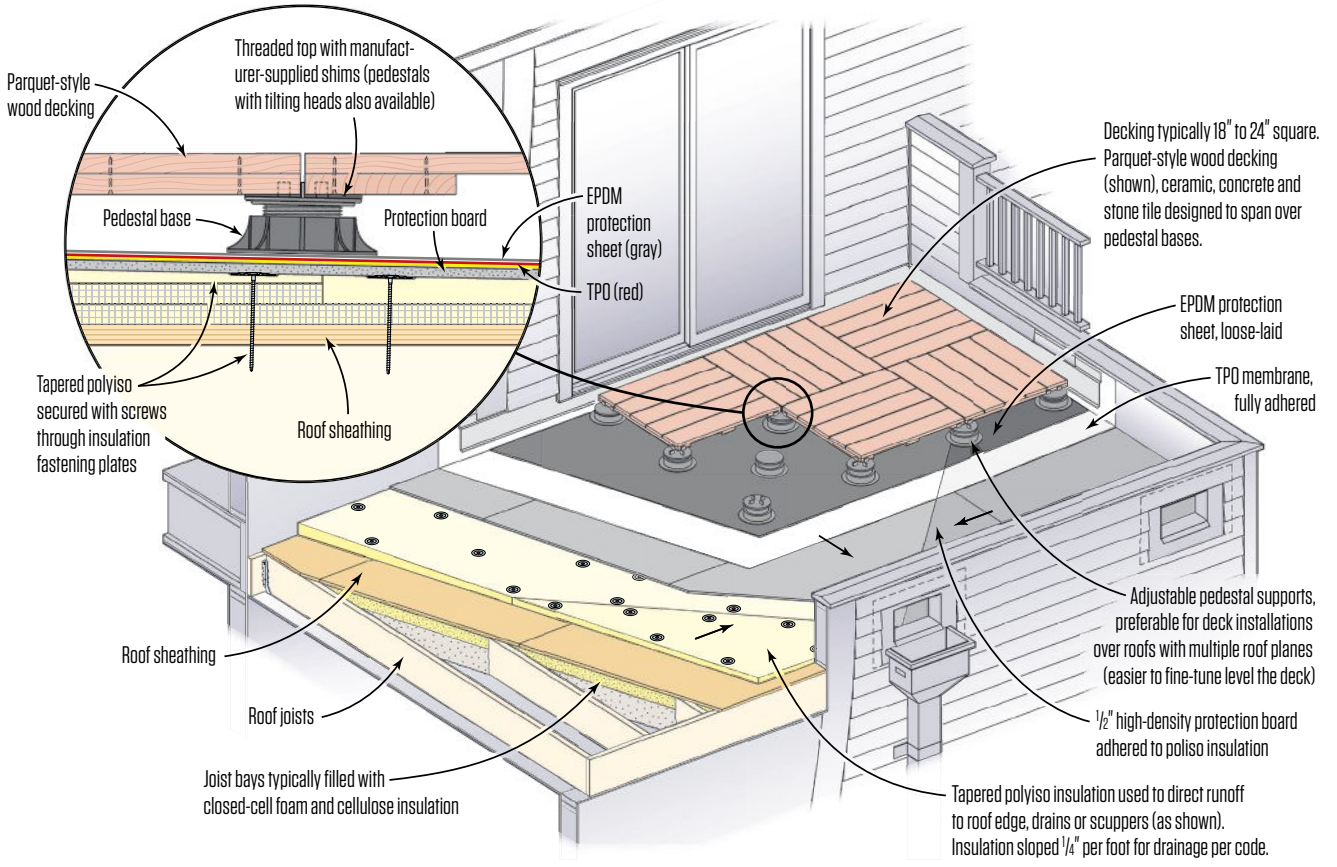
So, instead of attaching all of the deck boards to the joists, we screw some of them to 2x2s set next to the joists, creating a removable section of decking of three or four boards. This keeps the spacing correct—with a 1/8- to 1/4-inch gap between boards for drainage—and allows the boards to be lifted easily. Don't make the mistake of making the removable section too large; when the materials are soaking wet, they can be quite heavy. I've struggled wrestling with 25-square-foot panels (they must have weighed well over 100 pounds each) and would recommend keeping them smaller than 10 square feet where possible. We like to make removable sections at the high end as well so we can stick a hose in to wash debris down the slope.

Fastener length. One detail I wouldn't have thought needed to be mentioned is to use screws that are shorter than the depth of the sleepers. Yes, I watched with my own two eyes as a co-worker drove 3-inch screws through 3/4-inch decking over 1 1/2-inch-thick sleepers. Yes, I paid the roofer to come fix the holes. Yes, that person kept working for us for years afterward, and he's still a friend—just one of those days, I guess.

PEDESTAL SUPPORTS

For clients who want a stone or tile deck over finished spaces, pedestal systems are a great alternative to traditional stone and tile assemblies. Mortared assemblies are expensive, requiring multiple layers of specialty materials and constant on-site vigilance during installation. They also build up to nearly 3 inches thick, which may not fit in a remodel situation—unlike with pedestal or sleeper systems, water can't drain through the walking surface of a mortared assembly and significant clearance has to be left under doors. Setting materials in mortar essentially

Tapered Insulation With Pedestal Supports



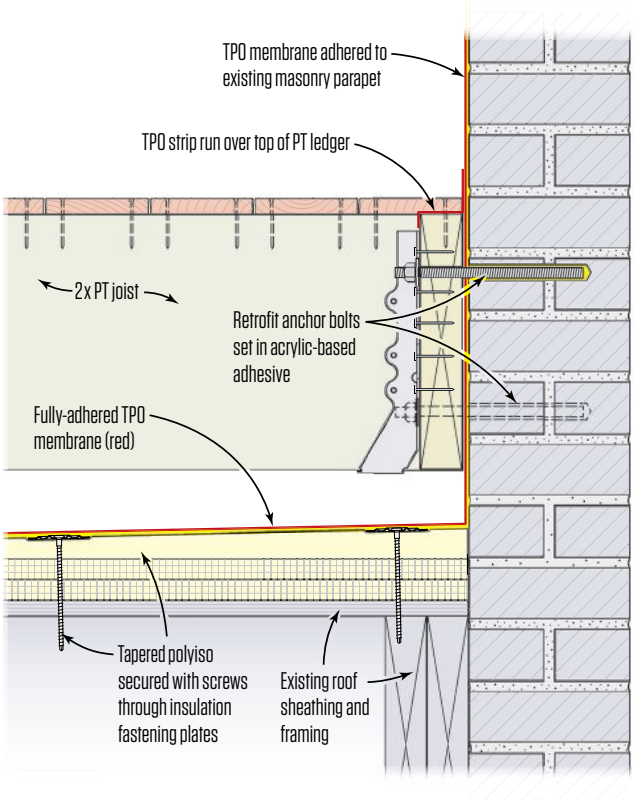
Here, tapered insulation panels are used to pitch the roof system towards scuppers (as shown) or roof drains. The 1/2-inch-thick protection boards installed over the insulation protect the TPO membrane from insulation fastener plates, while EPDM sheets isolate the roofing membrane from the pedestal bases. Especially well-suited for deck installations over roofs with multiple roof planes, adjustable pedestals allow for fine-tuning the deck to level.

guarantees efflorescence, which must be managed, and freeze-thaw damage is always a possibility with tile or stone set in mortar. Most clients don't like the tilted surface, which must be sloped 1/4 inch per foot for drainage. And, should a leak occur, it's a daunting task just to access it, usually involving a tile subcontractor, diamond saws, rotary hammers, temporary rain protection, and a mess.

Adjustable pedestal supports, which—like sleepers—can be set level, are available from a number of suppliers. They basically consist of two cylinders that thread into each other so their height can be adjusted. These suppliers also offer pedestal-compatible decking materials, typically in 24-inch-by-24-inch sections, including wood (in parquet-style pallets), ceramic tile, concrete, and natural stone pavers designed to span over the pedestal bases.

The pedestals install right over a normal low-slope roof (we use the same methods as for sleepers, with supportive cover boards under a heat-seamed membrane and a protection layer). If we ever need to fix a leak, we can just lift up the decking pieces and pedestals and get to work. Although the joints between the tile, stone, and concrete decking pieces aren't grouted, the installed walking surface looks like what most clients expect with a mortar-set assembly. Pedestal systems are much easier and less expensive than mortar-set materials, and much easier to live with later.

When we order pedestals, we work with a supplier and send it a drawing showing the slope(s) of the roof; the supplier works out the layout details and sends us sets of different types of pedestals, as they have a limited adjustment range and come in shorter and taller versions. We lay them out correctly per the plan, fine-tune the height, and drop the walking surface on top. Some pedestal systems need to be shimmed to account for the slope of the roof,



Where the roof deck is enclosed by a masonry parapet, ledgers can simply be bolted to the house framing and parapet to support standard deck joists **(11)**. Ledger flashing is needed to keep water from penetrating the bolted ledger connections **(12)**, which are typically specified by an engineer (see drawing, above right).

but we've also used pedestals with base levelers or threaded top sections that can be tilted slightly in lieu of shimming.

The sets we've used also include little shims that can be used to level any pieces that are different thicknesses, since the corners of four different pieces land on the pedestals. When the surface is wood, we usually install it ourselves (we have terrific carpenters), but recently we had a mason install a tile deck; their wet saw was the right tool to cut the 24-inch tiles at the deck perimeter, and they have a patient and careful guy who set the pedestals just right.

SUSPENDED DECK

When adding a rooftop deck to a masonry townhouse, we can often simply bolt ledgers into the masonry parapet walls and span joists all the way across, rather than install sleepers or pedestals. This is a simple solution, but it will work only on certain buildings. This makes for a clean install with little complication to the waterproofing and roofing. In fact, we often leave existing roofing in place when it's relatively new and doesn't seem to have any existing problems.

Depending on the wall construction, our engineers have provided us with bolted ledger connection details using various types of fasteners, lately specifying anchored bolts with acrylic-based adhesives for several types of wall. Apparently, epoxy adhesives lose a lot of strength when the temperature is high, so acrylic-based adhesives are preferred for rooftop applications that are exposed to the hot sun.

To reduce the chances of water flowing behind the bolted ledgers and penetrating the bolt holes, we flash the tops of the ledgers, typically with a TPO strip sealed to the wall and running over the ledger (see Suspended Deck Detail, above). Even though our fastener holes are not large, it seems prudent to try to keep the area behind the ledger dry.

Once the ledger and joists are installed, finishing goes a lot like any deck. Decking and railings (if needed) go in as they would on other types of deck systems. We do like to make accesses at the high and low points of the roof to make it easy to clean leaves and gunk.

Doug Horgan is vice president of best practices at BOWA, a design/build remodeling company in McLean and Middleburg Va.

2020 Index

JLCONLINE.COM

The 2020 *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

Note: This year's index also contains entries for the articles from the Professional Deck Builder *sections in the March, May, July/August, September, and October 2020 issues of* JLC. *Those articles are indexed separately at the end of this* JLC *Index, and those page numbers refer to the page numbers within the* PDB *sections. The codes used are the same as those listed above.*

JLC Index

Professional Deck Builder Index

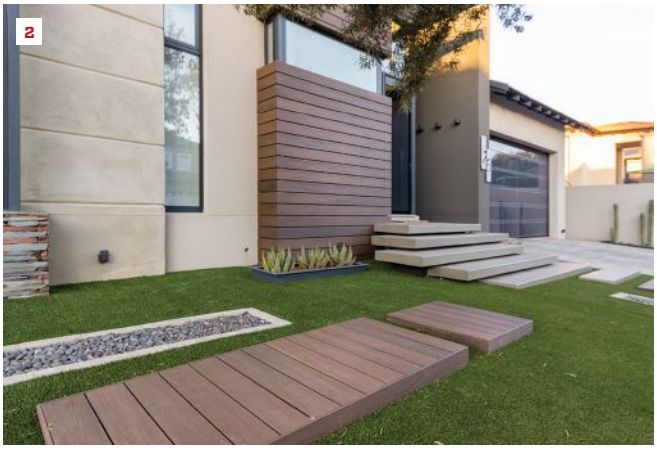
BY VINCENT SALANDRO

1. Drop-in Laundry Sink

Hastings Tile & Bath's Urban Wash collection for laundry rooms includes integrated or drop-in ceramic or solid-surface sinks with removable washboards. Five integrated options and four drop-in options with varying sizes and styles are available; pricing ranges from about $900 to $1,200 for ceramic and $1,300 to $1,500 for solid surface. hastingstilebath.com

2. Wood-Alternative Cladding

Made from Forest Stewardship Council–certified bamboo fiber and recycled plastics, Fortress Infinity co-extruded cladding and Fortress Apex capped bamboo-PVC cladding are offered in nonrepeating grain patterns, wood-grain textures, and earth-tone color palettes for a wood-like appearance. The manufacturer claims the cladding is UV-, fade-, and moisture-resistant and is easy to install. While pricing varies by market, Infinity cladding averages $9 to $11 per square foot, and Apex cladding, $12 to $14 per square foot. fortressbp.com

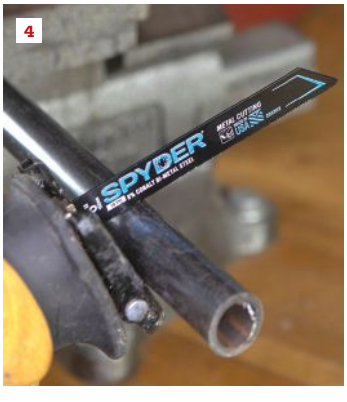


3. Cordless Duplex Nailer

Metabo HPT says its cordless Duplex Nailer is designed to increase efficiency in tasks like forming concrete or building scaffolding. According to Metabo, the nailer, which accepts 6D, 8D, and 16D plastic-strip-collated Duplex nails, can drive up to 900 16D 3 1/2-inch nails per charge, and has a brushless motor that allows for longer runtimes, increased power, and extended durability. The nailer has a pivoting belt hook and a side lock switch to prevent accidental firing. Sold with a 2.5-Ah MultiVolt battery, the nailer retails for $600. metabo-hpt.com

4. Bi-Metal Reciprocating Saw Blades

Spyder Products designed its Black Series bi-metal reciprocating saw blades for tough cutting tasks. The manufacturer claims that the blades, constructed from an 8% cobalt blend, are faster and more durable than standard bi-metal blades. Available in lengths of 6, 9, and 12 inches, and with from 6 to 18 teeth per inch, the various blades are ideal for cutting wood, nail-embedded wood, thick materials, or metal, according to Spyder. Blades come in three- and five-piece packs and in a 14-piece variety kit with a storage case. They're available at Lowe's, starting at $80. spyderproducts.com



5. Outdoor Living Enhancements
The new Trex Outdoor Fire & Water collection includes outdoor fire features, water elements, and weather-resistant planters, all made with heavy-grade copper and stainless steel. Fire pots and fire tables are available in a variety of shapes, sizes, and finishes, and they feature burners that create a large flame and brass water blockers that minimize water intrusion. Contractor pricing for the collection ranges from $250 to $4,300. trex.com

6. Fiberglass Roofing Underlayment
Boral Ply 40 is an SBS-modified, fiberglass-reinforced underlayment/base sheet for metal, tile, shingle, or shake roofing. According to Boral, Ply 40 is easy to install, and its modified-asphalt composition minimizes wrinkling and buckling. The underlayment offers uncovered exposure time of six months and carries ASTM-D6757, -D4601, -D226, and -D4869 certifications and approvals. Boral Ply 40 is sold in 39 3/8-by-66-inch rolls through distributors; pricing varies regionally. boralroof.com

7. Handcrafted Bathroom Vanities
Strasser's Montlake collection includes hand-crafted wood-drawer vanities ranging in widths from 24 to 72 inches along with coordinating linen towers, drawer banks, mirrors, and medicine cabinets in various sizes. In addition, Strasser offers a 32-inch Tall Retrofit model that the company says allows for easier "swap-out" renovations. Available in eight door styles and 17 finishes, vanities have full-extension soft-glide European drawer mounts and six-way adjustable door hinges. The starting price for a 24-inch vanity is $1,070. strasserwood.com

8. Third-Rack Dishwashers
The large-capacity Third Rack Dishwashers from Whirlpool have extra usable space to accommodate hard-to-fit items such as mixing bowls, blender jars, and casserole dishes to allow more dishes to be loaded at a single time. The second rack can be raised or lowered to fit taller items, and a three-piece silverware basket can be separated for additional flexibility. Another feature is a leak-detection system, which will flash a light on the front of the appliance if a leak is detected. Available finishes are fingerprint-resistant black stainless and stainless steel. Pricing ranges between $700 and $1,000. whirlpool.com

9. WUI-Approved Sun Tunnels

Flame-resistant construction and ignition-resistant tempered diamond wire glass as the standard pane help Velux TZR and TZRL Wildfire Glass Curb-Mount Sun Tunnel Skylights to meet Wildland-Urban Interface (WUI) zone requirements. The Sun Tunnels combine a 14-inch Velux Fixed Curb-Mounted Skylight with an adapter that connects to a standard 14-inch reflective aluminum tunnel. The TZR option, for tile roofs, does not include a flashing kit (a Velux tile flashing kit can be purchased separately); the TZRL option, for shingle roofs, includes a flashing kit and adhesive underlayment. Pricing varies by region. veluxusa.com

10. Knob-Free Wall Oven

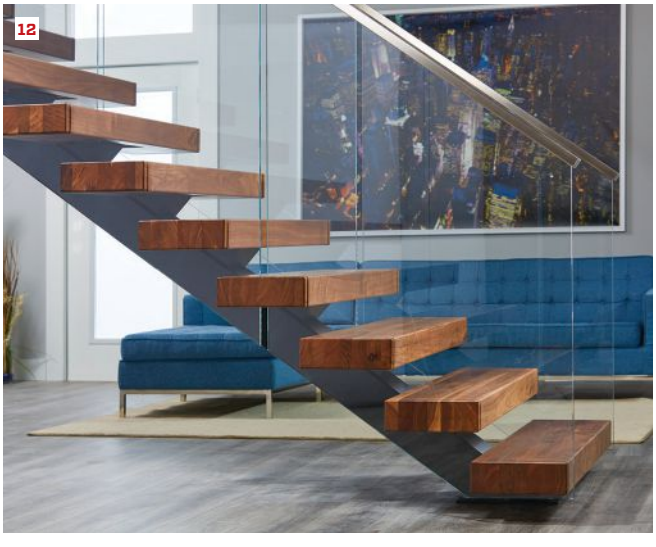
Wall ovens are ideal for compact kitchens. Fisher & Paykel's 30-inch Wall Oven features a minimalist knob-free design with a touchscreen that allows users to cook by food type, function, or recipe. The oven has 17 functions and a total capacity of 4.1 cubic feet. The manufacturer claims the oven provides consistent heating for precision performance. It retails for $4,500. fisherpaykel.com/us/

11. High-Volume Dust Extractor

Festool's CT 48 E AC Dust Extractor is designed to capture large volumes of dust while operating at peak efficiency. The vacuum's large, 12.7 gallon capacity means less time spent emptying a container, and its automatic filter-cleaning function helps maintain high suction power. The extractor is OSHA Table 1 compliant for materials containing silica dust. Included are a large-diameter tapered hose and a reducer that allows for connection to all Festool tools with either a 36mm or a 27mm port. The CT 48 AC costs $975 and comes with several accessories. festoolusa.com

12. Floating Glass Railing

On Viewrail's Vedera railing, proprietary hardware integrates the glass directly with the company's Flight floating stair treads, while fasteners are hidden to ensure a single continuous wood grain shows through. A round or square stainless steel cap or square wood cap rail can be added—without additional support posts—to provide a handrail. The floating stair system is available in a choice of 15 wood species, which can be finished with any color stain desired. The stair and 1/2-inch tempered low-iron glass railing are priced starting at $12,000. viewrail.com



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MultiQuip MC3PEA Concrete Mixer

BY JOHN CARROLL

Recently, I needed to place about 36 square feet of concrete in a basement, in three separate pours. Each pour required 1/2 to 3/4 cubic yard, which works out to about 2,000 to 3,000 pounds of concrete per pour. My ready-mix concrete supplier charges a $125 delivery fee for any pour less than five yards; so if I had used ready-mixed concrete, I would have paid an extra $375 for the three pours.

A cheaper option would have been to use my old concrete mixer. In 1986, I bought a portable concrete mixer that I still tow behind my truck to jobs. It's a heavy piece of equipment that easily mixes up three 80-pound bags per batch and, after 34 years, it's still running well. On the other hand, hooking it up to my truck and attaching the safety chains and then finding a spot on site to set it up can be a production. If I had used it on this job, I would have set it up outside the basement, poured each batch into my wheelbarrow, and then toted the concrete to the pour location in buckets. That would have saved me $375 but would have been a lot of heavy hauling.

With the MultiQuip Mix-n-Go mixer, however, I was able to carry the mixer to the job in my pickup truck. At the job, my helper and I carried the 138-pound, 3-cubic-foot mixer down a short set of steps, then rolled it another 30 feet to its final position inside the basement. We set it up a few feet away from the first pour, which was a footing.

The Mix-n-Go can be set up in two ways. In the first, it sits low on two wheels and two short legs that hold it at the correct angle for mixing. In this configuration, I mixed two 80-pound bags per batch, then rolled the mixer over to the footing and poured the mixture directly into the trench. Using it this way is like having a combination mixer and wheelbarrow. It's perfect for small, ground-level pours.

The second pour on this job, though, was not at ground level. After I had built a block wall on the footing, I had to mix and pour reinforcing grout (rich, flowable concrete) down every fourth core of the blockwork. To do this, my helper and I set the mixer on a metal stand that comes with the unit. My helper then made the grout and dumped it into a wheelbarrow. Using a small bucket, I scooped the concrete out of the wheelbarrow and poured it down the cores.

The third pour was a 4-foot-by-12-foot slab 5 feet above the floor. To do this pour, we again set the mixer on the stand and dumped the concrete into a wheelbarrow, then placed the concrete by the bucket. At the end of each pour, we rolled and carried the Mix-n-Go outside to clean it.

Features. The wheels on the Mix-n-Go are pneumatic but not roadworthy; the drum is thick, heavy-duty polyethylene plastic; and the paddles are made from steel. There are two power options: electric motor or gas engine. The mixer employs steel gears to reduce the speed and increase the torque of the motor or engine to the rotating drum. It has plenty of power and runs smoothly and quietly.

All in all, this is a high-quality mixer at a modest price. I paid $730 (including taxes and shipping) to Contractor's Direct (contractorsdirect.com) for the electric-powered model. If you do a lot of small pours, I highly recommend it. multiquip.com

John Carroll, author of Working Alone, *is a builder who lives and works in Durham, N.C.*

Photos by Matthew Carroll Navey

The compact MultiQuip MC3PEA Mix-n-Go mixer fits in the back of a pickup truck and—measuring only 24 inches wide—can be wheeled through a doorway (left). Mixed batches can be poured into a wheelbarrow or directly into a form (right).

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

Tough Carbide Recip Saw Blade

BY CLAYTON DEKORNE

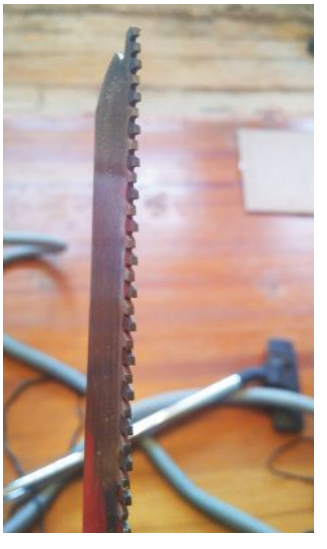
In the past year, Diablo and Milwaukee have each come out with carbide recip saw blades specifically designed for cutting thick metals. The Diablo Steel Demon with "Amped" carbide and the Milwaukee Torch with "Nitrus" carbide both feature thick, high-density carbide teeth with wide gullets (the hollows between the teeth). Diablo's blades have a bit closer spacing (8 teeth per inch) than Milwaukee's (7 teeth per inch), but both companies are going for the same effect: increasing the speed of the cut through hard, thick metals. Rob Robillard at Toolbox Buzz did a well-thought-out test of both these blades before they were available on tool shelves, and we encourage you to watch his video review online. Rob and the Toolbox Buzz crew evaluated both speed and duration. The Torch blade proved a smidge faster, but the Steel Demon more durable (more cuts per blade).

The typical applications for these blades are cutting out old cast-iron drains and cutting structural steel and rebar. They seem perfect for residential builders and remodelers who don't work with these materials on a production basis but do run into them more often than they might like. These blades are pricey—around $22 for a 9-inch Milwaukee, $20 for the Diablo. The 6-inch blades are around $15. These are not substitutes for a metal-cutting band saw, a chop saw with a carbide or diamond blade, a rebar cutter, or an acetylene torch—all of which will be much faster cutting options in production applications. But the new carbide recip saw blades can make these cuts when the cast iron or the steel is in the wall or otherwise impossible to access with other tools. That makes the blades indispensable for renovation work.

I was recently faced with a tough steel-cutting problem—taking out thick cut nails on a floor that needed to be removed so insulators could open up the floor and apply SPF to an otherwise inaccessible crawlspace. We needed to replace the floor afterwards so precision demolition was paramount, but the old wrought-iron nails were proving to be a huge obstacle. They smoked carbide multitool blades that ordinarily work well on steel nails. I could slip a 9-inch metal-cutting recip saw blade under the floorboards by bending it, but this was slow going—upwards of 40 seconds per cut and one blade for about 15 nails. At that rate, I would need about 10 blades and it would take about three hours just in cutting time.

Salvation came from the Diablo Steel Demon. Taking a cue from the Toolbox Buzz crew, I went for the longer-lasting blade. It zipped through each nail in about four seconds, and one blade did the whole job (upwards of 300 cuts). When I was done, the teeth looked unscathed. While wrought-iron nails are thick by nail standards, they aren't especially thick compared with, say, a wide-flange steel beam. Yet the hardness of the nails was my challenge, and the Steel Demon's aggressive carbide overcame it easily.

Clayton DeKorne is chief editor of JLC.



A recent job dismantling an old floor proved to be a good stress-test for the Diablo Steel Demon with "Amped" carbide (far left). Designed for cutting thick metals, this blade features wide gullets between the teeth (left). These help clear the metal flakes, which otherwise would build up between the teeth (as they do on the typical bimetal blade), creating lots of heat and slowing down the cut.

Photos: Elenai Studios

BY TIM HEALEY

Gut Rehab of the White House (on the Q.T.)

Soon after Harry S. Truman ascended to the presidency in April 1945, he and his family moved into the White House and discovered that "America's most famous residence" was literally falling apart. What began as annoying creaky floors and mysterious ghost-like sounds would later give way to more serious incidents.

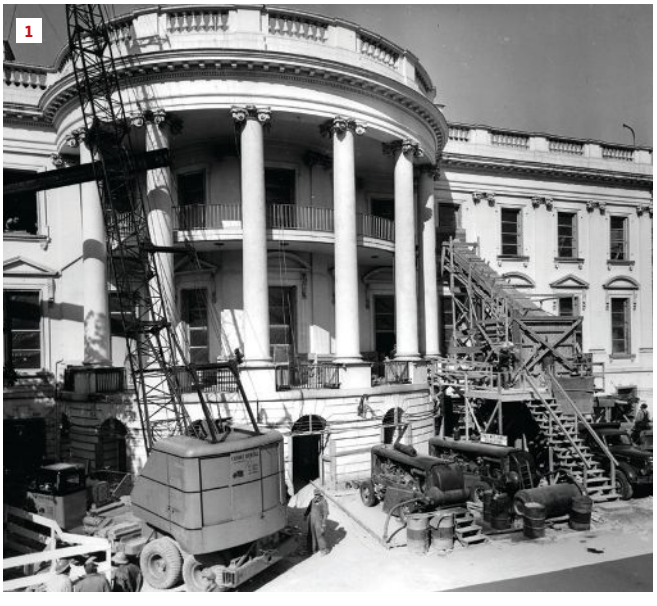
According to presidential historian Michael Beschloss, writing for *The New York Times*: "One day, while President Harry S. Truman took a bath upstairs, a great Blue Room chandelier threatened to crash down on his wife, Bess, and her guests from the Daughters of the American Revolution. The president later joked that he might have unexpectedly dropped through the ceiling naked on the ladies below, and he confessed that the incident made him nervous. The upstairs floor, he noted, 'sagged and moved like a ship at sea.'"

Then, in 1948, one of the legs of first daughter Margaret Truman's piano broke through rotting floorboards in her second-floor sitting room and penetrated the ceiling of the family dining room below. A team of architects and engineers was summoned to secretly inspect the structure. Truman knew the image of a collapsing White House was an apt metaphor for his plummeting approval ratings. He therefore didn't want to publicize the sorry state of the building.

The inspectors determined that portions of the mansion were in imminent danger of collapse. As a result, the first family was moved to nearby Blair House for their safety, and thus began the Trumans' three-year odyssey as displaced tenants. The first family wouldn't return "home" until March 1952.

The restoration included leaving the historical structure's facade intact, while completely gutting its interior. Within the remaining exterior shell, a steel superstructure was built above a new labyrinthine basement, which included a top-secret fallout shelter.

A good reference on this era is "The Hidden White House: Harry Truman and the Reconstruction of America's Most Famous Residence" (St. Martin's Press, 2013). In it, author Robert Klara sheds light on what may be the most complex and politically sensitive home-improvement project in American history.



Demolition began in late 1949 without fanfare (perimeter fencing was used to hide construction from the public). Steel shoring and debris was passed through openings in the left-intact facade **(1)**. By mid-1950, the interior was removed, then a new basement was dug within the gutted shell. Roughly 1.1 million cubic feet of open space was created as a result **(2)**.

Photos courtesy National Archives (Abbie Rowe, National Park Service)

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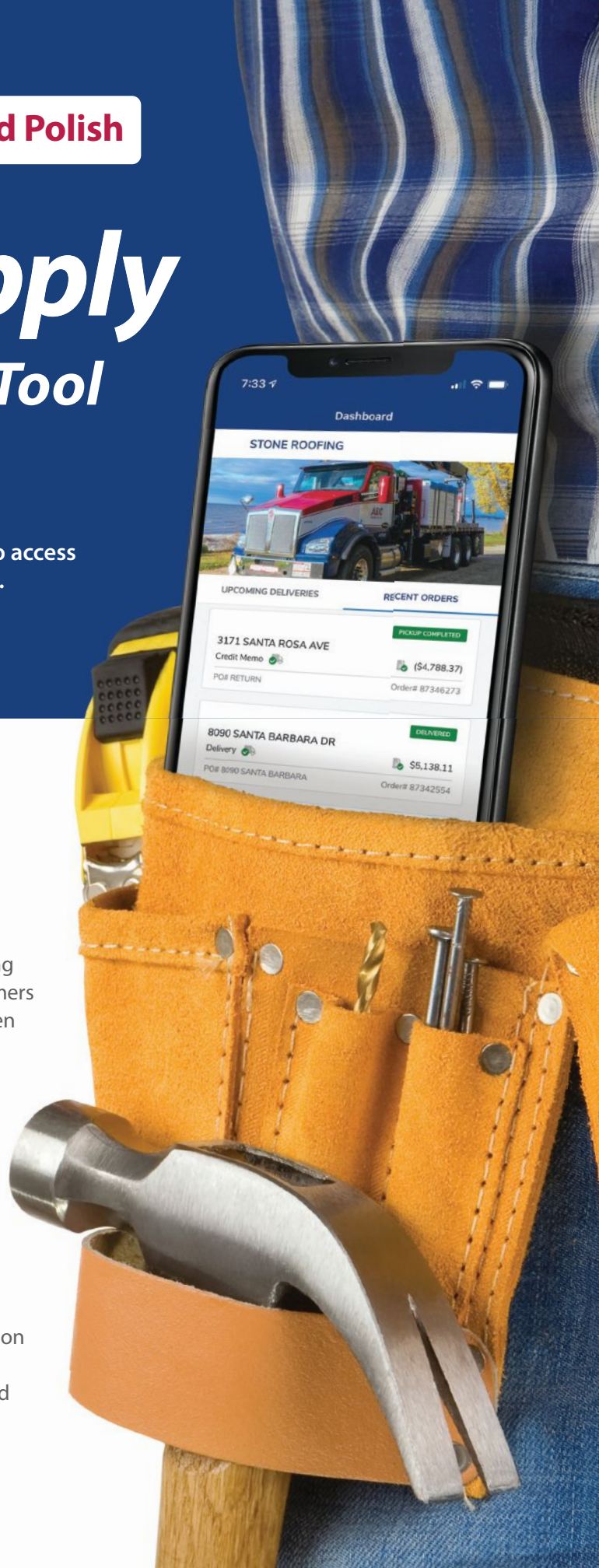

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