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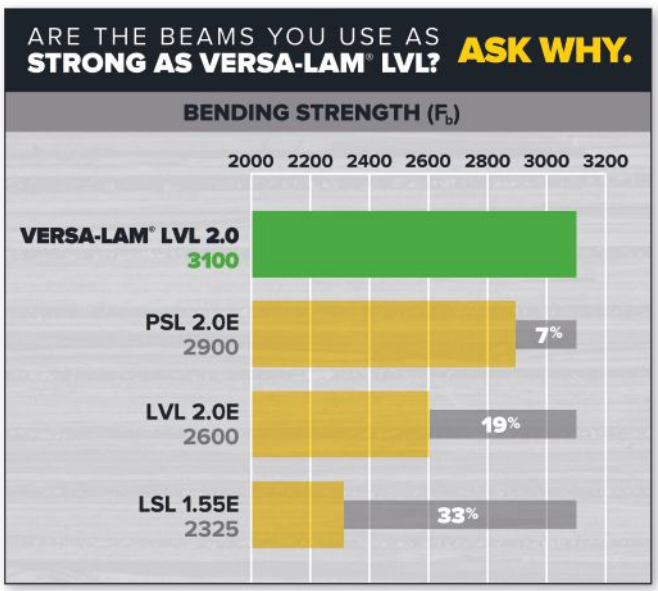

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On the cover: Chris Ermides, editor of *Tools of the Trade*, uses a framing square to check the flatness of a miter-saw table, as part of a miter-saw tune-up. Photo by Meaghan M Golden. See the story on page 11.

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DEPARTMENTS

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BY ROE OSBORN

Installing Window Casing

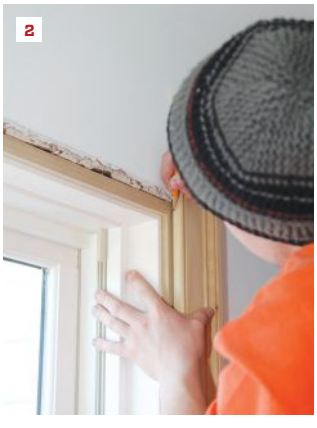
Last month in this column, we discussed installing window stool—the first step in trimming a window on the interior. The next step is installing window casing above and below the stool. Casing windows is a task that every finish carpenter faces on just about every project. Experienced carpenters develop methods for casing windows quickly and efficiently, following a series of predetermined steps for each window, the keys of which are outlined in the photos in this article.

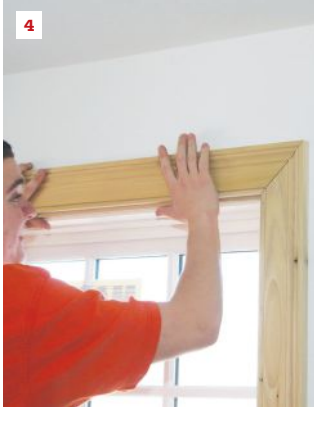
Window casings attach to the jambs of the window frame, which may require jamb extensions to build them out even with the drywall. The windows in this remodeling project needed thin strips as build-outs, and that part of the installation will be covered on our website (see link at bottom of facing page). More complete coverage of the extension-jamb topic will come in a future *Training the Trades* column.

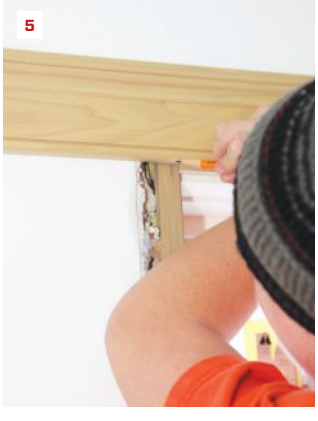
Also at our website, following the same link, you will find additional details, which we couldn't fit here, about cutting and installing casing. If you're just starting out as a finish carpenter, the online details can help you create a strategy to install casing with a minimum amount of time and effort, which in turn will help you become a more professional craftsman.

Roe Osborn is a senior editor at JLC *and the author of* Finishing a House *(Taunton Press, 2012).*

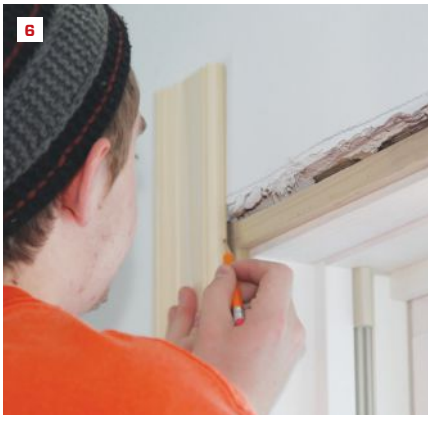
After checking to make sure that the stool is level and the window jambs are plumb, mark the reveal at the corners of the jamb **(1)**. Reveals generally vary from 1/4 to 3/8 inch, and this carpenter uses a 6-inch steel ruler for a precise measurement. Place a length of casing on the stool and mark the length at the reveal mark **(2)**. Cut the casing at 45 degrees and cut a slot in the joint face for a biscuit. (The casing pieces fit together with biscuits that align the pieces and reinforce the joints). Tack the jamb casing in place through the bead along the inside edge **(3)**. Next, make a 45-degree cut on the end of the head casing, along with a slot for a biscuit, and set it in place to check the fit **(4)**. Then mark the length at the reveal mark at the other end **(5)**.

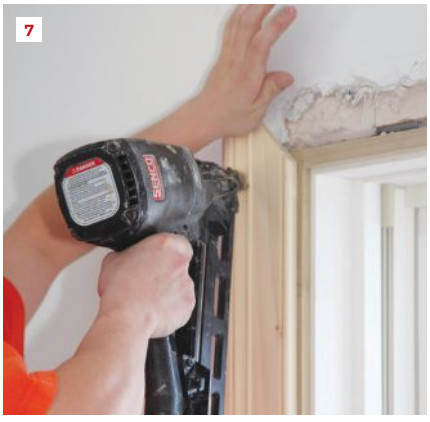




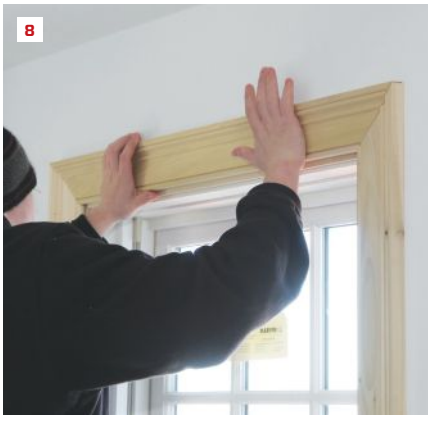


Photos by Roe Osborn





Set the head casing aside and mark the length of the opposite jamb casing **(6)**. Make a 45-degree-angle cut at the top end and cut a slot for a biscuit. Then tack the jamb casing in place on that side **(7)**. The drywall around window openings often sits proud of the jamb extensions. In the photos, the carpenter has removed some of the drywall to allow the casing to lie flat against the jambs. He also drove an additional nail through the outer part of the profile to hold the casing flat.



Cut the other end of the head casing and dryfit the piece with biscuits to check the mating faces **(8)**. If satisfied with the joints, spread glue on the biscuits and the joint faces and install the head casing. At this point, the rest of the casings can be nailed off with 16-gauge finish nails in an even pattern every 12 inches or so. Next, the apron trim goes under the stool. Its length is the measurement between the outside edges of the jamb casings. Cut returns for the ends of the apron, gluing and pinning them in place **(9)**.

A simple jig aligns the end of the apron perfectly with the outside edge of the jamb casing **(10)**. Cut a slight back bevel on the top edge of the apron so that it fits more easily against the stool. When the apron is aligned side to side, spread a bead of adhesive along the top edge and nail off the apron **(11)**. If there is a gap between the stool and the apron, draw them together with a clamp before nailing.

For a more detailed discussion of installing window casing, go to **www.jlconline.com/training-the-trades/installing-window-casing**.

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Q If I use an impervious foam sill seal under the mudsills, is treated wood required for the sills?

A Glenn Mathewson, code educator and consultant from Colorado (buildingcodecollege.com), responds: Sill seal is intended to air-seal the joint between the foundation and the mudsills, but it also provides a capillary break between the concrete and the framing. That might seem to suggest that it's OK to use untreated lumber for the mudsills, saving a little money and eliminating from the jobsite lumber stack yet another specialty product that is used for one purpose. But let's look at what the code says.

Since the 1920s, building codes have required materials to be decay resistant when used in proximity with the earth or in areas that are subject to moisture retention. I like to think of these areas as being subject to delayed drying. It's usually much easier to prevent material from getting wet than it is to dry it out.

But here is where the code gets tricky. In Section R317 (Protection of Wood and Wood-based Products Against Decay) of the 2015 and 2018 IRC, the list of seven conditions in R317.1 where code requires treated material can be confusing. For example, item 3, which appears to be closest to our target, says that "sills and sleepers on a concrete slab in contact with the ground must be treated." However, in the 2006 edition of the IRC, an exception was added when there is an "impervious moisture barrier" between the sills and the slab. But this code item refers specifically to a concrete "slab," while our case talks about a foundation wall.

Item 2 in R317.1 requires treated lumber for "framing members that rest on concrete exterior foundation walls and that are less than 8 inches from exposed ground." This item doesn't refer to a "sill" directly, but it does refer to an exterior foundation wall. Impervious moisture barriers are not included in this item, but using treated lumber seems to hinge on its distance above exposed ground. To me, this means that the moisture or drying issue is not due to the lumber being in contact with concrete—which a barrier could correct—but rather the issue is due to the proximity of the lumber to the exposed (and moist) earth.

Complicating the discussion, item 5 refers to "wall framing on the exterior of a building having a clearance of less than 6 inches from the ground." What? Now the critical distance is 6 inches, not 8? But is a mudsill "wall framing?" It certainly would be for walls framed directly on top of the foundation, but what if the mudsills are below the floor framing and thereby separated from any wall framing? Should that even matter? (I told you this gets tricky.)

So this might be one of those times when I suggest to just give up and go with treated material or perhaps to invoke my favorite IRC section, R104.11, titled "Alternatives." This section describes the purpose of the code as setting the benchmark *minimum* standard, while recognizing and encouraging other means of providing equivalent *intent and performance*. In the list of seven conditions where decay-resistant lumber is required, three of them specifically mention a protectant material between concrete and wood, which may be a sufficient argument for not using treated material. However, my advice would still be to make the mudsills out of treated lumber. Remember that meeting code means only D-minus or better work. The small added expense of using treated lumber for mudsills is cheap insurance for the longevity of the building.

Photo by Roe Osborn

After the foundation concrete cures, sill seal is usually the first thing to be installed. This foam material air-seals the joint between the foundation and the mudsills. In most cases, those mudsills are made of treated lumber.

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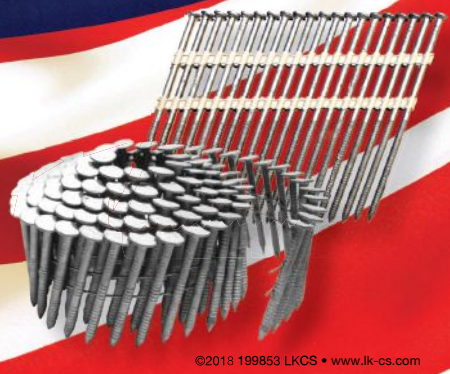

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Check for flat, straight, and square. The table should be flat, with no high or low spots. A thin straightedge like a framing square is better here than a level because it makes identifying the location of potential trouble areas easier **(1)**. Remove the auxiliary fence from the stationary fence and check it for straightness, adjusting as needed **(2)**. Replace the auxiliary fence and check that it is square to the table **(3)**.

Photos by Meaghan M Golden

Miter Saw Tune-Up

BY CHRIS ERMIDES

I've owned several different miter saws since starting in the trades nearly 20 years ago, and I recently tested eight brand-new 10-inch dual-bevel sliders ("Tool Test: 10-Inch Sliding Dual-Bevel Compound Miter Saws," Sep/18). Between my time in the field as a carpenter and the time I spent on that review, I have developed some efficiencies around tuning them up. Miter saws are complex machines designed to perform a wide range of tasks, so it's worth taking 10 or 15 minutes after you've pulled one out of the box, or out of the back of the pickup, to make sure it's cutting as intended. The steps outlined here make for an efficient process that can be done on the jobsite using tools that you likely already have in your pouch or truck.

For this article, I tuned up a DeWalt DW717; the methods can be done with any miter saw, however. If you don't look at your saw's owner's manual for anything else, I highly recommend reading thoroughly the section on calibrating its cutting accuracy. In many cases, the adjustments are intuitive, but in some, it takes a lot of time to become familiar with where and how those adjustments are made.

CHECK THE TABLE FIRST

Out of the box, the saw's table should be flat. Because of the way miter-saw tables are designed, it's highly unlikely that you're going to get a saw that dips or bows egregiously in the middle. You might, however, find small inconsistencies in various spots rather than a blatant sway in the table's overall flatness. Of the eight saws that I recently tested, only a couple of them were perfect across the table—the rest had minor dips here or there—but they were all flat.

The easiest way to check the table's flatness is by running a straightedge across it. A framing square is a good choice for this. It's long enough to rake across the table from wing-to-wing **(1)**, and it's thin enough that you can see smaller areas that might dip or bow.

If there are huge discrepancies—like the thickness of a credit card—with a new saw, it's probably worth returning. You may find that the table drops a hair here or there, likely due from the casting process or abuse

after a lot of use. For saws that are well broken in, tape (like painter's tape) can work as a way of bridging any low spots if necessary—though in my experience, it's unlikely that you're going to see the results of a 1/64-inch dip here or there show up on casing or baseboard or even crown cut.

THE FENCE IS NEXT

A straight fence is key. A fence that bows inward toward the back of the blade will cause the blade to bind and, depending on the saw, kick the head out toward your body. There are two types of fences you'll encounter: a continuous fence and a two-piece fence. Some folks make the mistake of thinking that here is where you want to adjust the saw so that it cuts square miters. It is not.

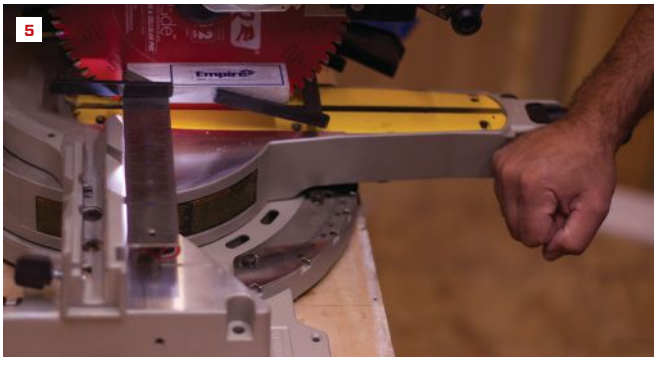
Saws that have a continuous fence are joined in the middle by a rounded section called the "yoke." Saws that don't have a yoke have side fences that are independent from one another and need to be adjusted separately. When adjusting a continuous fence, remove the auxiliary fences and lay a framing square on edge from end to end. I like to place the square on a piece of 3/4-inch stock to get it off the table slightly, putting it at an area where most stock will be registering on the fence **(2)**.

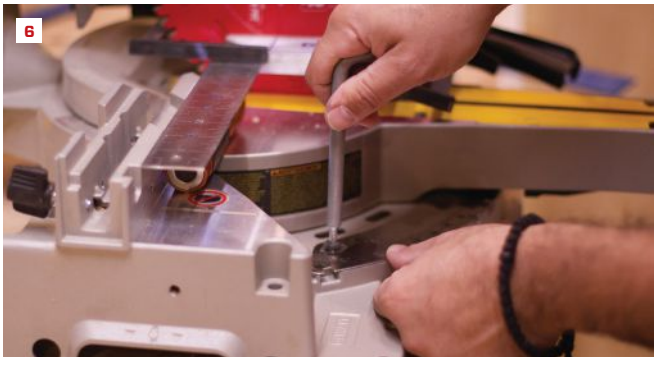
If the fence needs adjusting, loosen the screws and align to the framing square's edge as necessary. For continuous fences linked by a yoke, prying at the yoke might be necessary—particularly if the fence cants in toward the back of the blade. Keep in mind, though, that the holes for the fence's screws offer some wiggle room but not a lot. Two-piece fences are obviously much easier to adjust. You can adjust one side at a time if necessary, leaving the other side's screws tightened.

Once the fence is straight, move on to make sure the auxiliary fences are square to the table **(3)**. If they aren't, which was the case with two saws that I tested, it's because there was a defect in casting the fence or it got damaged. If your saw doesn't register square here, you probably need to take it to a repair shop to have it adjusted or order replacement auxiliary fences.

SQUARE THE BLADE TO THE FENCE

Squaring the blade to the fence is the next adjustment to be made. This involves setting the miter detent plate, which is usually held to the saw's base by four screws. I perform this step by registering a square to the blade and the fence. I've seen many carpenters use a rafter square for this job; I think it's a bad choice here. Rafter squares, particularly those likely to be in your tool pouch, get beat up if even you can't see evidence of such at first glance. Other square types are arguably useful here—people make a good case for combination squares.





With the saw's head set at the 90° detent, clamp the try square to the saw blade so that the square can register near the top of the fixed fence. A flashlight will help identify even the tiniest gaps here **(4)**. Loosen the miter plate screws and gently tap the end of the table until the light disappears **(5)**. Lock the head in place and then tighten all the screws on the detent plate **(6)**.

Set a square against the table and press it lightly to the blade **(7)**. Shine a light behind the square **(8)**. If the saw has a detent plate **(9)**, setting the blade square to the table will account for other detent angles. On some saws, you have to set the 45° stop independently. A combination square works well **(10)**.

Personally, I like the try-square style because it has a large, flat stock that registers well onto the saw's blade, and it has a long enough blade to register on the fence. (I'm not advocating a brand of square, just the style.)

In addition to a try square, I use an LED light from Klein Tools (I like its size and brightness for this task) behind the square to help me see any adjustments that need to be made. I place the light under the square's blade to illuminate any gaps that might show up **(4)**. I've found this method to be more reliable than simply using my eye because it's often difficult to see the variation given the colors and sheen of the various metals.

Start by setting the blade into the 90° detent slot (or 0°, depending on your saw's scale) but don't lock it. Now place a square between the blade and fence. I like to clamp the stock of the try square directly to the blade. I do this using two track-saw track clamps. It frees up my hands to loosen the detent-plate screws and then to tap the head of the saw **(5)** as needed while I'm watching the place where the square's blade touches the fence.

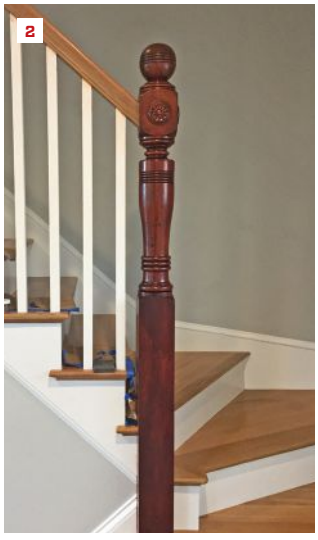
From here, adjust as needed until the light disappears and the square's blade registers tightly against the fence. Then lock the miter in place, and set the detent screws **(6)**. Once the blade is set square to the fence, it should in theory cut accurate miters since the detent plate includes detents for miters.

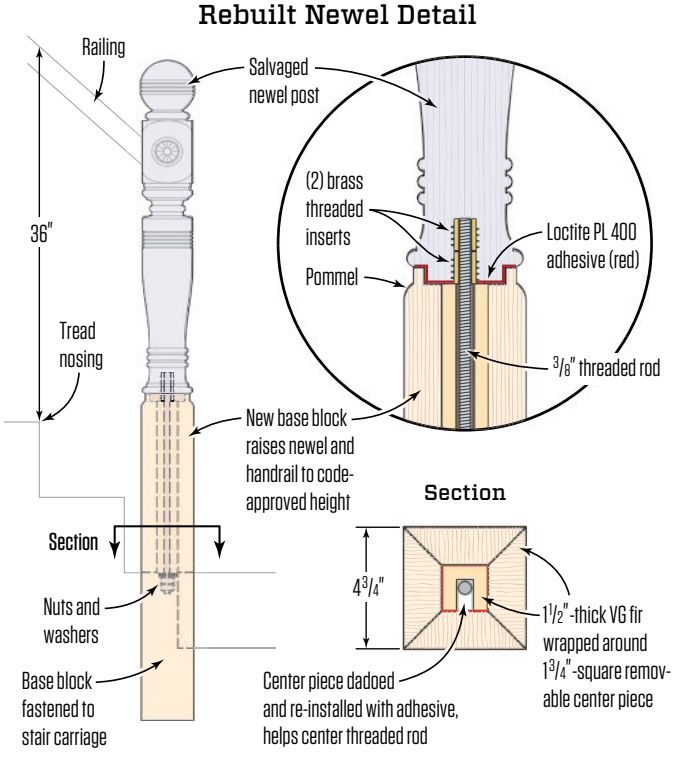
SET THE BEVEL LAST

Setting the saw's bevel starts with making sure the blade is square to the table **(7, 8)**. If the saw has a bevel detent plate (as this DeWalt does), then the respective angles will follow in their accuracy in the same way the miter detent plate functions **(9)**. With other saws, adjusting the 90° bevel cut is a separate process from adjusting the left and right 45° positive stops **(10)**. This adjustment allows you to fine-tune the bevel cut at the stops. Sometimes these adjustment screws are hidden; others have more obvious adjustments. I follow the same process for setting the bevel as I do for the miter, though I don't always use clamps, because it's tough to engage them with the square in this setup.

Following these steps, which are a variation of the steps outlined in your saw's user manual, should have your saw cutting as accurately as it can. Without employing the use of a caliper and a whole other set of cutting methods (and time), it's not possible to give any reliable guidance on acceptable measurable tolerances. If you're on site, trial and error with the joints will tell you how well the saw is performing. Minor adjustments can be made using cuts as a gauge. But if you follow these techniques, you'll be well on your way.

Chris Ermides is editor of Tools of the Trade.





On this project, three salvaged newels were re-used; the largest of the three was installed at a first-floor winder stair. A new bottom block **(1)** raised the newel and handrail height to comply with code **(2)**, while also creating a strong connection to the new stair framing.

Newel Post Renewal

BY KEN REIS

I was recently on a jobsite in Chatham, Mass., to review a new stair project with the contractor (someone with whom I frequently work) and his clients. While I was there, I noticed some old stair parts in the corner of the home's unfinished living room. The clients noted that there had previously been an old, circa-1900 house on the lot (owned by their family), but that it had been beyond repair and was razed to make room for their new home. They managed to salvage some of the antique newels, balusters, and rails from the home and wondered if it would be possible to re-use them in the new construction. As a stair builder, I enjoyed meeting someone who appreciated the quality and history of the old parts, so I told them I would do my best to incorporate the parts into the finish design.

Unfortunately, the old balusters were too short to meet code, and there was not enough usable railing length for either of the home's planned two stairways. The three salvaged newels, on the other hand, showed promise. Though they were also too short, and damaged at the base from the demolition, I was confident I could rebuild them, making them taller to meet code and strong enough to resist fulcrum loads typically associated with newel posts.

JOINING OLD TO NEW

My biggest concern was how to join the old newel tops to new extension bases. I wanted to make a strong joint that was also invisible to the eye. After doing some research and making a few samples, I came up with a joint that allowed for a large gluing surface, with its strength bolstered by a threaded-rod connection. I planned to locate this new joint where the newel transitions from square to round—what woodworkers refer to as the "pommel" or "pommel cut." Now that I had a working concept, all I needed was to execute it.

New base stock. The three salvaged newels varied slightly in style and size. I started with the larger, more ornate newel (which we planned to use for the first-floor landing), cutting off its base with my chop saw to create a flat surface for the post and new base to meet. Wanting to match its original 4 3/4-inch-square base block, I wrapped 2-by vertical grain (VG) fir stock around a removable 1 3/4-inch-square center piece (see Rebuilt Newel Detail, left). The center piece allowed me to glue up and clamp the mitered fir pieces together without

Photos by Dave Holbrook and Ken Reis

distortion. The removable center was not glued, which allowed me the option to remove it and later re-install it to help with the threaded-rod installation, if need be. I squared off the new base block with my chop saw, leaving a flat, clean surface to shape.

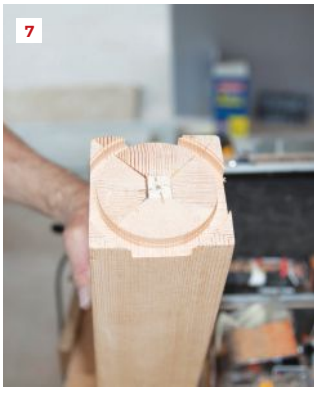
Shoulder and collar cuts. The next step was to create the joint where the old newel met the new base block. I first replaced the base plate on my Bosch trim router with a temporary Masonite one, which I used to help make radius cuts on the bottom of the old newel and the top of the new base. My plan was to create a rounded "shoulder" on the cut end of the old post and then a corresponding "collar" in the new base. With a new straight-cut bit in my router, I measured from the edge of the bit to the desired point that would give me the correct radius I needed (see photos, right). Because the existing newels varied in size, the distance between the router bit and the pivot point was different on each post.

Before making the inner diameter cut to create the collar, I brought my three block bases to a local wood turner, who made the rounded pommel cuts on his lathe (the center piece came in handy again for pommel cuts, providing a clamping surface for the lathe). Back on site and focusing on the larger newel, I made the inner diameter cut for my collar, then swapped the Masonite base with the router's factory plate and hogged out the remaining wood freehand with the router.

Making a strong connection. Finishing up, I removed the center piece from the base block and dadoed a continuous groove along its length, making it U-shaped. I then cut it to length (the extension base had to puzzle-piece into the corner of the stair carriage at the winder). Next, I installed two brass threaded inserts in the bottom of the post, then re-installed the U-shaped center piece, this time applying Loctite PL 400 adhesive to it. I applied additional adhesive in the shoulder-to-collar joint, then installed a length of 3/8-inch threaded rod with washers and nuts, which held the assembly together until the Loctite PL 400 adhesive dried. The combination of adhesive and mechanical fastening made for an assembly strong enough to satisfy the building inspector.

The two remaining, smaller-diameter newels (one located at the top of the second floor, the other at the bottom of the basement stairway) were built similarly. In both cases, however, I removed the center pieces entirely, since the remaining spaces were small enough to center the threaded rod for my final assembly.

Ken Reis is a stair carpenter and interior millwork sales manager for Mid Cape Home Centers. He lives in Brewster, Mass.



Milling the newel. The author made a temporary router base plate out of Masonite **(3)**, then screwed the router to the newel at the pivot point **(4)**. Here, he shaped one of the two smaller newels with a series of passes to make a new shoulder, turning the post while holding the router stationary **(5)**. The new base was routed similarly **(6, 7)**. The rounded pommel cuts were lathed off site, while the author used a router to make the inner diameter cut (the remaining wood was removed freehand) to create the base-block collar connection **(8)**.

BY DAVID GERSTEL

Your Bidding and Estimating Tune-Up Guide

David Gerstel has been a licensed builder for four decades and is the author of the construction industry classic, Running a Successful Construction Company. *The following article is adapted from his new book,* Nail Your Numbers: A Path to Skilled Construction Estimating and Bidding. *It can be ordered from your local independent bookstore or from online booksellers including Amazon.*

Shortly after I published *Nail Your Numbers*, I began receiving emails full of questions and suggestions from a fellow named Joseph Hough. At the time, Joe was working as a carpenter and studying engineering in Vancouver. For me, that would be a full load. But Joe was somehow finding time to give *Nail Your Numbers* as attentive a going over as any of my books has ever received from a reader.

Many builders, might benefit from taking on questions—prompts, really—that encouraged them to think through the way they handle estimating and bidding. Such an "exam" could act as a tune-up guide, prompting a close look under the hood to see what was working and what needed adjustment.

When Joe had completed the book, he asked me to send him an exam on estimating and bidding. I did; and a couple of months later, I received his answers to the exam questions.

As I read Joe's answers, I began to appreciate that he had achieved a better understanding of estimating and bidding than many of the veteran builders I had interviewed for *Nail*. To be sure, there were a couple of topics that I suggested Joe revisit. In response, he asked me to give him some direction, but I said, "no," telling him to figure matters out for himself. And that's when the idea for this article crystallized.

Many builders, it occurred to me, might benefit from taking an "exam" like Joe's. They would gain from taking on questions—prompts, really—that encouraged them to think through the way they handle the major issues that come up during estimating and bidding. If they found themselves struggling to articulate their method of handling one or another issue, they'd know they needed to learn more about it and get their practices in order. In other words, an "exam" could act as a tune-up guide, prompting a close look under the hood to see what was working and what needed adjustment.

In this article, you will find versions of most of the questions I asked Joe. I won't provide answers here, any more than I did for Joe. But I will, where it seems useful, amplify and explain the questions somewhat and offer a hint or two.

OK, get ready, get set ... Take as long as you like. Just make sure you can provide a competent answer to every question. The soul of our work, you might agree, is the construction of good buildings that serve our communities. But we can sustain that effort only if we have a sound business. And the heart of a sound construction business is bidding and estimating. Alright, then ... go!

Explain the difference between estimating and bidding. I was fortunate to learn about bidding and estimating from a professional estimator named Paul Cook, who was also a superb writer. Mr. Cook understood the difference between bidding and estimating so clearly that he wrote about the subjects in two separate books, *Estimating for the General Contractor* and *Bidding for the General Contractor*.

When I felt ready to write my own book and began interviewing other builders as part of my research, I found that all but the most savvy were puzzled when I asked them for their thoughts on the differences. One builder, though he'd been in business for 30 years, said, "It never occurred to me that there was a difference." Joseph Hough, by the way, came up with an interesting way of summarizing the difference. "Bidding," he wrote, "pertains to making money. Estimating pertains to spending it." How do you see the differences?

For a project I learned about recently, the clients refused to divulge their budget. Has that ever happened with you? If it did, how would you respond?

Explain why it is necessary to separate bidding from estimating. Can you pinpoint the hazards of allowing the mindset necessary for bidding to take over when you are estimating?

A builder told me that his wife used to create exhaustive job cost records for his projects. Then she got sick. He told her to just rest and forget about job costing. How much value did he think was lost when she was no longer producing the records, I asked him. "None," was his answer.

What do you consider the most important factors to consider when you are deciding whether to go after a project? What tools have you created to ensure that you are considering all the factors? Are your tools effective? Or do you find yourself too often investing precious time in estimating and bidding a project, but then not being selected to build it?

Do you ask prospective clients about their budget for a project? Do you have a well-thought-out approach to asking the "B" question? For a project I learned about recently, the clients refused to divulge their budget even to the architect. They were afraid that if they did candidly state their budget, the architect and builder would gobble up every penny of it. Have you ever gotten a similar response when you asked about budget? If so, how did you handle it? If not, how would you proceed if you did get such a response?

What are the primary functions of estimating spreadsheets? If you are using a spreadsheet produced by a software vendor, have you considered that you might be able to get more functionality for far less long-term cost by creating your own spreadsheet using Excel? What do you see as the pros and cons of using Excel vs. using a program created by others?

What is your preferred format for your spreadsheet? There is more than one good answer here. Professional estimators with little trade experience might legitimately prefer one widely used format while builders who have come up through the trades may prefer a format that fits better with their way of thinking through and building projects.

If you are deploying an in-house crew rather than having your field work done entirely by trade partners, are you including all the necessary divisions of work in your spreadsheet? Amazingly, builders specializing in diverse lines of work—retail, commercial, and residential—overlook one major division of work, or at least many of the items that should be included within it. I will give you a hint as to what it is: It covers items that are not visible in the plans and may not be mentioned even in fairly elaborate specifications. Make sure that you know what this division is, that it is included in your spreadsheet, and that it includes all the items that regularly, or even occasionally, occur in your projects.

What are the advantages, in terms of personal satisfaction and of potential profit, of keeping at least some divisions of work in-house rather than subbing out everything except supervision and perhaps a bit of utility work? Again, there is

THE BIDDING AND ESTIMATING EXAM

1. Explain the difference between bidding and estimating.
2. Explain why it is necessary to separate the two processes.
3. What do you consider the most important factors to evaluate when you are deciding whether or not to go after a project? What tools do you use to ensure that your evaluation is comprehensive?
4. How do you obtain information about the budget for a prospective project?
5. What are the primary functions of an estimating spreadsheet?
6. What is your preferred format for your spreadsheet? Why?
7. Describe job costing and the value of job cost records for estimating.
8. Describe the limits of job cost records and better sources of data for estimating labor productivity.
9. What clauses should a contract include to protect a bid from erosion during construction?
10. What is labor burden? What are its key components?
11. What is overhead?
12. What is profit? Why is it essential to earn profit in construction?
13. What are the pros and cons of the three major methods of charging for overhead and profit in a bid?
14. What are General Requirements? What percentage of your costs for a project do they typically run?
15. What is meant by the terms "Integrated Project Delivery," "Pre-Construction Services," and "Cost Planning"?
16. How can you move beyond estimating and bidding jobs for free?

no right answer here. Your answer will likely depend on your abilities, skills, and the aspects of a career in construction that attracted you to our world in the first place.

What is job costing? What value does it have for estimators? What are the pros and cons of using job cost records for estimating? I'd like to throw in an opinion here. Job costing is an accounting function. Its importance is pushed by industry educators whose background is accounting, not construction or estimating. In my view, they tend to overstate the value of job cost records for estimating while overlooking the value of other records.

I have met builders who are even more skeptical of investing much time in job costing than I am. One builder I interviewed for *Nail* told me that, following the standard sort of advice handed down from consultants with an accounting backgrounds, he asked his wife to compile exhaustive job cost records for his projects. She did that for years. Then she got sick. He told her to just rest and forget about job costing. How much value did he think was lost when she was no longer producing the records, I asked him. "None," was his answer.

How much benefit, especially for estimating purposes, do you get from job cost records relative to the time you spend on compiling them?

What contract clauses are especially important for preventing erosion of a bid during construction? Too many builders think that a comprehensive contract will alienate clients. I even know one who thinks that his failure to have developed a written contract is evidence of moral superiority. People trust him so much he does not, he brags, need any fancy documents to seal a deal. Just a handshake will do.

In fact, a thoughtful and fair contract, carefully presented to clients, supports trust. It demonstrates your desire to put all your cards on the table and to help clients fully understand the major transaction they are entering into. Within such contracts, specific clauses about what you can, will, can't, or won't do during construction can settle client expectations so disappointment does not set in as you are building the project. That, in turn, will prevent costly disputes over your charges and protect your potential profits, as is essential for sustaining a construction business over the long term.

What is labor burden, and what are the major components of labor burden? In particular, have you accounted for the difference between labor burden for journeymen and for apprentices, noting that certain of the burdens are substantial for apprentices while being insignificant for journeymen? I ask this because one of the sections of *Nail Your Numbers* that builders have most appreciated is the one titled "The true cost of apprentices." As Joe colorfully noted in his exam answers, "Apprentices can be real money guzzlers." You need to know exactly why that is the case, and a comprehensive labor rate sheet (such as the one included along with hundreds of other forms, lists, and illustrations in *Nail Your Numbers*) will tell you why.

Now, two huge questions: What is profit and why is it essential to earn profit in construction? What are the pros and cons of the three major methods of charging for overhead and profit in a bid? A surprising number of builders do not have sound answers to those questions. At the very worst, they think wages are profit and that, as I have heard many say, they "don't have any overhead." Or, not quite so bad, but still serious, they fail to account for and charge for all their overhead. And they think profit is bounty that will never stop flowing and that they can casually lavish on powerboats, fancy offices, or other delights.

Of course, the preceding prompts do not exhaust the estimating and bidding issues you should consider. For example, I did not ask about site inspections, and I did not mention material takeoffs.

I ask this because one of the sections of *Nail Your Numbers* that builders have most appreciated is the one titled "The true cost of apprentice labor." As Joe colorfully noted in his exam answers, "Apprentices can be real money guzzlers."

But for now, I will just go on to one final set of questions that I find particularly engaging, and that I hope you will as well:

- Are you sick and tired of spending countless hours generating bids for clients, architects, and designers—and of doing all that work without pay, merely in hopes of getting a chance to build the project?
- Are you acquainted with the concepts "Cost Planning," "Pre-Construction Services," and "Integrated Project Delivery"?
- Are you aware that builders all over the country have moved beyond "Bidding for Free" (to use a chapter title from *Nail Your Numbers*), and that they are paid at professional rates for their estimating and related preconstruction services?

In closing, let me just tell you that if you have not already done so but would like to, you can find your way out of the free "competitive" bid trap. Countless builders have made that move. They are paid for generating estimates and the accompanying information, such as ideas for value engineering, that is of such great benefit to designers and clients as they develop plans and specs for their projects.

There are two major paths beyond free bidding. Especially in a boom time but even when work slows, there is no reason that you cannot travel one of those paths. That is, there is no reason if you have become a capable builder and have put in the hard miles necessary to create strong estimating and bidding systems. If you have done that, then you can and, in my view, should seriously consider making the journey—unless, of course, you love working for free.

David Gerstel's new book, Nail Your Numbers: A Path to Skilled Construction Estimating and Bidding, *can be purchased from local independent or online booksellers. To learn more about* Nail Your Numbers, *go to DavidGerstel.com or Amazon.*

BY TED CUSHMAN

Humidity Control: A Closer Look

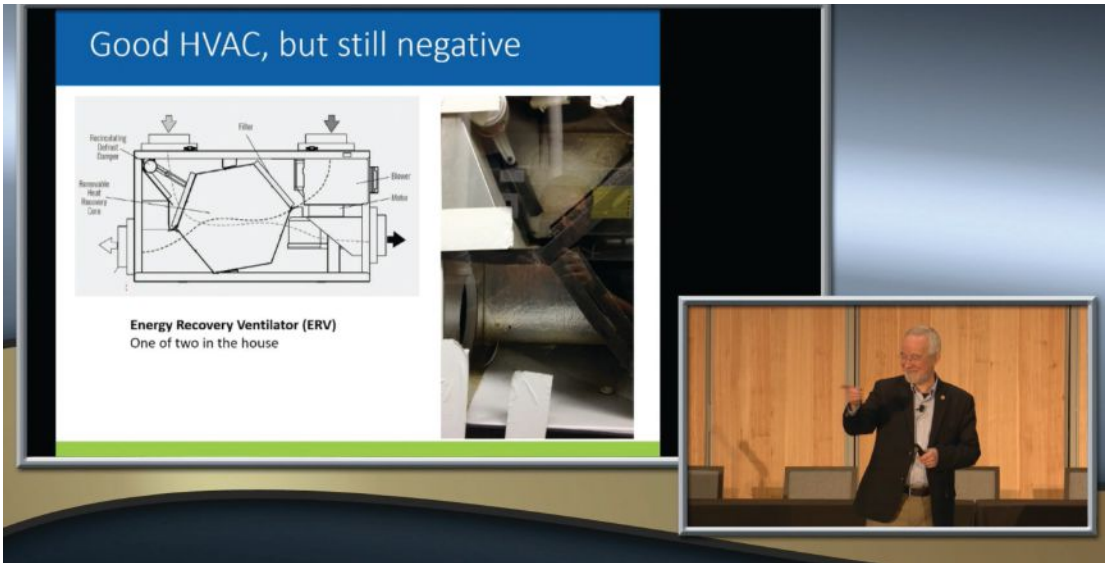
Air conditioning systems have a two-fold task: controlling temperature and moderating humidity. As codes increasingly require forced mechanical fresh-air ventilation in houses, the second job is gaining in importance. That's because in most parts of the United States, and particularly in central and southern regions, outdoor air carries a lot of humidity with it as it enters the house. *JLC* looked at that issue in this space in May 2018 ("Controlling Humidity in Warm Climates"). This month, we're back for a second look. At the Humid Climate Conference in Austin, Texas, in May, a two-hour presentation by building-science consultant Lew Harriman of Mason-Grant (masongrant.com) went to the heart of the humidity-control topic. With several case examples and an insightful summary of technical issues and approaches, Harriman shed new light on the theory and practice of managing humidity in homes—insight we're putting forward in advance of systems you might be designing for or installing next year.

MOIST MANSION MYSTERY

Harriman's first example was a troubleshooting case involving a puzzling moisture problem in a brand-new custom home in the Chicago area, owned by a wealthy businessman. With four finished floors from basement to attic, this house was well insulated and impressively airtight, and it was equipped with advanced air conditioning, exhaust ventilation, and an energy recovery ventilator (ERV). It should have been a good performer. But there was a problem with indoor humidity: Night and day, season in and season out, the house ran relative humidities in the high fifties and above.

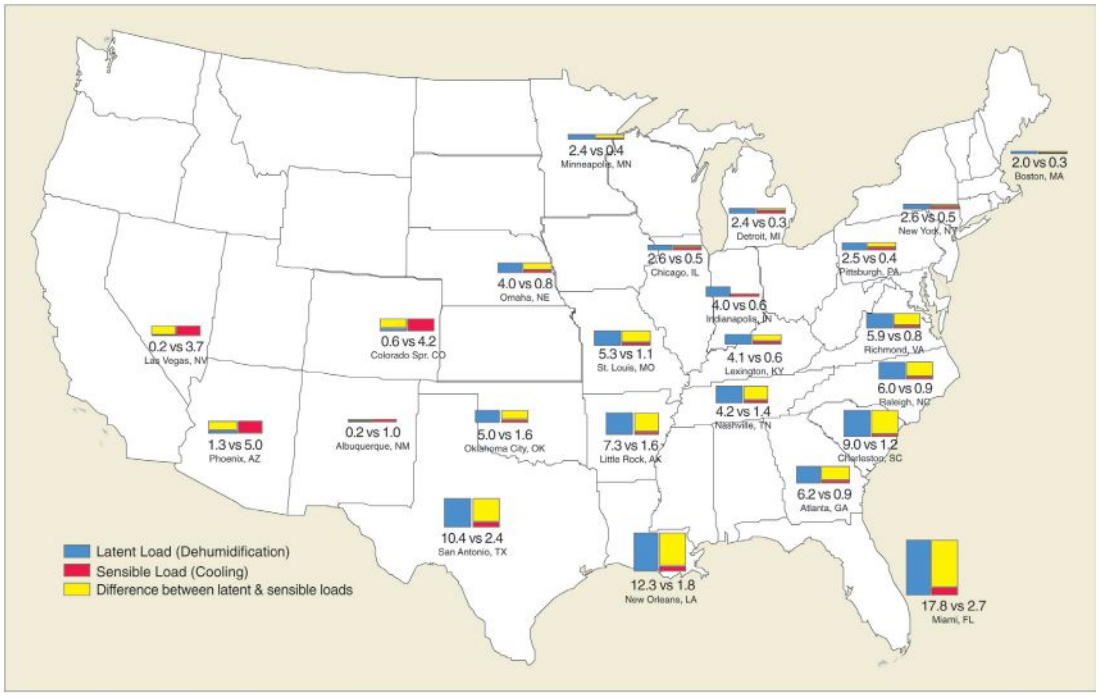
Harriman was called in for a diagnosis. An initial review turned up none of the usual suspects, Harriman recounts: "What's the load? Are they taking lots of showers? Nope. Are they breathing heavily at night? No, this is happening during the day. Are they scrubbing a herd of puppy dogs in the bedroom at night? No. Do they have lots of plants? No. There's nothing in this house that suggests that there is a big internal humidity load. Nothing."

Conference attendees suggested other possibilities, and one by one, Harriman shot the ideas down. Wet basement? Nope: "Bone dry. Beautifully drained, beautifully waterproofed, nice capillary break under the slab." Blocked condensate drains? Good thought, but no: "They had lovely big traps that you could clean out, and a couple



Lew Harriman talks in Austin, Texas, in front of a picture of a backdrafting energy recovery ventilator (ERV). By itself, providing fresh air will not solve humidity problems.

Photos and graphics courtesy Lew Harriman/ASHRAE



The graphic above depicts the relationship between the sensible (cooling) load and the latent (dehumidification) load in various locations in the United States. Very commonly, air conditioning systems have to deal with a latent load that far surpasses the sensible load.

of them were transparent, just the way they should be so that you could see whether they were clogged, and they were new." Cooking moisture? The owner's professional chef ran the huge exhaust fans every day as he prepared family meals.

The building's hired manager provided a major clue. Says Harriman, "He took the metal panel off the side of the ERV and replaced it with Plexiglas." Then he hung a small strip of light plastic inside the ERV, next to the exhaust port. The manager's cellphone video of this rigged-up wind gauge clearly told the tale: Whenever too many of the home's many exhaust fans (which included two commercial dryer vents, lots of bathroom vents, and a huge kitchen exhaust fan) were running, the strip of plastic bellied inward. Rather than functioning as a balanced air exchanger, the ERV had become a straight air intake port. Overwhelmed by the building's powerful exhaust fans, both legs of the machine were drawing in humid outdoor air. Under worst-case conditions, with all the exhaust fans running, Harriman measured 27 pascals of negative pressure—and that's in a house with four fireplace chimneys.

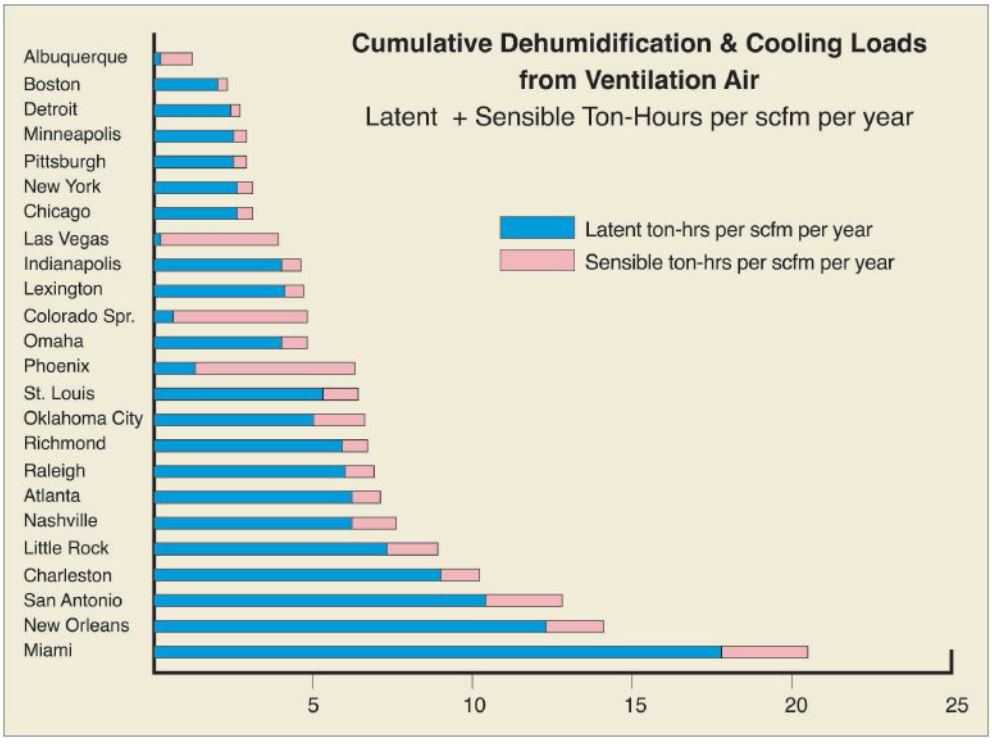
As far as he knows, Harriman says, this house was never fixed. Any proposed solution bogged down in disputes over who was responsible. But Harriman says that the first place he'd look for answers would be the range hood, which, at 948 cubic feet per minute (cfm) of actual measured airflow, was much more powerful than it needed to be. Equipment sizing was a factor as well. A Manual J calculation performed after the fact by consultant Corbett Lunsford indicated that the home needed 7 tons of cooling under design conditions; the builder had installed 11 tons.

Even in an ideal world, notes Harriman, Manual J sizing guidelines use a peak cooling load that would be exceeded for only 36 hours in a typical year. "That means that all mechanical equipment is oversized for 99.6% of its operating hours," Harriman comments. And while oversized equipment may dominate the cooling load, it struggles to control humidity, because moisture that condenses on the coil tends to re-evaporate into the house as soon as the short cooling cycle ends.

So this house didn't have the equipment it needed. The ERV controls humidity only if it's actually exchanging air, and then only if the indoor air is already dry. The cooling equipment dehumidifies only if it's running—which, for 99% of the year, is only part of the time. What was missing was a full-time dedicated dehumidifier, set to respond to excessive humidity, not to high temperature. And that dehumidifier, as Harriman would explain, should be arranged to dehumidify outdoor air as it enters the building.

DESERT MONSOON

Harriman's next example cast an even sharper light on the humidity problem posed by incoming air. The case comes from early in



A city-by-city list of major American locations shows how the work done by air conditioners is commonly dominated by the requirement to remove humidity from the air.

Harriman's career, when he was a commercial market manager for a dehumidifier supplier. A call came in late on a Friday from a semiconductor manufacturer in Arizona: "We need some dehumidifiers by Monday."

A humidity problem in Arizona? Yes. Most of the year, Arizona has desert conditions. But for a brief period from July to September, that part of the Southwest gets something called the "Arizona Monsoon," a season of high humidity and frequent thunderstorms, fueled by moist air coming up from the Gulf of Mexico and the Sea of Cortez.

When he analyzed the chip fab plant's numbers, Harriman saw the pattern that would grow familiar to him over his long career: The indoor sources of humidity were modest, and were dwarfed by the humidity brought in by ventilation air. "So if you were the designer," asked Harriman, "where would you put the dehumidifier? Me, I would put it on the ventilation air."

Harriman equipped the factory's intake ports with desiccant dehumidifiers and moisture-responsive controls. Once that was accomplished, the humidity spikes and dips went away, and the humidity remained stable around the clock, month in and month out.

In the commercial and industrial world, Harriman says, drying the ventilation air is a lesson learned long ago. But in residential construction, moisture problems are still treated as a mystery. Equipment is oversized, focused on cooling, and controlled to respond primarily to temperature rather than the moisture load.

FLORIDA FLOW METER

Harriman's third case didn't directly involve ventilation air. Instead, it was an investigation of indoor mold complaints for a development of homes near Tampa, Fla. Mold was growing on ceilings, primarily in second-floor mechanical rooms, and the assignment was to find out where the moisture was coming from.

In the end, Harriman and colleague Andy Ask concluded that the source of moisture was a humid vented attic. Daily temperature cycles were letting the attic fill with hot, damp air, and heat was driving the moisture through ceilings into the home. But what's interesting in this case is that Ask and Harriman were able to put hard numbers to the amount of moisture the home's air conditioners and dehumidifier were extracting from the home's indoor air.

They did this with a simple method: They measured the condensate. They positioned a tipping bucket rain gauge where it could catch condensate dripping from the home's air conditioners and dehumidifier, and they counted the times the bucket tipped with an electronic "pulse counter."

In this case, the air conditioners were able to do the bulk of the work. Over the course of 13 days in August and September, one air conditioner pulled out 492 pounds of water, and the other pulled out 290 pounds; the dedicated dehumidifier removed an additional 300 pounds of water. These homes, interestingly, didn't have any

Lew Harriman and colleagues devised the system shown above to measure the water output of a house air conditioning and dehumidification system. Water emitted by the building's condensate drain filled a bucket, which tipped over when full (left); a pulse counter (right) counted the bucket tips, keeping a running total of the drain's performance.

powered fresh-air ventilation at all. So for purposes of comparison, Harriman calculated the amount of moisture the HVAC systems would have had to contend with if the houses did have incoming fresh air as recommended by ASHRAE Standard 62.2. The result is eye-opening: If the homes had been ventilated that heavily, the moisture load would have roughly tripled.

THE TAKEAWAY

To avoid moisture problems in homes, Harriman concludes, builders need to realize that the humidity contained in outside air is the big gorilla in the room. To drive home the point, Harriman quotes from a senior colleague, Don Gatley, author of the book *Understanding Psychrometrics*. "Don Gatley did 79 moisture investigations in his career," says Harriman, "and he told me that all but four were caused by either too much building suction or not enough drying of the ventilation air."

More than 20 years ago, Harriman and some colleagues published a paper about the moisture contained in ventilation air. Analyzing more than 200 data sets from locations around the nation, they concluded that the humidity load of incoming air exceeds the sensible cooling load of the air almost everywhere. The authors proposed a new unit, the "ton-hour," to compare the annual loads associated with ventilation (the unit would equal a ton of cooling capacity, operating for an hour).

In some cases, the loads are extreme. In Miami, for instance, every cfm of continuous ventilation will require 17.8 ton-hours per year for dehumidification, versus just 2.7 ton-hours for sensible cooling. In milder climates, the total loads are lower, but the ratios are similar. Boston, for example, with 2.0 ton-hours of dehumidification and 0.3 ton-hours of sensible cooling, needs less energy overall to treat incoming air, but the ratio between dehumidification and cooling is about the same as in Miami.

To sum up, Harriman offered a number of lessons:

- Don't oversize cooling equipment.
- Install dedicated dehumidification.
- Dry out humid ventilation air before it gets indoors.

So while we often think of wet basements as the biggest cause of indoor moisture, and we think of kitchen and bath vents as the best way to remove intermittent humidity, those are just the starting points when the code requires continuous ventilation. When continuous ventilation is required, reliable humidity control requires a dedicated dehumidifier. Harriman recommends placing that dehumidifier so that it dries out the incoming air before it gets into the house. Keeping excessive humidity out of materials provides the dry indoor environment that meets owners' expectations: a house that is comfortable, well ventilated, and mold-free.

Ted Cushman is a senior editor at JLC.

Rebuilding a Framing Nailer

Increase longevity and productivity with this periodic task

BY BARRETT SITES

OK, I admit it: I love buying tools. But I also want them to work properly and last a long time, so I always take good care of them and do routine maintenance, which saves me a lot of time and money in the long run. Pneumatic nailers—from headless pinners and finish nailers to roofing and framing nailers—are regularly part of my tool arsenal. These nailers are all similar on the inside, and periodically or when a project has given one a particularly rigorous workout, I tear them down to clean them, inspect them for wear, and replace the seals and gaskets.

While rebuilding pneumatic tools is a good idea after an extended time, I also do several things with every use to keep these tools in good working order. I always put a couple of drops of air-nailer oil in the nozzle before connecting the air hose. After every job, I blow off the tools to remove dust and debris. Water vapor in the air lines is especially hard on nailers, so I drain the air from my compressor after every use to remove moisture from the air tank. In some areas with constant high humidity, you may need to install a device to physically remove the moisture from the air lines.

In addition, I try to operate air tools at the proper cfm. Too much pressure can damage a nailer, and too little pressure can result in poorly driven fasteners. Finally, I always use fasteners with the proper angle, head type, and collation made specifically for my nailer. Using the wrong fastener can make a nailer jam, misfire, or double fire—all of which can be dangerous.

I recently rebuilt my old Bostitch framing nailer. I bought an O-ring maintenance kit online that works for several Bostitch nailers. Then I cleaned and decluttered my workbench so I could keep track of all the nailer parts. I removed and sorted the contents of the kit, separating all the parts on my workbench. I also gathered all the tools, cleaners, and lubricants that I'd need, and I was ready to start.

Barrett Sites is a remodeling contractor in Chambersburg, Pa.

Photos by Kimberly Sites

DISMANTLE THE NAILER

Your work surface should always be clean and uncluttered so you can keep track of the parts as you remove them and work on them. First, remove the four machine screws that secure the cylinder cap to the main frame **(1)**. Lightly tap the cap with a rubber mallet to loosen it, if necessary. Continue to remove the parts of the nailer, and lay them out on the bench top in the order that you remove them **(2)**.

WIPE DOWN ALL THE PARTS

Wipe down all of the parts properly to remove dirt and old oil. On a clean paper towel, spray a cleaner-lubricant, such as Gum Cutter (berkebileoil.com), that will not have an adverse effect on the internal nailer parts **(3)**. Then wipe the inside of the main nailer frame **(4)**. Using fresh towels with cleaner, wipe down the rest of the parts including the driver-piston assembly **(5)** and the piston head valve **(6)**. Most rebuild kits come with a parts schematic, but if none is included and you are unfamiliar with the internal parts of a pneumatic nailer, refer to a parts schematic from the nailer's manufacturer.


7


8


9


10


11


12

REPLACE THE O-RINGS ON THE PISTON HEAD VALVE

Remove the piston stop and compression spring from the piston head valve and wipe them both clean. Using a pick hook, remove the inside O-ring from the piston head valve **(7)**. Select the proper replacement O-ring from the kit and smear the ring with the lubricant provided in the kit **(8)**. After making sure that the new O-ring is completely coated with lubricant, slip it into the groove on the head valve **(9)**. Next, remove the outer O-rings from the piston head valve **(10)**. As before, smear lubricant on the replacement rings and slip them into the outer grooves on the valve. Rotate the valve with your fingers on the O-rings to ensure that the lubricant is distributed evenly **(11)**. Place the compression spring and piston stop inside the piston head valve **(12)**, and slip the assembly into the cylinder cap, pressing gently with your thumbs **(13)**.


13

REPLACE THE O-RING ON THE DRIVER-PISTON

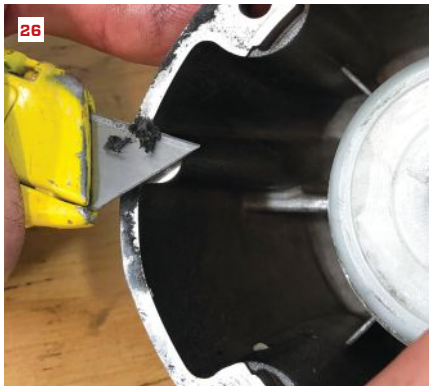
The driver-piston assembly consists of the piston head attached to the driver. Remove the old O-ring **(14)**, and thoroughly clean all dirt and old lubricant from the O-ring groove **(15)**. Squirt fresh lubricant into the entire perimeter of the groove **(16)**. Select the proper replacement O-ring and slip it into place on the piston **(17)**. While working on the driver-piston assembly, check to make sure the end of the driver shaft is not damaged or worn. If you have the measuring tools, make sure that the distance from the piston to the end of the shaft is within the manufacturer's specs. Adjusting the shaft is best done by a service technician.

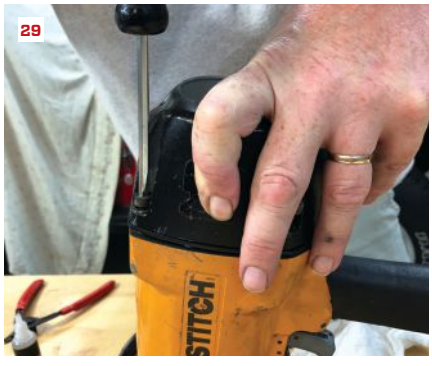
CYLINDER SLEEVE NEXT

The cylinder sleeve that holds the driver-piston assembly has two O-rings to replace. Pull the smaller ring from its groove **(18)**, and replace it after lubricating the groove properly **(19)**. Run a finger around the new O-ring to ensure the lubrication is evenly distributed. Repeat the process with the other O-ring. Smear air-nailer oil in the sleeve **(20)**. Remove the bumpers from the end of the sleeve, then clean, relubricate, and set the bottom bumper aside until reassembly.

REASSEMBLE THE PARTS IN THE NAILER FRAME

The last parts to clean are the cylinder ring, which has an O-ring that needs to be replaced in the usual fashion, and the cylinder seal (not shown). With all the parts clean and properly lubricated and with the O-rings replaced correctly, it's time to reassemble the nailer. The locator plate (removed earlier) is a half-round piece of metal that guides the driver shaft **(21)**. Set the plate into its slot in the nailer, taking care not to install the piece upside down **(22)**. Next, slip the driver-piston assembly into the cylinder sleeve, pushing it all the way through with the shaft protruding from the bottom **(23)**. Place the bottom bumper into the frame over the locator plate to help guide the cylinder assembly into place. The shaft of the driver has a groove cut into one side that has to align properly with the locator plate. With the shaft and the locator plate aligned correctly, slip the cylinder assembly into the nailer frame **(24)**. Next, slide the cylinder ring into place over the sleeve, pushing the ring as far down as possible **(25)**. Finally, slip the cylinder seal over the top of the cylinder assembly.





INSTALL THE CYLINDER CAP

The cylinder cap installs on the nailer frame with a gasket that needs to be replaced with every rebuild. First, though, carefully scrape off any residue from the edge of the cap, using a sharp utility-knife blade **(26)**. The cap for this nailer has guides that align the gasket properly on the cap and keep it in place during reassembly **(27)**. Press the cap onto the nailer frame in the proper alignment **(28)**, pushing down hard on the cap to depress the compression spring. While holding the cap in place against the nailer frame, insert and start to thread all four screws into their holes. It's important to tighten the screws evenly, so tighten them corner-to-corner, a few turns at a time **(29)**. When the cap is in contact with the frame evenly around its entire perimeter, tighten the machine screws to a predetermined torque **(30)**. For this nailer, the manufacturer recommends 25 to 40 pounds of torque.

TEST-FIRE THE NAILER

When you have finished rebuilding the nailer, test the tool to ensure that it's working properly. As should be done with every use, add a couple of drops of air-nailer oil before connecting the air hose **(31)**, then drive a few test nails into a scrap board **(32)**. If you've followed all the steps of the rebuild, the nailer should be ready for its next job.

Organizing the Mechanicals

Without a clear plan, large-house systems can get out of hand

BY DOUG HORGAN

When we build a normal-sized house, future maintenance and repair work is often straightforward. If the upstairs is hot in July, the upstairs HVAC system is the culprit. If the lights in "bedroom 2" aren't working, you just go find the breaker in the panel box. And the two hose faucet drains are in the basement, near the hose faucet locations.

But not every house is normal. In a mega-house, the HVAC, electrical, and plumbing systems are extensive and complex. We've built houses as large as 30,000 square feet—so large that we need to take extra steps to organize and document the house systems, or they will cause hours of headaches later. Here are some of the ways we make bigger houses manageable.

ELECTRICAL

If you don't start with a good plan, you'll have a lot of trouble with electrical systems. Large houses have multiple breaker panels, and it's a good idea to locate and organize them the way a homeowner will think about them. For example, a panel on the second level can have all the second- and third-level circuits, or the two panels on the north end of the basement can do everything on the north half of the house, and so forth. If half of the circuits on the second floor are on a nearby panel, but the rest are on two different panels in the basement, frustration and wasted time can result.

Labeling panels early on helps a lot too. Later trades can note on their equipment where it's fed from, if the panels are labeled early.

Photos by Doug Horgan

The wiring circuits for a huge house **(1, 2)** can pose a challenge to installers and to maintenance or remodeling companies. The author recommends terminating wiring runs in panels in a way that will make sense to the owners and future electricians **(3, 4)**, and labeling every wire with its purpose and the location of the devices or receptacles it serves.

We usually distribute multiple generator sub-panels and lighting-control-system panels in a similar manner. The home-automation systems we normally use are wired so every lighting circuit goes straight to a large panel full of the system switches and dimmers. Because people change their minds and add things later, it's helpful to have these scattered around a large home. It also saves a lot of wire to have them near the areas they control. In a house that's 150 feet long and 40 feet tall, this can add up.

The electricians should keep a detailed list by room, noting where lighting and outlets are wired to. "Bedroom 4 plugs: panel 5 (upstairs laundry room). Bedroom 4 lights: lighting control panel 3, controller 2, load 4. Bedroom 4 bath lights: lighting control panel 3, controller 2, load 5." A neat copy of this should be left with the house, though our best electricians keep a copy with them as well and can answer questions over the phone.

Labeling individual wires inside panel boxes is another helpful practice. Changes are inevitable and can be extensive, and large crews will be more productive if any electrician can understand each panel.

Ground fault protection is another area where some organization is crucial. In a smaller house, a few GFCI breakers are manageable. In a house with six breaker panels, eight bathrooms, four unfinished mechanical and garage spaces, and another 10 outdoor plugs, we've ultimately found that it's simpler to install GFCI plugs at each location where protection is needed. Yes, it meets code to wire three utility rooms on one GFCI breaker, or to put the porch and garage plugs all on a GFCI plug located in some random spot like the powder room. But it's a giant pain to find and reset them, and we get the phone calls when clients can't figure it out. We even find ourselves creating elaborate maps on some of our remodels. It's much easier to have a GFCI in the garage, a GFCI on the porch, every outdoor plug its own GFCI, every bathroom its own.

Even in kitchens where we sometimes use plug strips or other decorative devices, we find a spot on a side wall or in a cabinet for the GFCI reset button.

PLUMBING

We don't usually make extra efforts to valve off or label individual bathrooms (unless we're using a manifold-type plumbing system). But there are a few extras that can improve a plumber's day at some point down the road.

First, it's a decent idea to break the house up into a few sections that can be closed off individually. That way, if something goes wrong, part of the house can keep running. A house with no bathrooms is much worse than a house with at least one working bathroom. We let the layout of the house decide where and how to do this. In our area, larger houses usually have more than one mechanical room in the basement, and we have the plumbers run a large line from one to the other and branch out from there; each half can be shut off independently.

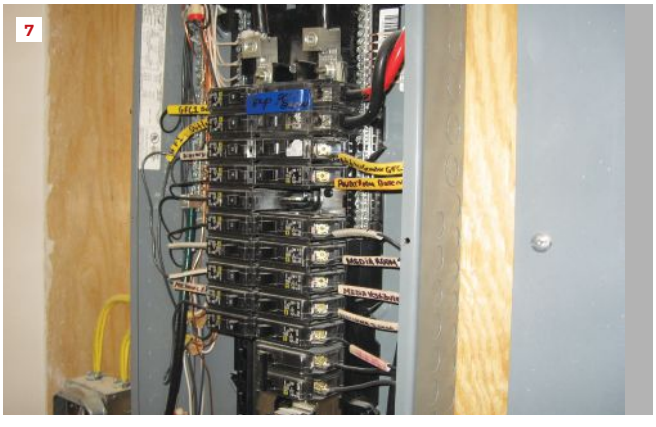
A house with six or 12 hose faucets can be a challenge to drain down for winter. We've remodeled large houses where plumbers scattered shut-offs and drains all around the house, and clients can't remember where some of them are. A few winters later, they change maintenance people, and we get a call about a flood from a frozen pipe. To simplify the process, we group hose shut-offs into a manifold. One shut-off closes off the water to all the faucets, and we put a boiler tap on the manifold for a hose to the drain.

It's common these days to run a gas-line manifold as well, particularly with corrugated stainless steel tubing (CSST) installations. Labeling the valves accurately is obviously important. When we have more than one manifold, we include tags on each, noting the other locations.

Another trick we've learned is to add some extra valves to double hot-water-tank installations. A number of our luxury homes have two tanks. With a little bit of thought, these can be installed so one can stay operational even when the other needs to be shut off for service or replacement. This turns a leaky water heater from a "must be replaced today" emergency to a simple matter of turning a few ball valves and scheduling the work when convenient.

We even have a few houses with two wells, and an interconnection between them can be a great convenience to the clients. Even if one well was installed for the irrigation system, when lighting zaps the main house well pump, we can turn some valves and keep the house operational for the time being. Another key is installing a bypass around water-treatment devices, so the house can still have water even when they break.

Be careful with recirculating hot water. We can't seem to get away from hot-water recirc lines with the spread-out designs we are given, but our unfortunate experience with them is that they literally wear out the piping, sometimes within a decade. Hard or acidic water accelerates the process, but it can happen with any water. The key is to minimize the rate and time of pumping. We use minimally sized pumps (if your plumber is



When power circuits and lighting-control circuits are extensive enough to fill several panels **(5)**, it can be helpful to organize some circuits into sub-panels located around the building **(6)**. Every circuit should be clearly labeled to indicate what it's for and where it leads **(7)**.

A manifold system **(8)** is a good way to keep dozens of hot- and cold-water runs organized. The author recommends organizing outdoor-hose-bibb piping lines and gas lines at a central location **(9, 10, 11)**, with the capability of shutting all the lines down at once as well as individually, and with all lines clearly labeled to indicate what they serve and where they terminate.

nervous about a small pump, have them use a multi-speed pump and set it to the lowest option), and always install an "aquastat" thermostatic device to turn the pump off when the line is hot.

Our attempts to use timers have had mixed results. Typically, we find the timers bypassed or set to "always on" within a couple of years. The pump shown in photo 13 on page 34 thinks it's 11:30 at night when it's 1:40 in the afternoon. The clients have switched it from "timer" to "on" because of frustration with the timer.

One setup that seems reliable is using the home automation system. It usually has an accurate clock that resets itself after power outages. For our second-home clients, we include the recirc pump on the "away mode" list so it turns off when they are away from the house.

If you find your plans require more than one recirc line, definitely put valves on each one so they can be balanced. Shorter or larger-diameter lines may need to be throttled back in order to ensure that the other lines get flow.

Our standard is Type L copper piping. It's a bit thicker than the standard Type M, which helps with recirc line durability. If I understand, in commercial buildings, Type K (even thicker yet) is sometimes used on recirc lines, but our plumbers have pointed out that standard copper fittings are the same thickness as Type L, and they don't feel an additional upgrade to the tubing is warranted.

Pipe expansion loops. We did a renovation on a large house with the mechanical room at one end and the master bathroom on the opposite end. The hot-water supply and recirc lines were more than 100 feet long. While we were working there, three leaks in this long run appeared. On investigation, we found that CPVC piping is supposed to be installed to account for expansion and contraction. Long runs can move quite a bit with temperature changes. A simple offset arrangement will handle the movement, and is spelled out in the manufacturers' manuals.

Pipe calculations. Some luxury baths have amazing amenities,


12


13


14

When a large house is served by a well with possibly limited water production, large buffer tanks **(12)** can ensure that water does not run out during high-demand periods. Recirculating timers can go out of synchronization, in the author's experience **(13)**. One way to reduce wear on recirculation lines is to use an aquastat **(14)** that turns the pump off when the line is hot.

but the design process needs to be thorough. We recently installed a shower with a total of 13 heads between the body sprays, rain head, and handhelds. The plumbing supplier calculated that we needed four instantaneous heaters to support the shower, and the directions for the heaters called for a 1 1/2-inch cold supply line to the four heaters.

So far so good, but it turned out the house was on a well with a 3/4-inch supply line into the house. There are ways to adapt to such a situation, but they need to be figured out in advance.

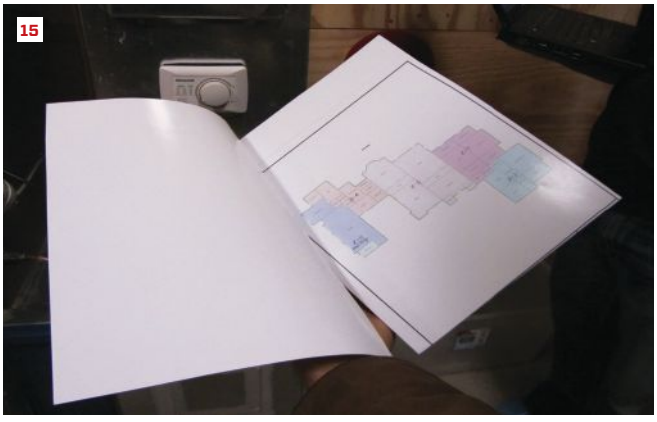
Many of our largest homes are on well service. If a shower has multiple heads or if a large family may simultaneously run water, the draw could be 15, 20, or even more gallons per minute, much more than most wells can put out. We install a storage tank in the basement for this situation. Two hundred gallons of stored water smooths out the high draws and allows the well to catch up even if it puts out only five gallons a minute.

HEATING, VENTILATION, AND AIR CONDITIONING

A relatively simple house may have two or three HVAC systems, and for that, a formal HVAC schematic may not be needed. But we've been involved with homes with eight or 12 systems, and some of those had zone controls with 20 or 30 thermostats. In such a large house, an easily understood floor plan showing which rooms are on which HVAC systems is essential.

This drawing should also show unit locations, thermostat locations, and outdoor compressors. If systems have automatic zone dampers directing air to separate parts of the ductwork, obviously these need to be documented. It's even important to make an early decision on unit names. If the HVAC company calls a unit "attic system 2" but the electricians label it "north attic compressor," it slows everything down.

The same situation applies to floor heat zones—a layout with manifold locations, zone pumps, and systems is a must for future



A clear schematic indicating which parts of the house are served by which HVAC systems **(15)** can help with troubleshooting and modifications. Screens to hide outdoor HVAC equipment **(16, 17)** should allow plenty of airflow and should leave ample space and easy access for maintenance and repair workers **(18)**.

service. (If you don't have that, you have a good excuse to finally buy that infrared camera, so you can figure out which loop is where.)

To facilitate future maintenance, it's much better to install the same size filters on the big systems, if at all possible. That way, filters can be ordered by the case. And if any unusual filters are installed, like the one 12-by-12-by-1-inch filter back grille in the bonus room, an obvious label on the machine can help future techs find them.

A checklist of all devices and filters is a necessity. The rear crawlspace dehumidifier has its own little filter, the attic ERV has two, and the third-floor south system has a humidifier cartridge that needs annual replacement. It's easy to forget something.

Be sure to walk the HVAC installers through the house and verify the operation of every piece of equipment. We once found a humidifier had never been wired up because the electricians forgot all about it. It was one of more than 50 devices on that house—an easy mistake to make if you don't check.

Geothermal systems have their charms—and are very expensive to install. One thing for sure, though, it's much easier to deal with the indoor-only equipment, compared with finding places to put five, 10, or more outdoor air-conditioning compressors.

Finding ways to somewhat hide outdoor units while keeping them fully functional can take some creative thinking. Normal units need full flow of outdoor air from the sides and an open area above them. A solid fence or even a thick hedge can block airflow in; a deck or porch can block the hot air leaving. Either will cause the hot discharge air to recirculate down through the coil, which reduces capacity (which clients will notice) and also causes premature wear and high energy use (not necessarily a priority, but best to avoid). An open lattice fence seems to be acceptable to most clients and visually blocks the equipment while allowing normal function.

Doug Horgan is vice president of best practices at BOWA.

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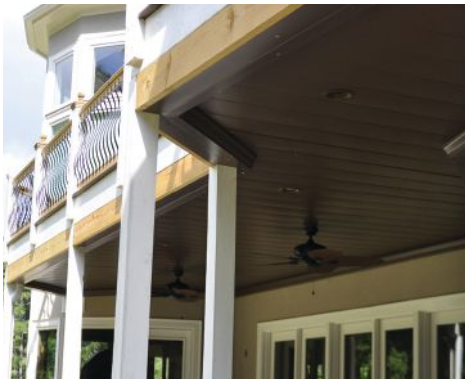

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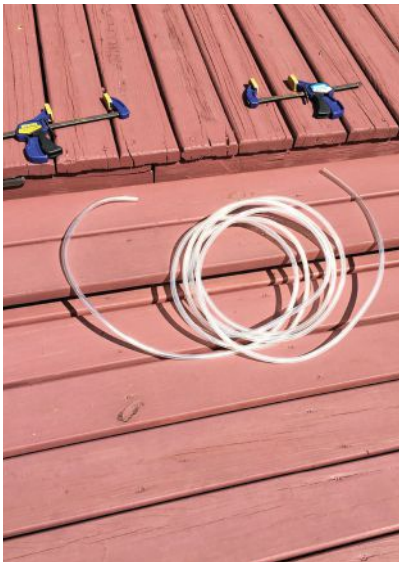

Old-School Water Level

by Steve Pincket

As a one-man crew working in a historic district, I often rely on old-school tricks and tools to get the job done. One of these is my trusty water level, which is simply a length of plastic tubing filled with water. It is much cheaper than a laser level or transit, it doesn't require another crew member to operate it, and it can even be used to establish a level around corners.

Before filling the tubing with water (or a colored fluid, such as nontoxic RV antifreeze, to make it easier to read), I loosely clamp the two ends of the tube upright so that it can burp out the air bubbles. Then I attach one end to a reference elevation, such as a ledger or rim joist, with a pair of screws. I use a small pistol-grip bar clamp to affix the other end of the tubing to the framing member I'm trying to level with my reference point, adjusting the level of the water in the tubing until it is even with the top of my reference elevation. You have to be careful not to accidentally pinch the top of the tubing closed with the clamp, because then it won't work. Having both hands free with the end of the tubing clamped but within reaching distance makes it easy to move around, especially compared with having to reach for a transit rod or readjusting a laser level. ❖

Steve Pincket owns Clarison Construction, in Lakeland, Fla.

Send Us Your Tips

We want your best deck-building tips. We're partnering with DeWalt to give away a power tool each issue to the reader who sends the best tip to prodeck@hanleywood.com. The prize for the March 2019 issue is a 60-volt cordless wormdrive saw kit. So, write up those tips. Don't sweat the grammar or the spelling—that's what editors get paid for. Take a photo (your camera's best setting, please), or send a sketch on the back of a napkin.

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Flush Deck in Snow Country: Bad Idea?

Q My clients—who are both approaching retirement age—would like their new deck to be flush with the interior floor to make access a little easier. But I've always dropped decks a full step below the door threshold to make snow removal easier and satisfy the building inspector. Is it feasible and permitted by the code to build a flush deck in central New York State's snowy climate?

A Mike Guertin, remodeler, builder, and regular presenter at JLC Live and Deck Expo, responds: There is nothing in the International Residential Code that would prevent you from building a flush deck. That said, I build in New England, and—like most local deck builders—frame decks one step down from inside the house to avoid snow and ice problems. Based on my travels around North America, this appears to be standard practice for decks in heavy-snow regions like the Northeast, Mountain West, and pockets of the upper Midwest. In the rest of the country, however, I've observed that most decks are flush.

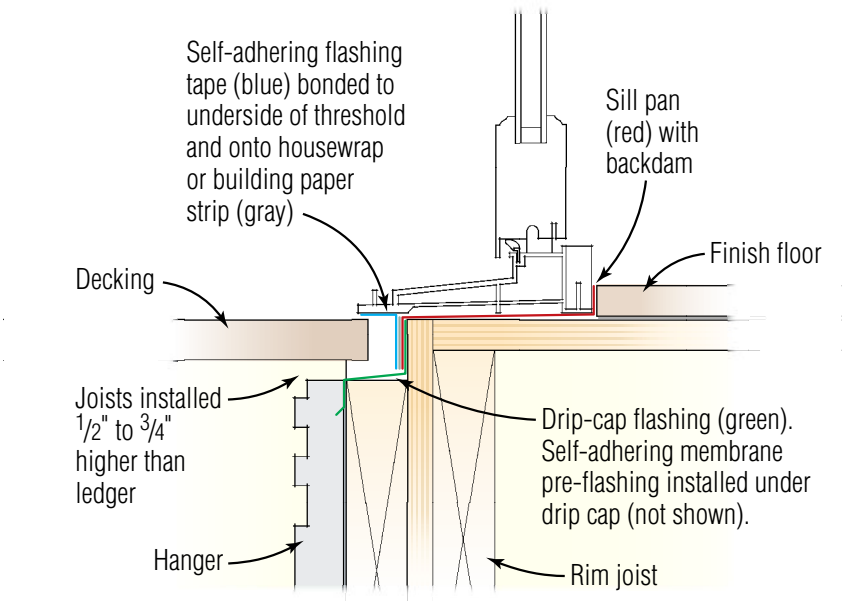
Are flush decks built in heavy-snow regions more prone to water problems at doors than similar decks built in light-snow or non-snow areas? I'm not so sure. I've seen water leaks and rot in the rim-joist area on houses with both flush and dropped decks, and the culprits are usually poorly detailed or nonexistent door flashing and a poorly designed or installed water-management detail along the ledger-to-house connection.

The IRC addresses flashing (Section R703.4, 2018 IRC), specifically requiring that it be installed to prevent water penetration into the wall cavity or structural framing (think rim joist, wall plates, mudsill, and so on). Flashing is also required at doors, installed either according to the door manufacturer's instructions or—when the manufacturer doesn't provide flashing instructions or details—in the form of pan flashing, which must be sealed or sloped to direct water to the finish wall cladding or the water-resistive barrier. Alternatively, flashing can be installed according to a flashing detail designed by a registered design professional (typically an architect or engineer) or according to other approved methods (that is, approved by the local code official).

Section R703.4 also specifically requires flashing wherever exterior porches, decks, or stairs attach to a wall or floor assembly of wood-frame construction. In practice, this means that ledger flashing is essential, as are flashing pans at doors. But because the decking on a flush deck tucks under the door threshold, there is potential for water damming up into the pan flashing—especially when snow piles up on the deck along the door and wall and some melting occurs.

If you are installing a new door as part of the deck project,

Flush Deck Detail



Properly-lapped flashing details that are carefully integrated between a door opening and the deck ledger are critical when building a flush deck in a cold climate. A gap between the deck and the threshold gives meltwater a pathway away from the house.

ILLUSTRATION BY TIM HEALEY

you have a lot of control over how the door is flashed. I recommend a one-piece sill pan flashing—either a preformed sill pan with end dams and a back dam, or a sill pan formed with self-adhering flexible flashing tape—again, with end dams and a back dam.

Unfortunately, under certain conditions, even a leak-proof sill pan won't prevent water from leaking in through the door-to-threshold gasket when an ice dam builds up on a flush deck and meltwater rises above the threshold level. I've only seen this occur under unusual weather conditions (for example, a snow-rain-freeze-rain cycle over the course of a day or two), but here are a couple of methods I use that can help to let water drain down the face of the wall before it ever reaches the door.

The first option is to set the ledger ½ inch to ¾ inch below the level of the deck joists and leave a gap of about ½ inch between the first deck board and the house. The gap will allow water to flow down and over the top of the ledger flashing instead of becoming trapped, as can be the case when the deck board is in direct contact with the ledger and flashing.

Another option is to space the ledger off the wall. You can do this with a ½-inch stack of washers or by installing Deck2Wall spacers. If you feel a wider gap will improve drainage, you can gain a couple of inches of space by installing Maine Deck Brackets or BR Brick Brackets between the house and the ledger, being sure to follow the manufacturer's installation guidelines. With any of these approaches, remember to leave a gap between the decking and the door threshold of about ½ inch so the water can flow through.

Finally, even if the deck is in a low-snow or no-snow region, you can reduce the chance of wind-driven rain leaking under the door threshold by lapping the door sill pan's face flange over the top of the ledger flashing (if a new door is part of the deck build).

In addition, installing a high wind skirt can help deflect water from the vulnerable subfloor-to-threshold joint. Instead of just using a bead of sealant at the joint, apply a piece of flashing tape to the underside of the door's threshold projection and fold it down over a strip of housewrap or tar paper along the wall that laps over the top of the ledger flashing, as shown in the illustration on page 5. The strips of tape and housewrap against the house let any water that has collected in the sill pan drain, while blocking water from entering the joint. ❖

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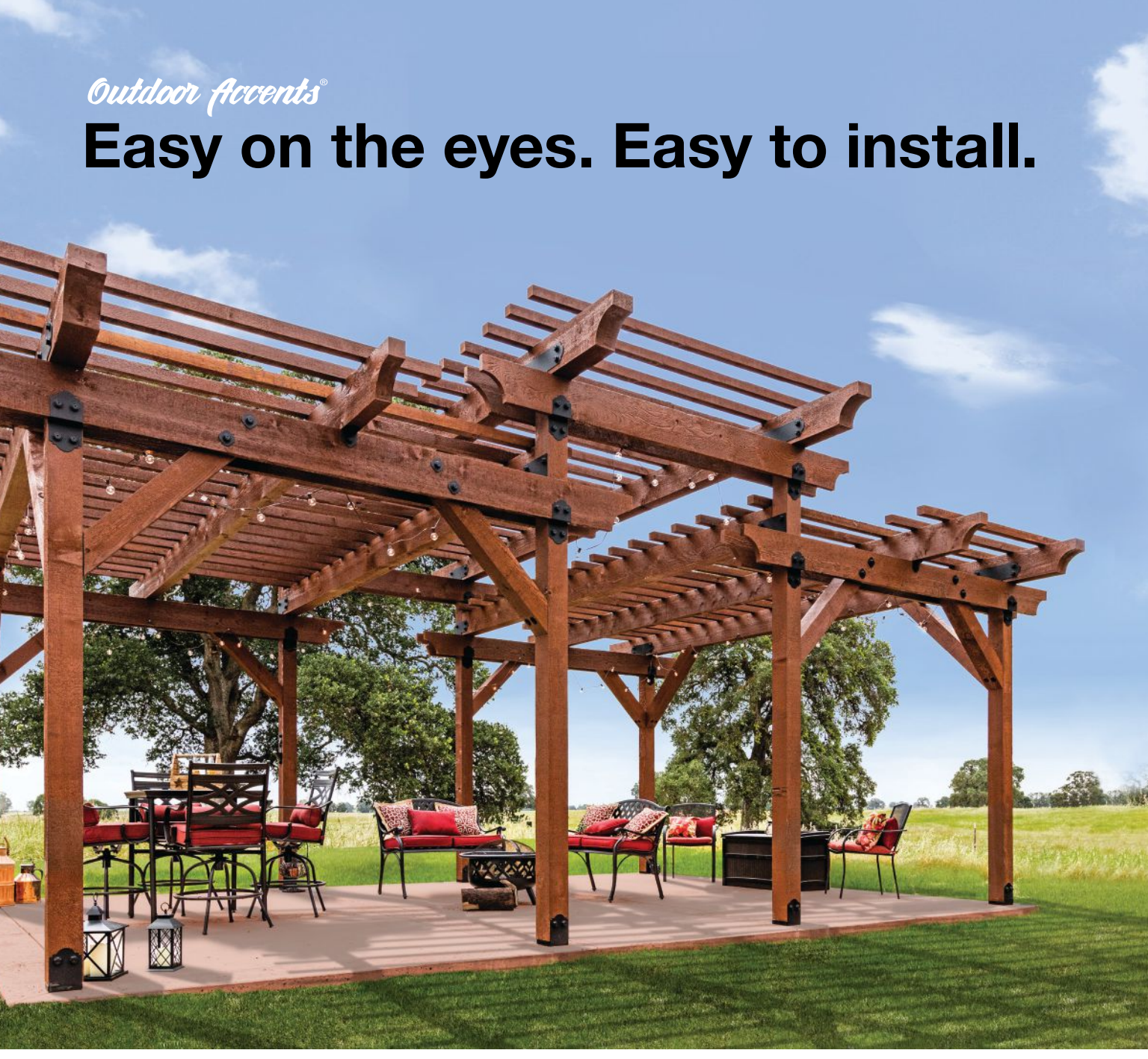

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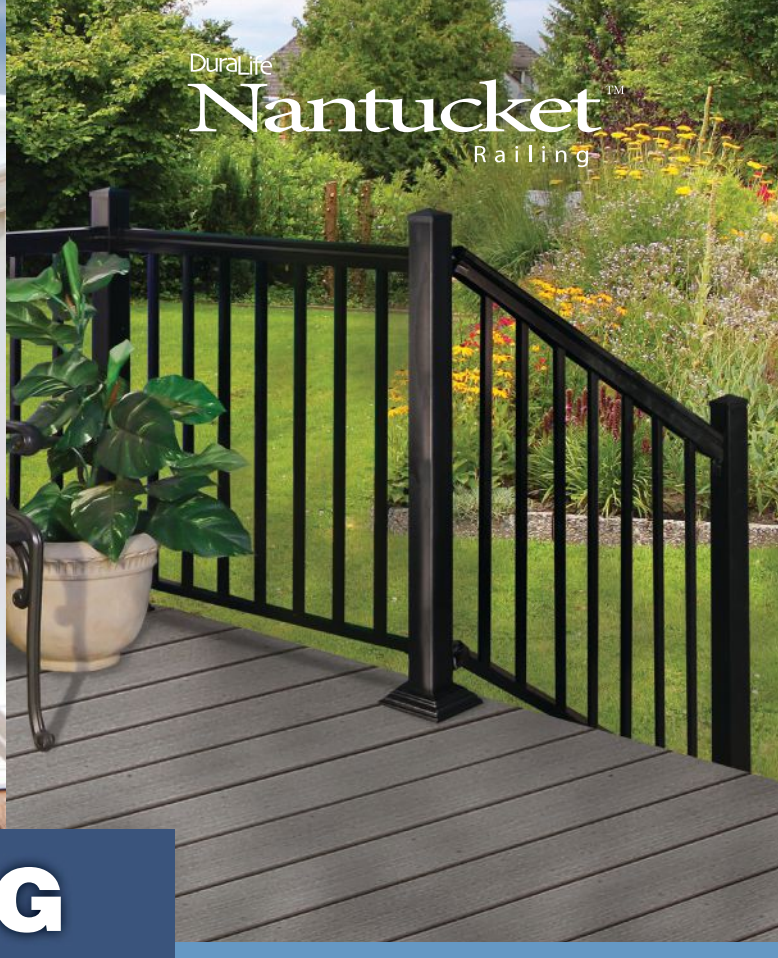

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Homeowner-Driven Deck Design

by Gary Daley

Think of an empty backyard as a blank canvas (inset), and let your clients guide you as you design their dream deck.

How do we get from "here"—the homeowner's bare backyard—to "there"—a successfully completed deck project that accomplishes the homeowners' design goals? Simple ... we ask the homeowners for their guidance.

One of the lessons I learned in my career at America's DeckBuilder, the company I founded in 1999, is that homeowners usually know what they want, even if they don't know how to articulate it. The trick is to ask the right questions and learn how to read your clients' cues.

Start With a Checklist

Information gathering should start with the first phone conversation. My company developed a simple checklist that we used to collect not only the contact information of prospective clients but also basic details about their project goals.

One of our first questions was whether there was an existing deck. If there was, we asked if the caller wanted to replace the deck, or if they were simply looking to resurface it. If the latter, we politely declined the job. In our experience, it wasn't profitable to try to bring existing framing up to code and make it safe.

We also wanted to know if the prospects were interested only in PT wood decking or if they were willing to consider manufactured decking. To help them get focused, we would ask them if they had done any research or seen any decks that had inspired them. In addition, we wanted to know whether the deck would be elevated, which would open up more material and design options for our clients.

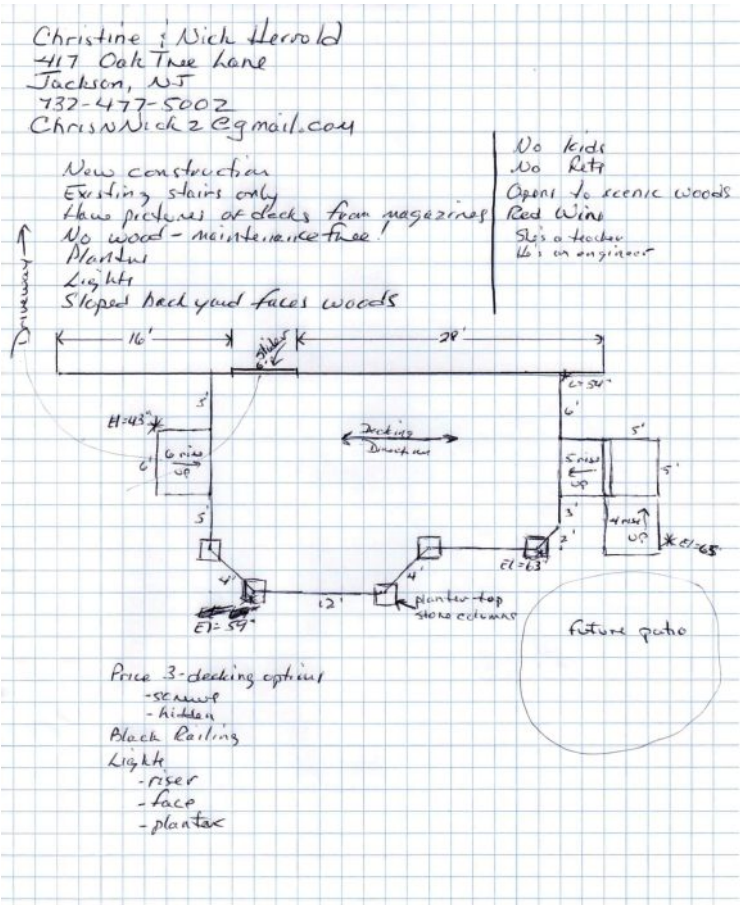
Finally, we noted how our clients found out about our company. Knowing whether they found us on the internet, through a referral, or through advertising helped give us a better idea of where to target future marketing efforts.

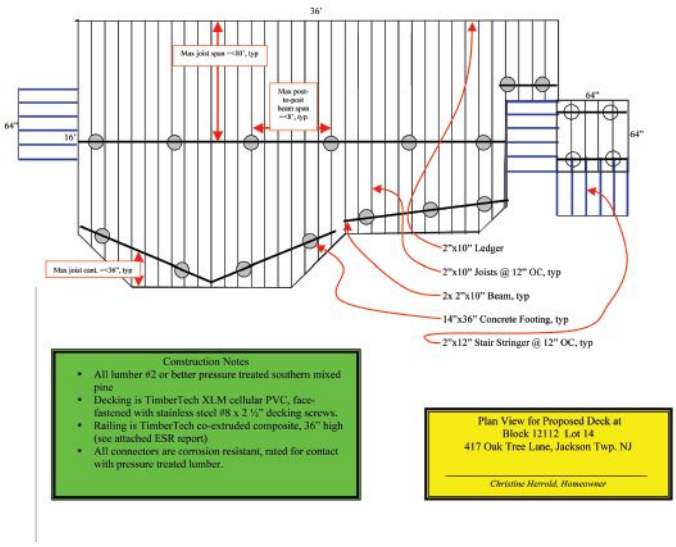
There is probably software or an app that helps collect and organize this information, but it's not necessary. Our system wasn't fancy: We wrote the information on graph paper, which we could add to later as we learned more about our client and worked on their design.

Schedule an Appointment

When setting up appointments for my first site visits, I wanted to make sure that all of the decision-makers would be present. Sometimes, a wife would make

PHOTOS BY GARY DALEY





The author kept track of project details on ¼-inch-square graph paper, including basic contact information, jobsite notes and dimensions, and sketches (top). Later, he used this information to prepare a working drawing of the design (bottom).

the initial contact, saying, "My husband asked me to meet with you first." While I tried never to make assumptions about partners, I always explained that I would be providing a boatload of technical information at our meeting, and I needed both partners to hear my presentation and be able to ask follow-up questions.

I also tried to schedule times when there would be as few distractions as possible. I like kids, but I tried to meet parents when their kids were otherwise occupied.

Even before meeting up personally, I was on the alert for red flags. The first one was any mention of the word "budget." I didn't consider myself a budget-priced builder, and I wanted to make sure the visit would be worth my time. It's important to know what your niche is.

Another red flag was the desire to save money by using PT decking. There are valid reasons for choosing PT wood over other types of decking, but saving money isn't necessarily the best one, after factoring in maintenance costs and longevity and measuring anticipated resale value. Homeowners who were simply looking for cheap weren't our kind of customer.

The First Site Visit

When I first arrived at a potential client's house, I tried to make a good impression. Some might argue that showing up directly from the jobsite wearing jeans and a T-shirt covered in sawdust screams "authenticity." I think showering, shaving, and wearing clean clothes—perhaps with a company logo that matches the logo on your vehicle—screams "professional." I wanted prospective clients to trust me and to think of me as their deck expert.

I made it a point to be on time and to come prepared with a good tape measure (I left the ratty ones on the jobsite), ¼-inch graph paper, an architect's rule, and some pencils so that I could sketch out designs right there. Of course, I also brought along a laptop with pictures of our work. To make it easier to find specific examples, I arranged the pictures by subject (for example, railings, skirting, lighting, stairs, and the like) in separate folders. I also kept product samples in my vehicle, so that clients could actually see and handle them.

The Consultation

I liked to control the "job interview" by having our conversation outside where the deck would be

On the completed project, two sets of stairs from the deck to ground level created both visual interest and a more efficient traffic pattern.

located and by asking lots of questions. While taking measurements and jotting down notes, I "grilled"—in a friendly way—the homeowners about the size of their family. I also asked if they liked to entertain, and if so, I asked about the size and frequency of their parties. I wanted to know what the neighbors were like, too, to find out if privacy would be an issue, or if they were trying to preserve the view.

While listening to my clients' answers, I tried to read their reactions and interactions with their spouses. People don't always say what they're thinking, and if I sensed a disconnect, I'd follow up with additional questions.

Meanwhile, I would take reasonably accurate measurements of the back of the house, noting elevations and major features that I would sketch out on graph paper. I then would use the clients' answers to my questions to draw a preliminary design following my general principles of traffic flow. At this point, I wasn't too worried about nailing all the details, and I continued to take notes for later reference.

Boiling Deck Design Down to the Basics

When I designed a deck, I liked to break down the process into three basic components:

- Aesthetics
  - How will the deck look?
- Economy
  - How much will it cost?
- Function
  - How does the deck work?
  - How does traffic flow?
  - Where does everything go?

In my initial designs, I always focused first on function and the way people would use the deck, knowing that cost and appearance would later play a role in my customers' final decisions. My goal was to include both traffic routes and static areas where relaxation could happen without interruption. Whenever possible, I liked to route traffic flow away from the middle of the deck and along the house or towards the perimeter of the deck. If there was deck furniture or a grill or cooking area, I made sure those areas didn't interrupt the flow of traffic.

If there were stairs, I located them against or near the house, and oriented them so they led toward a destination, such as a basement entrance, a pool, the driveway, a play area, or even nearby woods.

Unless I was designing to fit specific furniture or a feature such as a hot tub, I never split elevations on decks with less than 500 square feet of surface area. This may look good on paper, but in practice, the split level sacrifices function for aesthetics.

I also strove to minimize waste in my deck designs. For example, if there would be a picture-frame border, I sized the deck so that it measured 20 feet 10 inches wide instead of an even 20 feet, allowing me to use full 20-foot deck boards within the border.

Typically, I would be able to sketch out a basic design during our first meeting, using my clients' reactions to that sketch to either modify the initial design or totally start over. This is when we would talk more specifically about materials, railings, lights, and other features that would have a major impact on the appearance and cost of the project.

Before leaving, I would have a pretty good idea of what the final deck design would look like and have sketches and notes on my original contact sheet to complete the working drawing back in my office. Later, I would schedule a follow-up meeting, when I would bring my soon-to-be new customers wine or beer and something for their kids, which always made it easier for them to sign the contract so that we could get started on building their new deck. ❖

Gary Daley is now North East Regional Sales Manager for Green Bay Decking, and a former director of NADRA.

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Wintertime Deck Building

by Peter Ciaraldi

PHOTOS BY PROFESSIONAL BUILDING SERVICES

Staying comfortable—and profitable—when the thermometer plunges requires strategic planning, the right gear, and buy-in from both the employer and the employees.

Our family-owned business, Professional Building Services, is an exterior remodeling company based in New Hampshire, just north of Boston. We have multiple deck-building and siding crews, and to attract and keep good employees, we offer good benefits and incentives, including the opportunity to work full time year-round.

But New England winters can be harsh, with double-digit negative air temperatures and even lower wind-chill factors. A couple of years ago, we had to deal with more than 9 feet of snow in a single month. To keep our decking crews operating efficiently 12 months of the year, we've had to adopt some wintertime tactics that keep our crews comfortable (mostly) without sacrificing too much efficiency.

Selling the Work

Although we would all like to do an equal number of projects each month to balance out the work over the year and provide a steady cash flow, there are busier and slower times here in New Hampshire. In early spring, the phones ring off the hook with people trying to get a new deck completed before a graduation, a backyard wedding, or some other event. In the fall and winter, of course, nobody is thinking about a new deck—and that is when salesmanship comes into play.

We explain to customers that winter is a perfect time to build a deck, because it's less noisy (windows are closed, and the snow muffles the sound) and it's safer (most children aren't out playing in the backyard). The biggest lure, however, is that come springtime, our crew will be long gone, and the homeowners will be able to enjoy their new outdoor living space the very second the weather allows, instead of having to wait for us to even get started, especially for larger projects.

We generally have a one-to-two-month backlog, so we start our winter planning in August. Since our clients' outdoor season usually ends in late October or early November, this is when we schedule any necessary demo work of existing decks. We also try to schedule all the foundation work—typically 20 or so projects—in November and December before the ground is too frozen, even though we won't start many of them until later in the winter. We have some flexibility, though, because 90% of our projects use helical piles, which our subcontractor is able to install year-round.

We hold off on dropping stock until we are ready to start framing, and will generally do multiple drops of framing, decking, and railings, depending on the size of the particular project. We make sure our suppliers are well equipped with tarps when they leave the yard, with instructions to cover the load if no one is on site when they deliver it. We also ask them to make sure that materials are up off the ground and well supported by dunnage.

If we're building an elevated deck and we have to provide a second means of egress, we will build a temporary set of stairs out of KD wood or plywood, as we need it to last only a short period of time.

Keeping Warm and Dry

In October, days when it reaches only 30°F feel horrible, but come February, when the thermometer reaches 30°F, it feels like a heat wave. Our crews have

to learn to acclimate themselves to the weather, but we also do everything we can to keep them warm and efficient.

During the interview cycle, we make sure that potential employees know that we work outside 12 months a year. In our regular safety meetings, we discuss frostbite and strategies for staying warm, and on days when it's particularly cold, the on-site supervisor regularly monitors the crew for signs of distress. If needed, he'll call for a mandatory warm-up period.

Having the right winter work gear makes a big difference in how productive you are in the cold. We supply jackets, hats, gloves, sweatshirts, and undershirts, and train our crews how to dress in layers. Some in our crew have electrically heated jackets that plug into DeWalt battery packs, and if they prove to be durable, we may add them to the list of work wear we supply.

Most of our guys do not like bulky work gloves, as they can't grip a nail or screw. But we've found a couple of brands that work pretty well, including Ironclad Cold Condition gloves and Atlas Therma Fit gloves. The Atlas gloves are probably not as warm and a little less expensive, but seem to be preferred by my crew, who find them a little easier to work with.

As anyone who has put up siding underneath dripping eaves can tell you, wet weather is often worse than cold weather, so we will tarp a site if the wind isn't blowing too hard. Our crews also have pop-up 10x10 shelters that they can set up on site to keep the saws and equipment dry. Each of our work trailers is equipped with a snowblower, shovels, and leaf blowers for clearing off snow.

Tools of the Winter Trade

To make sure the crews have fresh battery packs in the morning, the foremen bring all tool batteries back to the shop for overnight charging. Sticking with a single tool platform—DeWalt's Flexvolt 20V system—makes keeping track of the 15 to 20 battery packs that each crew uses easier.

The author supplies his workers with cold-weather gear. When it snows, crews are equipped with snow-removal equipment and pop-up shelters to keep work areas dry and snow-free.

Smaller, oil-free electric air compressors work better in the cold than larger, oil-lubricated compressors, so we use them more often in the winter. When it's super-cold out, the larger compressors just won't turn over without the help of blasts of hot air from a torpedo heater. To keep our nailers operating smoothly, we use cold-weather air-tool oil, an antifreeze lubricant designed for use only when temperatures dip below freezing.

If the homeowner allows it, we sometimes keep tools and supplies in a foyer or a garage to keep them warmer. If this isn't an option, we have plywood warming boxes that we've insulated with rigid foam and wired with an outlet so that we can heat them with a light bulb.

A large number of our decks are customized, and they often feature curves. In the past, we tried bringing our Trex ovens to the job and bending decking and rails on site, even in very cold weather. But heat-forming in the winter is difficult because it takes quite a while to heat a literally frozen board enough to bend it. And, in sub-freezing weather, the working time while the heated board remains pliable is greatly reduced. Now we do as much bending as possible off site by making patterns on site and transferring them to our jigs back in the shop.

The Bottom Line

Are we as efficient in the winter as we are in the other seasons? Of course not, but we've tried to make our cold-weather jobsites as efficient as possible. When we started working year-round, we probably operated at about 80% efficiency, depending on the severity of the winter, but now we strive for only about a 5% loss in efficiency. Of course, we still have to shovel out a site after a good snowfall, but now we have the equipment to speed the process along, and we delegate that task as much as possible to our lower-priced labor. We've also found that some homeowners will have the site cleared for us when we get back, especially if a storm is on a weekend.

It is definitely not easier to build through the winter, but it's better than the alternative, which is laying people off or giving them a fraction of the hours that we promised when we hired them. We want our team to stay happy and intact, and keeping them busy and paid is critical. As an owner, I feel it's my responsibility to give them a paycheck as long as it's safe to do so. ❖

Peter Ciaraldi is the head of Professional Building Services, a family-owned full-service remodeling company in Salem, N.H.


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Best Decks of 2018

Think you've upped your game? Check out the winners of this year's National Deck Competition

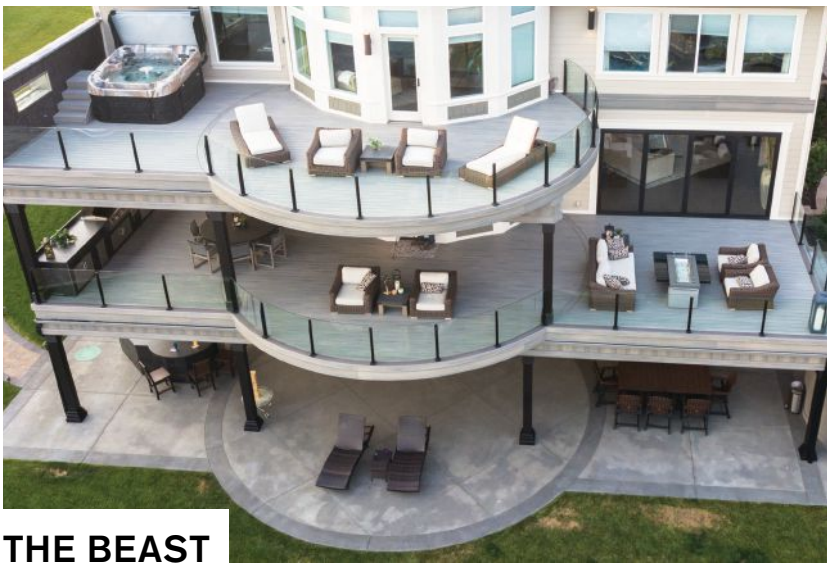
by Andrew Wormer

Every year, NADRA (the North American Deck and Railing Association) invites its members to enter their best deck projects for consideration in its annual National Deck Competition. Inspired by the success of annual deck competitions at the organization's state chapter level, NADRA launched the national event in 2010.

Back then, there were only 10 categories in the competition, including separate categories for wood decks in four different species—pressure-treated, western red cedar, redwood, and "exotic" woods. Compare that to 2018, when there were more than 20 separate categories, ranging from wood decks under $25,000 to virtually unlimited creations that start at $100,000 and go up from there.

That's the category from which judges (full disclosure: I was one of them) selected this year's overall winner (shown above). You can read all about this project and see more winners in the following pages. And if you think you've got game, consider this your invitation to enter your best project in next year's contest.

PHOTOS COURTESY NADRA



THE BEAST

The overall winner in this year's competition is a multistory deck built by Jason Russell (aka Dr.Decks). The sheer scale of the project is what first grabs your attention, and then, of course, there are the curves. Part art, part science, curved decking is one of Russell's signature features. In this case, the challenge was figuring out how to create the curved third-story cantilever that projects 4 feet out from the main deck framing in two directions, without supporting it with a post.

Russell's secret? A 1,200-pound steel girder assembly hidden inside the framing. The girder is hung from the upper deck's ledger at one end and bears on a massive 6-inch-by-28-inch engineered PT glulam at the other end. Another triple 2-by joist parallel to the steel girder provides an attachment point for the girder's shorter cross members and prevents it from rotating. Since a crane could not be used to place the heavy girder, Russell resorted to some hydraulic jacks and some manual cranking lifts to carefully raise the assembly into place.

Engineered framing allows for long spans, so Russell maximized those spans to preserve the views from the deck and used engineered laminated posts to minimize the number of columns needed to support the long beam spans. Custom curved glass panels—which also enhance the view—were fabricated to conform to the radius of each railing section, while each deck level was waterproofed with an EPDM membrane system.

Other features of the deck include a see-through fireplace and infrared heaters, a hot tub on the upper level, extensive LED lighting, and a wireless sound system. Finally, there's a compact outdoor kitchen upstairs, and a second, larger one with heaters downstairs for larger gatherings.

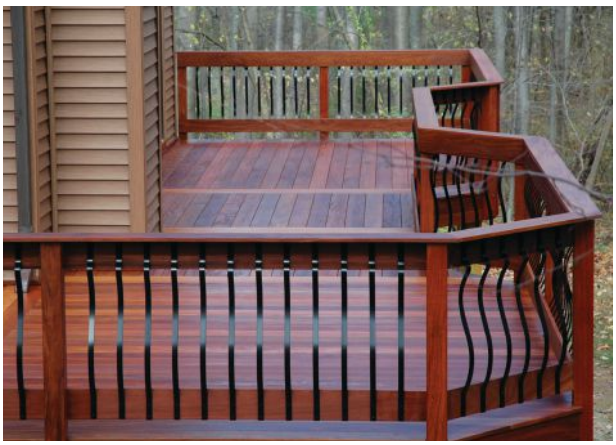
>> Jason Russell/Dr.Decks LLC Tacoma, Wash. **> Manufacturer Partner:** Wolf Home Products

Crop Circles. Underneath this deck are three septic tank ports, which require occasional access. Instead of ruining the deck's circular geometry with square hatches, Jason Russell heat-formed the Azek decking to create three removable round deck panels with an incredible 13-inch radius. To make them, Russell devised an entirely new method of deckboard bending that involved a hot immersion tank, proprietary technology, and a significant investment in time and money. The removable round deck panels are held together with a fiberglass backing material.

REFINED WOOD DECK

Made of Brazilian teak, this 900-square-foot deck was built to replace a couple of tired, old PT decks. Builder Brendan Casey used transitions and inlays to eliminate butt joints in the random-length Brazilian teak decking, rounding over every cut to match the edges and sealing them with wax. The stairs have ripped slat-style treads to allow for better drainage and air flow.

To give the Brazilian cherry posts and teak rails a furniture-like finish, Casey sanded the wood all the way down to 1,500 grit, then prefinished everything on all four sides with Messmer's oil finish prior to installation. After completing the installation, Casey washed the entire deck, dried it, and applied a second coat of oil. Low-voltage LED lights were added to highlight the elevation changes.



>> Brendan Casey/Casey Fence and Deck Keedysville, Md.

Curve Appeal. With homeowners who love to entertain, this curved staircase accommodates an existing landscape feature that couldn't be moved, while enabling guests to flow from the upper to the lower deck. Builder Sean McAleer laminated the semi-circular stringers and prefabricated the stairs offsite, a process he says was only slightly less difficult than transporting the assembly to the jobsite. The staircase has Zuri treads and black custom powder-coated aluminum rails to contrast with the white PVC skirtboards and risers, accentuating the dramatic flow of the stairs.

BEACH HOUSE

Builder Bob Kiefer combined ipe decking with PVC rails and recessed panel posts to give this Staten Island home its beach-house look. Kiefer says he installed the ipe decking in a herringbone pattern on both the main deck and the small balcony off the master bedroom to create the feeling of being down on the boardwalk. All details were covered from top to bottom, including wrapping all posts underneath and scribing radii on the beam wraps. Just like Grandma's home cooking ... even the lattice panels were made from scratch!

>> Robert Kiefer/Decks by Kiefer Martinsville, N.J.

Power Screens. Hidden behind the ipe trim that wraps the beams of this porch are motorized screens, while tracks cleverly concealed in the ipe-wrapped columns guide the screens as they are raised or lowered with the press of a button. Builder Sean McAleer designed the open gable with custom glass and Velux skylights to flood the porch with natural light whether the screens are up or down.

THE BOATHOUSE

Designed to mimic the style of the clients' home, this dock and boathouse features composite decking, Boral trim to match the house, and custom-fabricated in-ceiling boat and personal watercraft lifts hidden behind stained T&G ceiling boards. For entertainment, builder Jason Varney equipped the boathouse with recessed LED lighting and a Control4 smart home sound system.

>> Jason Varney/Dock & Deck Lenoir, Tenn.

WHAT'S OLD IS NEW AGAIN

Transforming an unused corner of a 100-year-old home into a new porch with a TV and hot tub, gourmet kitchen, and patio dining area while getting approval from the historical committee wasn't easy, says builder Sean McAleer. Working with the existing windows and bump out, he removed a small, existing slate roof and replaced it with a larger, flat metal roof to create a functional space with modern amenities in a yard that was dominated by a pool. To blend with the existing structure of the house, the finish work features oversized moldings and other traditional details.

>> Sean McAleer/DeckRemodelers.com Sparta, N.J.

Jigsaw Puzzle. Calvin Cerilli of Blue Chip Decks says that part of the challenge in building this cedar pergola is the fact that all the rafters are interconnected. Through a process of trial and error, Cerilli cut and dry-fit everything before assembly to make sure the pieces fit neatly into place. The LED post lighting is controlled by a photocell timer.

CELTIC KNOTS

>> Calvin Cerilli/Blue Chip Decks Winnipeg, Manitoba, Canada

This two-tier deck is supported by helical piles and features a handcrafted cedar pergola with arched rafters that were bent-laminated on site. Builder Calvin Cerilli says that, thanks to careful craftsmanship and accurate jigs, there was no more than 1/4-inch deviation from one arched rafter to the next. The pergola is accented by a custom laser-cut palm-leaf panel powder-coated with a rustic oil-rubbed bronze finish.

The Zuri decking is picture-framed and includes a pair of Celtic knot inlays woven into the border. Dimmable Trex LED lighting in the pergola posts, the mitered border, and the stair risers is controlled by a handheld wireless remote.

SIMPLE GEOMETRY

Mark King of Infinite Decks designed this project to fit around the landscaping that was already in place. The homeowners wanted two distinct areas to dine and entertain, and chose King's design over a handful of designs from other contractors. The project features Wolf PVC decking with Azek PVC Trim, and a custom aluminum railing with cable infill and under-rail lighting. The deck is supported by Goliath Tech Helical Piers.

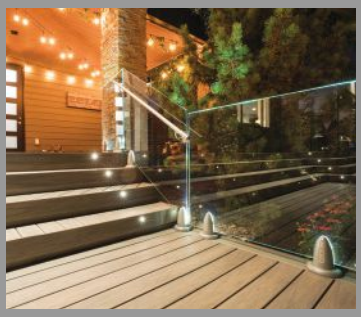
>> Mark King/Infinite Decks Lakeville, Minn. / Official Partner: Wolf Home Products

COMMERCIAL SUCCESS

Builder Pat Noonan's company—which specializes in prefabricated deck construction—built this project in an outdoor sculpture garden in front of Claes Oldenburg's iconic Spoonbridge Cherry exhibit, in Minneapolis. Because of the park's concert schedule, Noonan only had three days to install the deck ... using no heavy equipment. Prebuilt sections were hand-wheeled into place with a custom-built 16-wheeled cart for weight distribution, while steel pipes and hydraulic jacks were used to lift the sections off the cart and transfer them to the prebuilt foundation.

The 18-foot-diameter deck features intersecting inlays at different angles, a rounded half wall with vertical decking on both sides (to hide photography equipment), rounded border and safety railings, rounded stairs, and a custom-made PVC center circle with inlaid logo. Noonan used three different colors of TimberTech Legacy decking with hidden fasteners, changing the orientation of the decking more than a dozen times with different intersecting pieces. Skirting around the base of the deck ties in with the different inlays to create a dripping effect over the side.

>> Pat Noonan/Deck and Basement Co. Richfield, Minn. / Official Partner: Azek Building Products



Like Light. During the day, this Regal Ideas Crystal Rail virtually disappears. At night, the deck is illuminated by the frameless glass system's integral lighting and In-Lite LED stair lights. The project, built by Jason Russell, was the Illumination category winner.

Finishing Touch. The original structure was a multi-zone 385-square-foot deck featuring a larger area for general traffic and a raised portion for dining. To add a unique touch to the deck, builder James Baldwin added a third Trex Transcend color to the palette in the form of an inlay in the middle of the larger area.

THE PEOPLE'S CHOICE(S)

While a panel of judges selected all the other deck competition winners, People's Choice winners are selected by their peers. This year, Jason Alloway of New Castle Building Group won the Builder Project award for this 850-square-foot Trex deck (top photo), which was built over a Trex Elevations steel frame supported by helical piers. In addition to an elevated hot-tub deck with gable roof overhead, this project features artfully placed curves.

>> Jason Alloway/New Castle Building Roswell, Ga.

In the Manufacturer Project category, NADRA members chose this expansive tropical hardwood deck (bottom photo), which was designed by RiverWorks Design Studio and built by Alexander Homes, both based in Muscle Shoals, Ala. The project was submitted by Feeney, which supplied the DesignRail aluminum railing system. Note the continuous wood top rail, a key element in the deck's design. ❖

>> Feeney/RiverWorks Design Studio Muscle Shoals, Ala.

2018 NADRA National Deck Competition First Place Awards

> **Wood Deck Under $25k**: Blue Chip Decks
> **Alternative Deck Under $25k**: Infinite Decks/Wolf Home Products
> **Limitless Creation Under $25k:** SelectDecks/Trex Co.
> **Wood Deck $25k–$50k:** Casey Fence and Deck
> **Alternative Deck $25k–$50k:** Dr.Decks LLC/Azek Building Products
> **Limitless Creation $25k–$50k:** Blue Chip Decks
> **Wood Deck $50k–$100k**: Decks by Kiefer
> **Alternative Deck $50k–$100k:** Deck Remodelers.com
> **Limitless Creation $50k–$100k:** Deck Remodelers.com
> **Alternative Deck Over $100k:** Dr.Decks LLC/Wolf Home Products
> **Limitless Creation Over $100k:** Dr.Decks LLC/Wolf Home Products
> **Open Porch:** DeckRemodelers.com
> **Dock:** Dock & Deck
> **Unique Feature:** DeckRemodelers.com
> **Illumination:** Dr.Decks LLC/Regal Ideas and Wolf Home Products
> **Refurbished/Restored Deck:** Casey Fence and Deck
> **Commercial Outdoor Living Project:** Deck and Basement Co./Azek Building Products
> **The Greatest Showroom Under 3,000 square feet:** PMC Building Materials/Trex Co. and New Castle Building
> **The Greatest Showroom Over 3,000 square feet:** Pro Deck Supply
> **Manufacturer Project:** Feeney/RiverWorks Design Studio
> **People's Choice Award - Manufacturer Project:** Feeney/RiverWorks Design Studio
> **People's Choice Award - Builder Project:** New Castle Building

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5

Before
1


2


3


4

California Style

by Michael Walter

While my clients' home in the northern hills of Orange County, Calif., has outstanding—and expensive—views, their existing deck was dated and leaked like a sieve onto the patio below. Since they (and their pets) use the ground-level slider underneath the deck to access their pool and backyard, the homeowners did what they could to shield the doorway from the rain with a makeshift deck cover made of plywood and caulking (**1**).

But the old deck's bigger problem was its ledger, which had been bolted to the house framing over the home's three-coat stucco siding and caulked to the stucco instead of being properly flashed. Not only was this a bad idea structurally, it also created entry points for water to penetrate the stucco and get inside the framing. A permanent fix to all of these problems was needed on a home of such value.

We removed the old 2-by decking and deck framing, then cut through the stucco back to the rim joist before installing our new ledger (**2**). After bolting the ledger to the framing and installing proper flashing, we called in our plasterer, who patched the area around the new ledger using Rapid Set stucco mix. Fortunately, the home had recently been painted, making it easier for us to match the paint color after the plasterer got it close with his last color-coat of plaster.

After re-framing the deck (the footprint of the new deck is close to that of the old one), we installed a Trex RainEscapes deck drainage system (**3**). Integrated with the ledger flashing, the waterproof membrane completely protects the ledger and deck framing and creates a perfectly dry area underneath the deck for both people and pets. Next, we installed Trex Transcend decking and a matching railing with low-maintenance aluminum balusters and low-voltage LED lighting (**4**). Then we finished the under-deck area with PVC trim and a nice ceiling.

When we were done, the new deck matched up perfectly with the existing spiral stairway, columns, and corbels (**5**). ❖

Michael Walter owns MLW Construction, in Anaheim Hills, Calif.

PHOTOS BY MICHAEL WALTER

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JLCONLINE.COM

BY SYMONE GARVETT

1. Weather-Resistant Garage Doors

Clopay's Modern Steel garage doors incorporate weather-resistant features such as insulation (with R-values ranging from 6.5 to 18.4), a vinyl bottom weather seal and aluminum retainer, and impact glass (available in four styles: clear, bronze, matte, and pebble polycarbonate). The company says select models can withstand wind speeds up to 200 miles per hour, when properly installed. A single-car-garage door without windows starts at $700, while a door with windows starts at $800. clopaydoor.com

2. Aluminum Under-Deck System

Designed to keep the area beneath an elevated deck dry, the Haven Underdeck System uses lightweight, durable aluminum panels to channel water to a gutter system and downspouts. The company says that these panels will not rust or become brittle, and individual panels may be removed later without disturbing adjacent ones. Homeowners can choose options such as LED lighting, speakers, swings, and fans. More than 27 colors are available. Pricing varies based on project scope and size. havenunderdeck.com

3. Durable Rod Railing

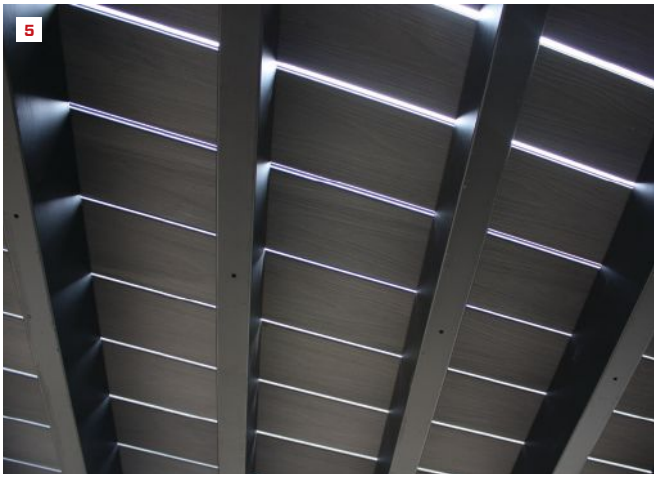
Viewrail's new 1/4-inch rod railing is made with 2205 duplex stainless steel. According to the manufacturer, the rods won't sag and are more corrosion-resistant than marine grade 316 stainless steel. Rods are available in lengths ranging from 2 to 20 feet, in one-foot increments. The railing can be bent to turn a radius on a curved stairway, deck, or balcony. Pricing ranges from $85 to $225 per linear foot. viewrail.com

4. Smart-Home Water Monitor

The Streamlabs Smart Home Water Monitor is a wireless, non-invasive monitor that installs without interfering with the plumbing system. When positioned near a pipe, the monitor uses ultrasonic waves to measure the difference in the "time-of-flight" between two specified points to collect data on the system's water flow and usage activity. It then presents that data via the Streamlabs app, providing early leak detection and water-use readouts. Users may set custom alerts based on specific conditions. The product has a suggested price of $200. streamlabswater.com

5. Sleek Steel Framing

Fortress Building Product's new Evolution light-gauge-steel deck framing features an interlocking joist and ledger system that's engineered to look and install like wood while providing a flat surface that won't twist, warp, rot, or crack. The framing is compatible with any type or brand of decking, including composite, PVC, aluminum, tile, wood, and tropical hardwoods, and is resistant to fire and insect damage. Parts are powder-coated black. Price varies based on project scope. fortressframing.com



6. Modern Electric Fireplaces

Fireplace manufacturer and distributor European Home has expanded into electric with its new Electric Modern name-branded fireplaces. The fireplaces use multicolored LED lights to emulate the look of flames. While this effect produces no heat and requires no venting, an optional heating element is available. Styles include single-sided, corner, and bay (three-sided). Fireplaces are available with log set media and may be controlled through European Home's E-Touch app, or via remote control. Pricing ranges from $2,365 to $5,060. electricmodern.com

7. Eco-Friendly Stone Veneers

Cultured Stone's new Pro-Fit Terrain Ledgestone manufactured stone veneers contain 58% recycled content on average and are made with a closed-loop recycling system that allows reuse of water in manufacturing. Its panelized format allows for easy installation, and it doesn't require painting, coating, or sealing once installed. The low-relief stones in varied textures come in four colors: gray-white, mid-gray, gray-brown (shown), and black-gray. Contact a local distributor for price. culturedstone.com

8. Easy Connect Joining System

The new Easy Connect Joining System for Andersen A-Series windows aims to make it easier to install a variety of large window combinations. Interlocking fiberglass joining plates are applied in the factory, and units arrive ready to install directly into the rough opening and ready to be connected to adjoining combinations. Easy Connect Joining System is tested to AAMA 450 requirements, is WDMA Hallmark-certified for air, water, and structural performance, and is impact-certified for Florida's High Velocity Hurricane Zone. Contact a local distributor for pricing. andersenwindows.com

9. Black Stainless Steel Hood

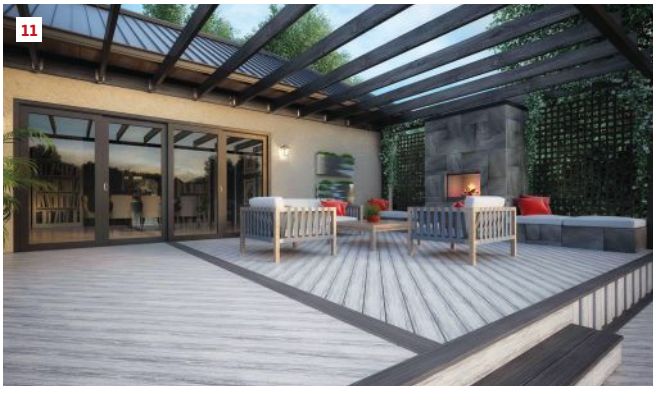
Kitchen-appliance manufacturer Zephyr has introduced a black stainless steel hood in its Ravenna Island collection. A smoke-gray glass canopy curves over island cooktops and has an anti-smudge titanium coating for extra durability and easy cleaning. An energy-efficient "BriteStrip" LED light outputs an even 3,000K warm white color to illuminate the cooking surface, and "Icon Touch" controls, integrated into the canopy, operate the hood's 600-cfm blower. Pricing starts at about $1,700. zephyronline.com

10. Sound-Control Underlayment

Designed specifically for use under luxury vinyl tile and planks—with or without glue—the Protecto Wrap Co.'s new Whisper Mat LVT sound-control underlayment is a primerless, peel-and-stick sheet membrane constructed with a latex rubber sheet and an aggressive block copolymer adhesive. Whisper Mat LVT is CRI Green Label Plus Certified for optimal indoor air quality, and it resists mold and mildew growth, according to the manufacturer. Pricing starts at less than $1 per square foot. protectowrap.com

11. Strong Composite Decking

Deckorators' new Voyage line of composite decking features the company's "Eovations technology," a fiber-like interior structure made from a blend of polypropylene and mineral filler. The manufacturer claims that this configuration delivers the industry's best strength-to-weight ratio, absorbs virtually no moisture, and minimizes thermal expansion or contraction. Voyage also has a protective capstock with textured embossing for improved traction. Voyage will be available in 2019 in 12-, 16-, and 20-foot solid and slotted-edge profiles, as well as in 12-foot fascia. Pricing will start between $4.75 and $4.95 per linear foot. deckorators.com



12. Aerial Map Measurement Tool

Global location content provider Nearmap has introduced a new measurement tool set, called MapBrowser, for the solar and roofing industries. The new tools will allow installers to measure roof pitch, height, width, and area from high-resolution aerial images. The imagery, which can be annotated with drawings, measurements, and notes, can help businesses in construction, painting, and insurance to show context for work being done. Subscription plans start at between $1,000 and $5,000 a year, depending on number of users and projects viewed. go.nearmap.com

Metabo HPT Sets a New Bar for Cordless Versatility

BY CHRIS ERMIDES

As of last month, Hitachi Power Tools officially changed its name to Metabo HPT. While the name change is confusing to some, rest assured that it means very little with respect to the brand. The tools are the same, including battery compatibility and warranties, but will just have a different name on them.

With the name change, the company announced one of the biggest releases in cordless tool technology since the DeWalt FlexVolt wowed the industry in 2016. Metabo HPT's new MultiVolt technology seems similar on the surface, but it is far more versatile. Not only did Metabo HPT come out with a dual-voltage 36V/18V battery pack (available now), it is offering a wide range of 36V tools to go with it. Where things really take off, though, is that in addition to being fully cordless, these 36V tools can alternatively be powered by an optional AC adapter.

FIRST, THE BATTERY

The 36V/18V MultiVolt Lithium Ion Slide Battery (4.0 Ah/8.0 Ah) is composed of 21700 cells (larger in comparison to the 18650 found in Hitachi's 18V batteries) to deliver more than 1,440 watts; the packs offer 4.0 Ah in 36V tools and 8.0 Ah in 18V tools. Yes, you read that correctly: The batteries will work in all Metabo HPT (and, therefore, your existing Hitachi Power Tools) 18V tools. A single battery costs $100.

THE AC ADAPTER

In AC mode, the tools are powered by the company's new ET36A 36V MultiVolt AC Adapter. Unlike the MultiVolt Battery, the AC adapter is not backwards compatible, so it will only work on 36-volt tools. It has a 20-foot cord with an inline inverter located about 5 feet from the plug end. As an optional accessory, the adapter costs $150.

THE NEW TOOLS

Before now, DeWalt's FlexVolt miter saw was the only tool that offered users the ability to run on either a cord or a battery. But the Metabo HPT MultiVolt battery platform runs a wide array of new 36V tools, including a 10-inch dual-bevel sliding compound miter saw, hammer drill, rotary hammer, sidewinder circular saw, recip saw, grinder, impact driver, and high-torque wrenches. When you purchase each of these tools, you'll have the choice to receive either the AC Adapter *or* a Cordless Starter Kit (single MultiVolt Battery and Fast Charger; Metabo HPT says that from November 1 to December 31 this year, you will receive an extra 36V battery free when you register the tool online).

Metabo HPT also revealed a couple of other 36V tools that it plans to release within the next year. One of those is a 10-inch jobsite table saw closely modeled after the latest C10RJ. The manufacturer said it will be available by the end of 2018. Additionally, Metabo HPT announced a 36V Brushless 7¼-inch dual-bevel sliding compound miter saw that will be manufactured in Japan. This saw is expected to sell for about $1,100 and will be released in 2019.

Chris Ermides is the editor of Tools of the Trade. *Follow him on Instagram @toolmagazine.*

Cordless or corded? With Metabo HPT's new MultiVolt line, you have the option of running the tool on a battery or plugging it in, with no drop-off in performance.

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

A Cordless Cable Stapler

DeWalt has a new cordless stapler set to be released in early 2019, this one aimed specifically at electricians. The 20V Max Cordless Cable Stapler (DCN701D1) fires DeWalt's UL Listed DRS1800 3/4-inch-wide-by-1-inch-long insulated staples that come 540 to a box. A specially designed nose that's equipped with an LED light straddles NM-B cable (double-stacked 14-2 to double-stacked 10-2, and single 10-3); the stapler will fire only when it is properly engaged over wire to prevent misfiring into the cable itself. At 4.7 pounds (without battery), the stapler is a little heavier than it looks, but it felt very well-balanced the few times that I shot it at the STAFDA show.

One aspect that might take some getting used to is that the handle is larger than on most cordless nailers and staplers. DeWalt says that's because the gun's motor is housed there. Even with a beefier handle, it's far better than hand-stapling. The gun works with low-voltage wire as well. It will come kitted with one 2.0-Ah battery for $250 or bare for $200. —*C.E.*

A cordless alternative to hand-nailing electrical-cable staples, this stapler has a specially designed head that straddles wire up to #10-3. A safety nose within the head engages only when depressed on cable, ensuring no misfires or errant staples into the cable's sheathing.

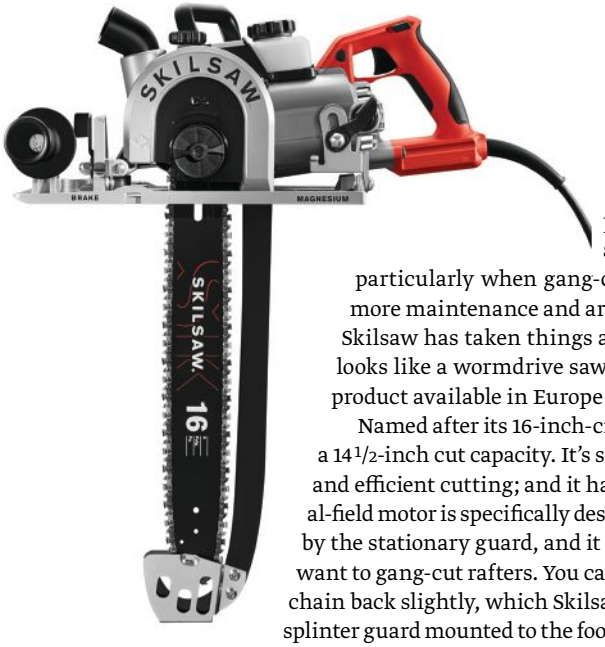
The Keen Utility San Jose is a classic-looking wedge-style boot that is available with or without an aluminum safety toe. The boots have proven to be both comfortable and lightweight so far.

Lightweight, Comfortable Wedge Boot

A few years ago, I reviewed a wedge-style boot from Keen Utility, called the Davenport. They were very comfortable boots that were also as heavy as a pair of cinder blocks (now they're discontinued). All boot and shoe manufacturers have complete misses sometimes, so I don't fault Keen Utility for that one—it has made other great footwear for the jobsite. In fact, I applaud the company for taking another stab at the wedge style with its San Jose—a classic-looking leather work boot with wedge-style outsole.

At first glance, and after spending a few weeks in the San Joses, I'm impressed. The double-stitched, unlined leather uppers are suppler than those on competitive brands and make the boots quite comfortable right out of the box. The welted outsole is abrasion-, oil-, and slip-resistant; it's also siped for added traction. While the softer leather seems durable, these boots don't provide much ankle support, so if you roll your ankles easily, I wouldn't recommend them. After wearing them for a while, I noticed some discomfort on the outer edge of my feet, which I learned was due to inadequate arch support. Replacing the insoles that come with the boots with Keen Utility's K-20 Cushion Footbed remedied the issue, and now they're as comfortable as any other boot I've worn. They're also lightweight.

The San Jose is available in black, falcon, and gingerbread with an aluminum safety toe (weight: 25.8 ounces; cost: $155); gingerbread is available in soft-toe as well (weight: 22.8 ounces; cost: $150). —*C.E.*



A Chain Saw Fit for Carpenters

Before the invention of the Prazi Beam Cutter adapter a little over 10 years ago, cutting large beams typically meant making multiple passes with a circular saw or using a gas-powered chain saw. There are footplates available for chain saws that improve their accuracy, particularly when gang-cutting rafters and floor joists, but gas-powered chain saws require more maintenance and are louder than circular saws, so some framers tended to not use them. Skilsaw has taken things a few steps further by creating a dedicated carpentry chain saw that looks like a wormdrive saw (it is, at its core) with a chain added to it. (Festool has had a similar product available in Europe for many years.)

Named after its 16-inch-circular-saw cousin, the 16-inch Sawsquatch Carpentry Chain Saw has a 14 1/2-inch cut capacity. It's self-lubricating; it features a 56-tooth full house chain for more precise and efficient cutting; and it has on-board tool-less tensioning controls. Skilsaw says the 15-amp dual-field motor is specifically designed to keep the motor cool during use. The end of the bar is supported by the stationary guard, and it can bevel up to 60 degrees, making the saw a legitimate choice if you want to gang-cut rafters. You can raise the unit slightly up from the footplate, setting the angle of the chain back slightly, which Skilsaw says helps make for a more accurate cut. There's also an adjustable splinter guard mounted to the footplate to minimize splintering. Depth of cut at 90 degrees is 14 1/2 inches; at 45 degrees is 9 3/4 inches; and at 60 degrees is 6 7/16 inches. It comes equipped with a 10-foot cord and adjustable dust port, and includes an auxiliary handle and stand. Cost: $700. —*C. E.*

The 16-inch Skilsaw Carpentry Chain Saw has a massive 14 1/2-inch cut capacity and can bevel up to 60 degrees, making it a viable option for timber framers and stick framers who prefer to gang-cut large lumber.

A Five-in-One Ladder That Won't Wear You Out

Multi-position ladders have been around for a while now, but they have traditionally been extremely heavy. Contractors want lightweight ladders that are durable, strong, and functional (safety is a given), so the weight of multi-position ladders has been a trade-off for their versatility. That's changing, though, with the new fiberglass five-in-one from Werner. These Type 1A multi-position ladders have a duty rating of 300 pounds and feature twist-proof fiberglass rails. Available in 13-foot, 17-foot, and 22-foot reach variations, the ladders can be used as a double-sided stepladder, a stairway stepladder, an extension ladder, a wall ladder, and a scaffold base. The 13-foot FMT-13 weighs 32 pounds and costs $320; the 17-foot FMT-17 weighs 40 pounds and costs $420; the 22-foot FMT-22 weighs 50 pounds and costs $510. —*C.E.*

A new line of multi-position fiberglass ladders from Werner features a Type 1A rating. Weight varies from 32 to 50 pounds, depending on size.

December Advertising Index

BY CHAD TRIPLETT

Layout-Square Modification

One thing that I was taught when first learning wall layout was to fill in the 1 1/2-inch indent on my layout square with liquid correction fluid (like Wite Out). I do this on my Swanson Speed Square, but it can be done on just about any brand of layout square. The white stands out, so with a quick glance, I can easily locate and align the square with marks when I'm laying out wall plates.

I now teach carpentry and require all my students to do this on their layout squares. When teaching layout, we have students draw all sides of every framed wall component. While veteran framers might scoff at the idea of marking both sides of every framing component, we find that the extra effort is helpful for new carpenters and gives students more practice drawing the layout. Using the "Wite Out" trick helps tremendously in this process.

Students who are learning the trade need repetition and practice. Having them thoroughly lay out wall plates also gives them the visual guidance they need when learning to assemble components of a framed wall correctly. And, since we are in an educational setting, doing things correctly is more important than doing things fast.

Chad Triplett is the building trades program coordinator at San Juan College, in Farmington, N.M.

Send us your tips: *JLC*, in partnership with our sister publication *Tools of the Trade* and Milwaukee Tools, is giving away a power tool each issue to the reader who sends us the best trade tip. (Next month, we'll give away a Milwaukee M18 Fuel 7 1/4-inch cordless circular saw, shown at right.) Send tips to JLC-Editorial@hanleywood.com with "Trade Tip" in the subject line. Any building trade qualifies. Don't sweat the grammar or writing; that's what *JLC* editors get paid for. Only entries with high-quality photos can be considered.

Photos of layout square by Chad Triplett

BY ELIOT LOTHROP

The author tops out a restored barn's frame with an evergreen bough or "wetting bush" in Northern Vermont **(1)**. Here, a wetting bush is placed on the ridge of an old barn timber frame **(2)** that was dismantled and moved to a new location to be converted into a residence.

Topping Out the Frame

In the summer of 2001, I took a one-week intensive timber-framing class at the Heartwood School, in Becket, Mass. There, my classmates and I learned how to lay out timbers and cut joinery. By the end of the week, we raised a small timber-framed pavilion and held a "topping out" ceremony where we placed an evergreen bough (more commonly known as a "wetting bush") atop the pavilion's ridge. Our instructors noted this tradition was to give thanks for a safe structure raising and to thank the forest for providing the timber. Now, some 17 years later into my timber-frame restoration career, my crew and I make it a point to celebrate a job well done with a topping out ceremony whenever we finish a frame (typically, one we've dismantled, restored, and then put back together).

Appeasing the trees. Clients often wonder why we go to the trouble of tacking a branch to the top of their frame. As with most traditions that span hundreds of years, the custom's true origins are murky, but what is generally agreed on is that the placement of a wetting bush dates back to 8th-century Scandinavia.

Prior to the adoption of Christianity, trees were commonly worshipped as deities by early Europeans. In Scandinavian mythology, each tree had a spirit of its own; people originated from trees, and returned to trees after death. So, before constructing a home, the builders would formally ask permission from the forest to allow them to harvest a tree for building material. When the home was finished, the tree's highest branch was placed on the highest peak of a newly completed frame in a gesture of appreciation from those who built the home, while also assuring the tree spirit still had a place to live. Over time, these individual tree spirits came to be represented by a single forest god. Evergreen boughs were no longer placed atop a home's ridge to appease many spirits, but rather to elicit the blessings of the forest god.

Wetting bush. The origin of the phrase "wetting bush" (sometimes referred to as "whetting bush") is more apocryphal than "topping out." The phrase is likely derived from the German tradition of "watering a bush" as a rite of passage for the home's first nourishment. The placement of a pine bough symbolized the establishment of the home's roots, which would then nourish and promote a long and prosperous life in the home. I've also been told that pinning the wetting bush to the building meant that it was time for the hearty drinking to begin.

Eliot Lothrop operates Building Heritage, specializing in timber-frame restoration, in Huntington, Vt.

Photos by Eliot Lothrop

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