News of Interest for and from the Connecticut Association of Home Inspectors, Inc.

CAHI MONTHLY NEWS

July 2020 Volume 13, Issue 07

Presidents Corner

Fellow members,

Escape from New York

One positive result from the current Covid-19 pandemic is the massive migration of New Yorkers into the state that is driving the real estate market in Fairfield and New Haven counties. Multiple offers, offers above ask, “cash” deals, etc. are the new norm for the foreseeable future.
Many of our fellow inspectors are feeling the rush and are scrambling to accommodate the large numbers of inspections required. It is not uncommon in my area to be booked two or three deep a day and a week out. Stressful but a good problem to have after the disaster that was April. The sun is shining again and I am trying to make hay.

As the pandemic evolves and continues to change daily life it is important as inspectors to remain careful and vigilante. Many of our members that I have spoken with over the past few months have modified their approach and systems to properly protect all present and involved. Always a people person it was a little strange to be isolated and left alone in many cases to focus on the task at hand and finish with a wrap up with the client at the end of the inspection. To a certain degree I now prefer that approach although the client, in my opinion, benefits less from this approach.

As licensed professionals within the state, being recognized as essential to the real estate industry, was a reverence not to be taken lightly. We as inspectors are a vital part of the home buying process and as such we have contributed greatly to the V shape real estate market recovery that we all had hoped for.

Please go forward safely. Look to provide moments of kindness where ever possible and enjoy all each day has to offer.

As always my direct email is: dkristians@aol.com.

Best,

Dan Kristiansen

MONTHLY MEETINGS – Details & Info

CAHI’s regular monthly meetings are held at the Best Western located at 201 Washington Ave (RT 5), North Haven. Meetings are free to members. Most meetings are on the fourth Wednesday of the month from 7-9pm. Guests are always welcome! Guests may attend 2 free monthly meetings to experience our presentations, meet our members, and receive a CE attendance certificate.

Joining CAHI may be done at anytime of the year through our Membership Page

INSIDE THIS ISSUE

Meeting Dates!

Meetings have been canceled until further notice due to the COVID-19 outbreak.

United States
CONSUMER PRODUCT SAFETY COMMISSION

Shelter at Home Safety Checklist

Home Safe for Everyone

As you shelter in place at home with your family, check off these simple safety steps.

- [ ] Fire Safety: I have tested my smoke alarms and they are working. I stay in the kitchen while my food is cooking on the stovetop. I have a fire escape plan.
- [ ] CO Safety: I have tested my carbon monoxide alarms and they are working.
- [ ] Pool Safely: I have checked the layers of protection around my pool/spa to make sure they are in good shape, including my gate, fence, door alarm, pool cover or other layer.
- [ ] Medicines and Cleaning Products: My household cleaning products, laundry packets and medicines are in the original bottles, locked up and away from children.
- [ ] Magnets: I have warned my older children never to use high-powered magnets to simulate tongue or lip piercings and to keep these away from younger children. Swallowed magnets can stick together across intestines causing serious lifelong health effects or death.

Prevent Fires & CO Poisoning:

Working smoke and CO alarms save lives. Make sure to replace smoke and CO alarm batteries every year. Test alarms every month. Stand by your pain– that is, always stay in the kitchen when cooking. Have a fire escape plan (two ways out each room).

Young children and seniors will need additional assistance leaving your home during a fire emergency. Make plans to help them get out of the house to your family's designated meeting spot.For more information, see our multigenerational tool kit.

www.cpsc.gov/safety-education/neighborhood-safety-network/toolkits/fire-safety

You can also find more fire safety tips and information in our fire safety information center.
www.cpsc.gov/Safety-Education/Safety-Education-Centers/Fire-Safety-Information-Center

United States
CONSUMER PRODUCT SAFETY COMMISSION

Prevent Drowning:

Drowning related to pools and spas is the leading cause of unintentional death in young children. Layers of protection are so important – you never know which safety step will save a life until it does.
www.PoolSafely.gov

Prevent Poisonings:

Did you know in 2018, more than 70,900 children were seen in the ER due to unintended pediatric poisoning? More than 85% of these incidents occurred in the home and most often with these five products: blood pressure medications, acetaminophen, bleach, ibuprofen, and laundry packets. Make sure you keep household cleaning products and laundry packets in their original containers and in cabinets with child safety latches or locks. Never transfer these products to a different bottle without a child-resistant closure and a label. Children and others can mistake them and drink or eat the contents.

Put the **Poison Control Center's hotline (800-222-1222)** in your cell phone.

Prevent serious intestinal injuries or death from high-powered magnets:

You may think that because you have tweens and teens, small high-powered magnets pose no danger to them. But internal injury from small high-powered magnets can cause death or serious lifelong health effects.When two or more high-powered magnets are swallowed (such as when a teen mimics a tonguepiercing), they can link together inside a child's intestines and clamp onto body tissues, causing intestinal obstructions, perforations, sepsis and death. Remind tweens and teens that these magnets are not for them to play with or use in their mouth as jewelry– and make sure the magnets are always kept away from younger siblings.

Strategies for Safe, Affordable Decks

Six ways to trim costs and still meet code

BY GLENN MATHEWSON

"To produce safe buildings for the greatest economy and good of the public." Echoes of this sentence (from the 1927 Uniform Building Code) still ring true in today's International Residential Code (IRC), which states, "... to establish minimum requirements to safeguard the public safety, health, and general welfare through affordability, structural strength ..." (2018 IRC, Section R101.3). Everyone knows the code is the minimum standard and probably understands that its goal is to keep construction affordable. However, code has somehow taken on a negative connotation, as if a structure built to code is cheap or unsafe, or that a contractor known as building "to code" is a hack.

But I think that's the wrong way to look at the IRC, especially when it comes to decks. Its provisions aren't a best practices guide to building the "best" deck, but they are a terrific guide that can be used to build affordable, sufficiently safe decks.

As a code professional, I believe in safety, but I recognize that safety needs to be available to everyone, and minimum standards provide for maximum deck ownership. For builders looking to tap into the huge budget-deck market, here are some safe, respectable, and sensible strategies for building code-compliant decks that will maximize the client's dollars.

Glenn Mathewson is a frequent presenter at JLC Live and a consultant and educator with BuildingCodeCollege.com.

Photos by Glenn Mathewson

CANTILEVERING THE JOISTS

The IRC provides tables for sizing joists (see Table R507.6, below) and beams (see Table R507.5, facing page), which are based on the span of deck joists. The longer the joist span, the more load the beam carries and the shorter its span. Note that beams are being sized for the maximum allowable cantilever of the joists beyond the beam, whether they cantilever or not. If you are not cantilevering joists, you are probably oversizing both your joists and your beam.

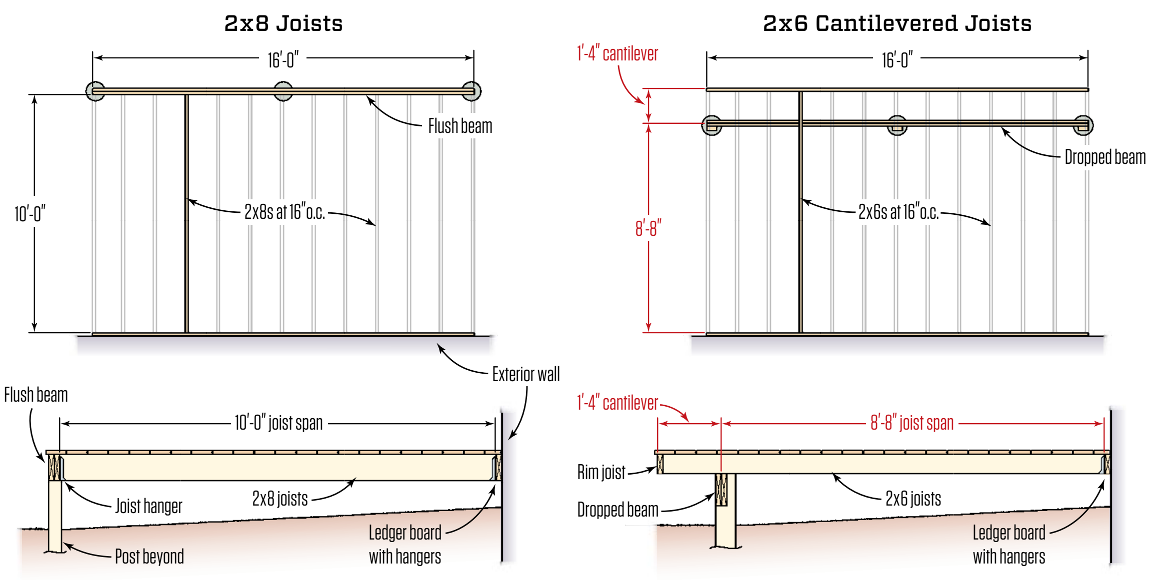
Lesson: Design joists to cantilever past the beams and you shorten the joist span. A shorter joist span allows you to use a different column in the table when sizing the beam—which in turn results in a smaller beam size. For example, instead of using 2x8s hung from a flush beam to build a 10-foot-by-16-foot deck, you can install 2x6 joists—which can span 8 feet 8 inches with an additional 1-foot-4-inch cantilever—over a dropped beam to build the same-size deck. This option saves on lumber and metal-connector costs.

TABLE R507.6
DECK JOIST SPANS FOR COMMON LUMBER SPECIES (ft. - in.)

SPECIES[a]	SIZE	ALLOWABLE JOIST SPAN[b]			MAXIMUM CANTILEVER[c, f]		
		SPACING OF DECK JOISTS (inches)			SPACING OF DECK JOISTS WITH CANTILEVERS[c] (inches)		
		12	16	24	12	16	24
Southern pine	2 × 6	9-11	9-0	7-7	1-3	1-4	1-6
	2 × 8	13-1	11-10	9-8	2-1	2-3	2-5
	2 × 10	16-2	14-0	11-5	3-4	3-6	2-10
	2 × 12	18-0	16-6	13-6	4-6	4-2	3-4
Douglas fir-larch[d], hem-fir[d]	2 × 6	9-6	8-8	7-2			1-5
	2 × 8	12-6	11-1	9-1			2-3

For a 10-foot-wide deck framed with southern pine, 2x8 joists at 16" on center are "oversized"

Note: rows and footnotes are omitted from the bottom of the table to highlight example.



Joist spans for a 10-foot-wide-by-16-foot-long deck. For the 10-foot-by-16-foot deck shown in the plan and section views above, 2x8 southern-pine joists at 16 inches on-center are "oversized" per IRC Table R507.6 (top). Using a dropped beam (above right) instead of a flush beam (above left) reduces the 10-foot joist span to 8 feet 8 inches with a 1-foot-4-inch cantilever, allowing the joists to be downsized to 2x6s at 16 inches on-center.

CANTILEVERING THE BEAMS

Per Table R507.5 (below), the IRC beam design provisions allow beams to cantilever an additional one-fourth the span beyond the last post. Utilizing this allowable cantilever is a wise way to have more deck supported on the same beam, without additional support posts. Additional posts not only drive up costs, but they also inhibit views from beneath an upper-level deck.

Lesson: One way to support a 10-foot-by-16-foot deck is with a double 2x10 beam bearing on three posts. By upsizing to a double 2x12 beam, dropping the beam, and taking advantage of the IRC's L/4 beam cantilever provision, as shown below, only two posts would be required to support the deck framing. Making use of beam cantilevers allows you to size smaller and less costly beams, as well as minimizing the number of posts.

TABLE R507.5
DECK BEAM SPAN LENGTHS[a, b, g] (feet - inches)

SPECIES[c]	SIZE[d]	DECK JOIST SPAN LESS THAN OR EQUAL TO: (feet)						
		6	8	10	12	14	16	18
Southern pine	1 – 2 × 6	4-11	4-0	3-7	3-3	3-0	2-10	2-8
	1 – 2 × 8	5-11	5-1	4-7	4-2	2-10	3-7	3-5
	1 – 2 × 10	7-0	6-0	5-5	4-11	4-7	4-3	4-0
	1 – 2 × 12	8-3	7-1	6-4	5-10	5-5	5-0	4-9
	2 – 2 × 6	6-11	5-11	5-4	4-10	4-6	4-3	4-0
	2 – 2 × 8	8-9	7-7	6-9	6-2	5-9	5-4	5-0
	2 – 2 × 10	10-4	9-0	8-0	7-4	6-9	6-4	6-0
	2 – 2 × 12	12-2	10-7	9-5	8-7	8-0	7-6	7-0
	3 – 2 × 6	8-2	7-5	6-8	6-1	5-8	5-3	5-0
	3 – 2 × 8	10-10	9-6	8-6	7-9	7-2	6-8	6-4
	3 – 2 × 10	13-0	11-3	10-0				
	3 – 2 × 12	15-3	13-3	11-10				
	3 × 6 or 2 – 2 x 6	5-5	4-8	4-2				

The example's 8'-8" joist span falls between the 8-foot and 10-foot Deck Joist Span columns. Interpolate "adjusted" span as shown below.

Note: rows and footnotes are omitted from the bottom of the table to highlight example.

Double 2x12 Cantilevered Beam

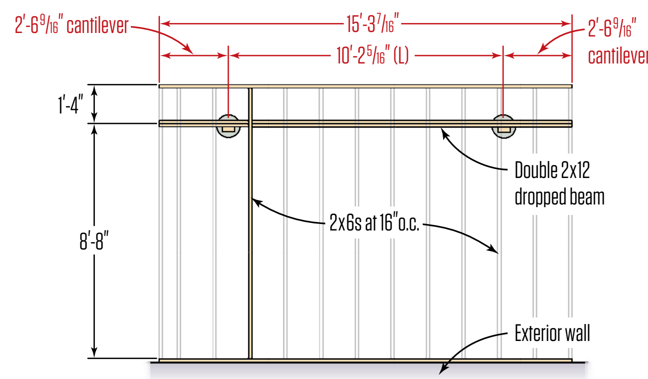
Beam Span Interpolation

1. **Determine "adjusted" beam span (L).** The beam span for 10x16 deck example (8'-8") falls 8" into the range between the 8-ft. and 10-ft. columns shown in Table R507.5. Cross-multiplying the ratio of this 8" distance and the difference between the 8-ft. and 10-ft. columns (24") with the ratio of the range between the resulting beam spans 10'-7" and 9'-5" (14") will yield a 4.66" adjustment—the adjustment is a decrease in span length. Subtract the 4.66" adjustment from 8-ft. column span (10'-7"), which results in a 10'-2 5/16" "adjusted" span (L).

   $\frac{8''}{24''} = \frac{X}{14''} = X = 4.66''$ 10'-7" (from 8-ft. column) – 4.66" = 10'-2 5/16" (L)

2. **Determine beam cantilever.** Divide the beam length (L) by 4 to determine the cantilever length.

   10'-2 5/16" beam length (L) ÷ 4 = 2'-6 9/16" cantilever length



Determining beam span. Table R507.5 (top) includes a footnote (g) that provides for an additional cantilever equal to the beam's listed span divided by 4. On a 10-foot-by-16-foot deck, upsizing to a double 2x12 dropped southern-pine beam and using this cantilever provision reduces the number of posts needed from three to two (though the deck's length will be slightly reduced). To interpolate spans not shown in the table, use the ratio shown above to find the "adjusted" span.

USING SINGLE-PLY BEAMS

The 2018 IRC expanded the deck-beam span table to include single-ply beams. Table R507.5 "Deck Beam Span Lengths" has five new rows for 2x6 through 2x12 single-ply beams. The spans aren't huge, but they help the IRC be what it is supposed to be—a minimum standard. In many designs with short beam spans or short joist spans, a single ply is sufficient as a beam. A stronger beam can carry more load, but the load it carries comes from the joists. Unless the joists are also oversized, they become the load limit. There is no benefit to blindly building beams that are twice as large and expensive. As shown in the table below, a single 2x10 beam can span 6 feet while carrying 2x8s spanning 8 feet and cantilevering another 2 feet.

Lesson: When beam spans are less than 8 feet, you may be able to use a single-ply beam. A single-ply beam will have much better decay resistance, as there is no space between members to trap moisture. A single-ply beam also allows for the connection of a 4x4 support post with a notch and bolts in place of a post cap connector. In addition, a single-ply beam allows for outside mounted guard posts to connect back into the deck frame with fewer intermediate members inside the connection. Single-ply beams can provide a design advantage, while also reducing costs.

TABLE R507.5
DECK BEAM SPAN LENGTHS[a, b, g] (feet - inches)

SPECIES[c]	SIZE[d]	DECK JOIST SPAN LESS THAN OR EQUAL TO: (feet)						
		6	8	10	12	14	16	18
Southern pine	1 – 2 × 6	4-11	4-0	3-7	3-3	3-0	2-10	2-8
	1 – 2 × 8	5-11	5-1	4-7	4-2	2-10	3-7	3-5
	1 – 2 × 10	7-0	6-0	5-5	4-11	4-7	4-3	4-0
	1 – 2 × 12	8-3	7-1	6-4	5-10	5-5	5-0	4-9
	2 – 2 × 6	6-11	5-11	5-4	4-10	4-6	4-3	4-0
	2 – 2 × 8	8-9	7-7	6-9	6-2	5-9	5-4	5-0
	2 – 2 × 10	10-4	9-0	8-0	7-4	6-9	6-4	6-0
	2 – 2 × 12	12-2	10-7	9-5				
	3 – 2 × 6	8-2	7-5	6-8				

The example's 8'-8" joist span falls between the 8-foot and 10-foot Deck Joist Span columns. Interpolate "adjusted" span as shown below.

Note: rows and footnotes are omitted from the bottom of the table to highlight example.

Single-Ply 2x12 Cantilevered Beam

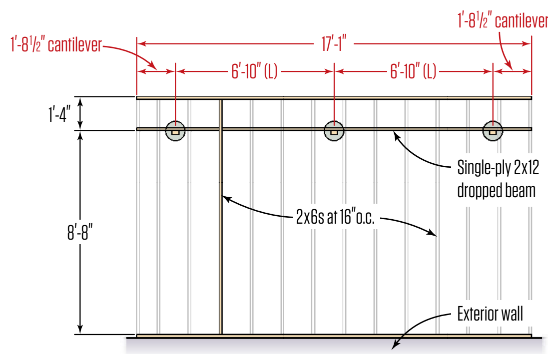
Beam Span Interpolation

1. **Determine "adjusted" beam span (L).** Similiar to previous example; cross-multiply the ratio of this 8" difference and the difference between the 8-ft. and 10-ft. columns (24") with the ratio of the range between the resulting beam spans 7'-1" and 6'-5" (9"). This yields a 3" adjustment. Subtract the 3" adjustment from 8-ft. column span (7'-1") for a 6'-10" "adjusted" span (L).

   $\frac{8''}{24''} = \frac{X}{9''} = X = 3''$ 7'-1" (from 8-ft. column) − 3" = 6'-10" (L)

2. **Determine beam cantilever.** Divide the beam length (L) by 4 to determine the cantilever length.

   6'-10" beam length (L) ÷ 4 = 1'-8½" cantilever length



Single-ply beam. The IRC's beam span table includes sizing for single-ply beams, showing that a single 2x12 beam can be used to support a 10-by-16-foot deck (top). Although the beam will require three support posts, the single-ply beam can cantilever, allowing the deck to be widened to 17 feet, as shown in the plan view above. To interpolate the spans shown in Table R507.5 to determine the "adjusted" span of the single-ply 2x12 dropped beam, use the ratio shown above.

DROPPING THE DECK

The past decade of deck building has seen an increasing focus on the ledger connection, and rightfully so. Many decks insufficiently attached to wood framing or attached to decayed material have been collapsing. However, if you examine this subject closer, you find that all the failures are due to a connection to wood framing.

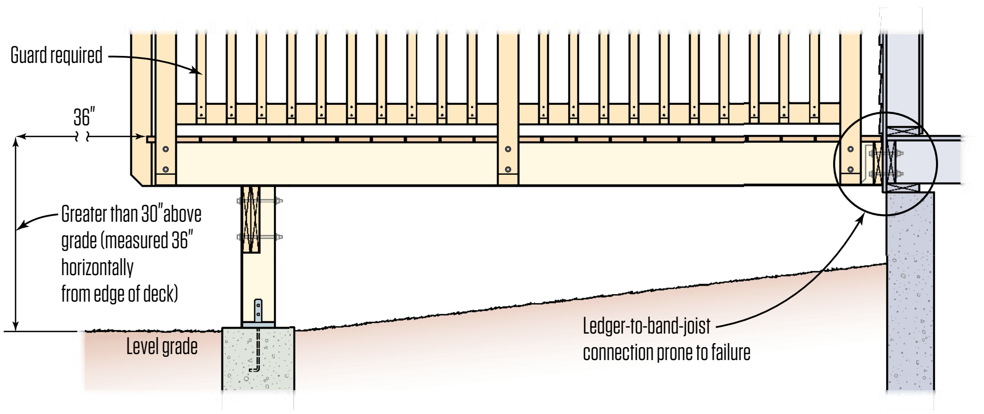
On a first-floor deck, an advantageous design is to drop the deck below the wood framing and attach it directly to the foundation. This changes things—big time. All the concerns that drive the misunderstanding of the IRC's lateral-load-anchor details disappear. Take away the connection to the band joist and you eliminate the weakest link in the chain. In structurally sound concrete, common 1/2-inch-diameter mechanical or adhesive bolt connections of the ledger to a concrete foundation are more than sufficient for most common deck designs.

The lateral-load anchor isn't the only thing to disappear, as flashing is no longer required. The IRC requires deck ledgers to be preservative treated, and flashing is required only when attaching to wood framing. Ledger flashing is primarily meant to protect the house framing, not the ledger. With a connection to the foundation, the exterior cladding and water-resistive barrier is not penetrated (another benefit to dropping the deck), and thus there is no counterflashing to place ledger flashing behind.

Though not directed by code, it may be useful to run a bead of sealant down the top of the ledger at the foundation, or better yet, space the ledger 1/2 inch off the foundation for drainage and drying behind.

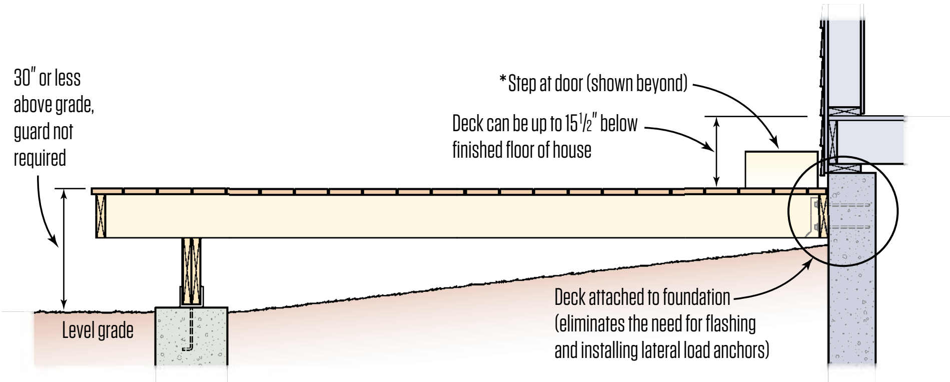
Lesson: For first-floor decks, drop the deck below the framing and attach it instead to the foundation. This eliminates damage to the cladding, as well as the need to install flashing and lateral-load anchors. Unless there is a side-hinged door, the deck can be up to 15 1/2 inches below the house framing, with the construction of a single step. Otherwise, a small landing can be built outside of the door. First-floor decks are also often close enough (30 inches or less) to ground level that guards may not be required.

Deck Attached to Wood Framing



A deck that is hung from a ledger fastened to the rim joist requires ledger flashing to protect the house framing and often requires lateral-load hardware. In addition, decks that are more than 30 inches above grade around the perimeter of the deck require guards, adding to the cost of the deck.

Deck Attached to Foundation



Anchoring the deck to a sound concrete foundation eliminates the need for ledger flashing and lateral-load anchors. This approach also allows the deck to be dropped closer to grade, eliminating the need for guards.

TAKING ADVANTAGE OF FOUNDATION EXCEPTIONS

For ground-level decks, the IRC offers a few options for relief from robust foundation systems. The simplest is allowing joists to bear directly on the ground (see IRC R507.3, exception). In this construction, they aren't really joists, in the sense that they don't span between bearing points. If the joists are preservative treated for ground contact and fully supported along their bottom edge on grade, then I don't expect to see any concrete delivered. For decks up to 20 inches above grade, the joists can be independently supported by pier blocks bearing on grade, rather than by beams and ledgers. Neither of these construction methods would be suitable for supporting guards around the deck, but their limited height above grade is meant to avoid that necessity.

Lesson: When a deck is built at ground level, there's nothing wrong with it structurally functioning as flagstone or patio pavers would function. There is little hazard in the structure of wood sitting directly on the ground.

A grade-level deck doesn't need to be supported by a concrete foundation, as long as the deck is not connected to the house framing.

USING LESS CONCRETE

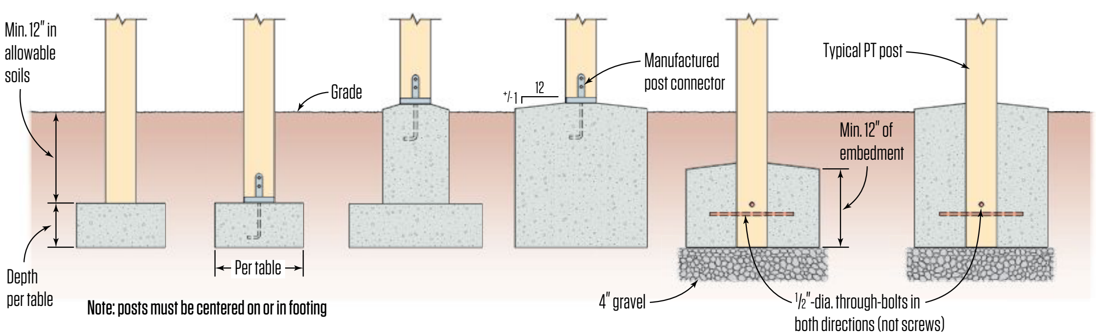
There are two ways to use less concrete in your deck footings: Leave it all at the bottom or bring it all up to the top. When preservative-treated posts rated for ground contact are used, the IRC allows deck support posts to be sunk into the ground. For areas with a frost depth and thus deep footings, there is no requirement that the concrete come up to the surface. A minimum 6-inch-thick concrete footing can in most cases be poured at the bottom of the hole and the post placed directly on top without a post base.

However, this is permitted only when the soil type is sufficient for lateral restraint and the post is embedded at least 12 inches into the earth. This is not acceptable for conditions where uplift design is required or when posts support a roof above the deck. In regions with a 3-foot frost depth, this strategy can result in huge savings in concrete and labor, not to mention the cost for post-base hardware.

The other option is frost-protection exceptions. If a deck is not supported by another frost-protected structure (like a ledger connection to a house), then the footings are not required to be frost protected. Freestanding decks can save in concrete and excavation expenses in exchange for no frost protection. Bear in mind that some regions have soil and groundwater sufficient to create problems with frost heave that may make this code-compliant choice a poor consumer choice. However, in other freezing regions, the soil is not conducive to frost heave and using this exception will likely make no difference in performance.

Lesson: The only concrete that matters in a deck footing is the concrete in contact with the soil. The IRC provides many options to consider for minimizing the amount of that concrete.

Use Less Concrete



Excerpted, with enhanced illustration, from the 2018 International Residential Code; Copyright 2017 Washington, D.C.: International Code Council. Reproduced with permission. All rights reserved. www.ICCSAFE.org

IRC Figure R507.3 specifies connection details between deck posts and deck footings. It also provides for different deck foundation options, including posts that are buried in the ground to reduce the amount of concrete needed for the footing.

Damp Buildings, Human Health and HVAC Design from ASHRAE

Moisture control and ventilation can have a major impact on Indoor Air Quality. That is why EPA's Indoor Environments Division would like to highlight the latest professional guidance from ASHRAE (formerly known as the American Society of Heating Refrigerating and Air-Conditioning Engineers) on Damp Buildings, Human Health and HVAC Design. This is one of several publications that ASHRAE has produced over the last few years that help building professionals improve practices with respect to humidity control and moisture management in buildings. Extended periods of dampness and condensation can result in adverse health effects and structural failures.

Check out this latest publication from ASHRAE on Damp Building, Human Health and HVAC Design HERE!

Early Warning Metrics for Health and Structural Problems from Dampness and Condensation

In this summary report, ASHRAE proposes using 4 quantitative metrics that each provide an early indication of dampness and condensation that could lead to future adverse health effects:

- Persistent water activity levels above 0.75 at the surfaces of organic materials or coatings.
- Persistent moisture content above 15% wood moisture equivalent (WME) in organic materials, coatings, and untreated paper-faced gypsum board.
- Persistent moisture content above 90% equilibrium relative humidity (ERH) in concrete or masonry that is either coated with—or is in contact with—organic materials or coatings.
- Persistent indoor humidity above a dew-point temperature (DPT) of 60°F (15°C) for buildings that are being mechanically cooled or above a DPT of 45°F (7°C) for heated buildings in moderately cold and mixed climates (in international climate zones 4 and 5, as referenced in Table B1-4 of ANSI/ASHRAE/IES Standard 90.1 [ASHRAE 2019b]).

Each of these indicators is important! When more than one indicator is present in the same space, it is an even greater signal to building owners and occupants that there could be a problem that should be addressed.

If conditions exceed the threshold levels for any of these metrics in a persistent manner it is considered an ***abnormal***.

- Persistent means that the condition has become typical because it extends for days or weeks at a time (rather than being infrequent excursions of a few hours per week).
- Abnormal means that the damp conditions are seldom the basis of design for durable buildings and energy-efficient climate-control systems, even though they may regularly occur in many buildings.

The likelihood of adverse health effects and structural problems related to dampness increase if persistent and abnormal conditions exist.

BY MYRON FERGUSON

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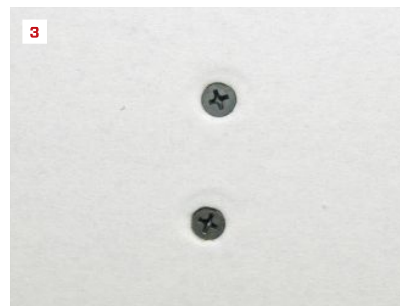

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This **(1)** is the goal for drywall painted with flat paint: a Level 4 finish—tape coat followed by two finish coats lightly sanded with 220-grit paper. For a glossy or eggshell finish, go with Level 5, which adds a skim coat of compound over the entire surface. Screw pops **(2)** are the most common callback in the industry and often result from poorly driven screws. The top screw **(3)** is driven properly, but the bottom screw has broken the paper around the screw head.

Avoiding Drywall Callbacks

JLC *contacted long-time* JLC *contributor and JLC Live presenter, Myron Ferguson, to plumb his expertise on what can go wrong with drywall and how problems can be prevented. Myron started us off with an overview, before we dove in with specific questions.*

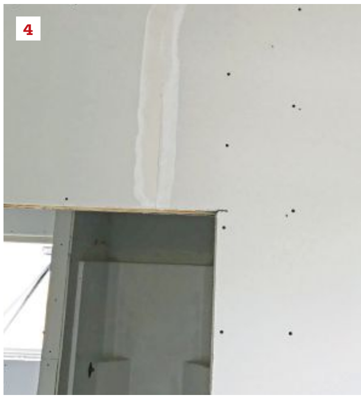
MF: Someone joked to me recently, "It's only drywall—anyone can screw it up!" The truth is, it's easy to do a lousy job with drywall. There are a lot of good, basic rules to follow, and it all starts with the quality of the hanging job: Use longer sheets to minimize butted seams, run the boards perpendicular to the framing, use screws instead of nails, use drywall adhesive on the framing in the most visible areas, don't use too many screws, and use the proper length screws. Most importantly, don't depend on the tapers to fix problems that were created by the hangers.

It's not just the drywall. Homeowners usually have high expectations for completed drywall work. People expect a perfectly smooth, blemish-free surface, and they expect it to look that way years after the project is completed. Part of my job is managing those expectations. I can do a Level 5 finishing job in a room, but a bad paint job can make the walls and ceiling look terrible. If a builder is investing time and money into a high-level drywall finish, they should also hire a first-rate painter.

Takes two parties. Both drywall contractor and general contractor play a role in achieving a high-quality finish. The drywall contractor needs to take the time to do high-quality work and should always use the best tools and materials. Getting in and out as quickly as possible, scraping by with minimal tools, and low-balling the materials are not compatible with doing first-rate work.

The general contractor needs to give the drywall crew enough time on the schedule to do their best work and needs to create the best working conditions possible. The work site should be clean and wide open so that the drywall crew can work quickly and efficiently. Conditions for the materials are important, as well. Controlling temperature, humidity, and airflow before, during, and after drywall work is a huge factor and one of the best ways to ensure the lasting quality of finished drywall. Keep in mind that

Photos by Myron Ferguson



This butt joint **(4)** over an opening is OK, but just barely. The joint should be at least 7 or 8 inches from the corner. Overcuts **(5)** and blow-outs **(6)** are common with sloppy hanging. The taper can fix these, but it takes considerably more time.

quality in drywall is not only about what the job looks like when you leave but also about how well it endures.

JLC: Every contractor has seen screw pops; what causes them?

MF: A screw pop happens when a screw head pushes out from the drywall surface and pushes the compound coating out along with it. A common cause is setting a screw to proper depth, but without pulling the drywall tight to the framing. If the drywall ever is pushed tight to the framing, the screw head will pop. Any fastener that misses or is not securely anchored into a framing member may work loose over time. If you miss, don't leave the screw in place.

The opposite is also possible; if not enough compound is used over a screw indentation, a slight depression will show in the drywall surface. It's also possible for the framing or drywall to expand after taping is finished, which can pull the screw in slightly and cause an indentation. One of the most common causes for this is hanging drywall when the framing is too wet. As the wood dries, the framing shrinks and pulls away from the drywall. Misaligned and twisted framing can also contribute to fastener failure.

JLC: What's the best way to prevent fastener pops?

MF: From a contractor's standpoint, the most important thing is controlling the temperature, humidity, and airflow in the rooms where the drywall is being installed. Wet framing is one of the biggest culprits.

The moisture content should be tested (no more than 12% moisture content), but it rarely is. Using common sense can go a long way here. If the building has never been heated and has never had time to dry out after being framed in wet conditions, then the contractor should build time into the schedule for the framing to dry out before insulating or installing any vapor retarders.

If I am concerned that framing is wet, I will test and record the results in case future problems should arise, or if I feel like the job is being rushed. I generally like to see a moisture content of 10% or less. By the time the electric, plumbing, and heating are roughed in, enough time has usually gone by to dry out most buildings unless the conditions for drying are poor; high humidity, rain, and propane space heaters being used will all delay drying.

The drywall contractor needs to fasten the drywall correctly. I make certain that the panel is tight against the framing. The nose of a screw gun helps to push the panel tight to the framing, which is another advantage of screws over nails.

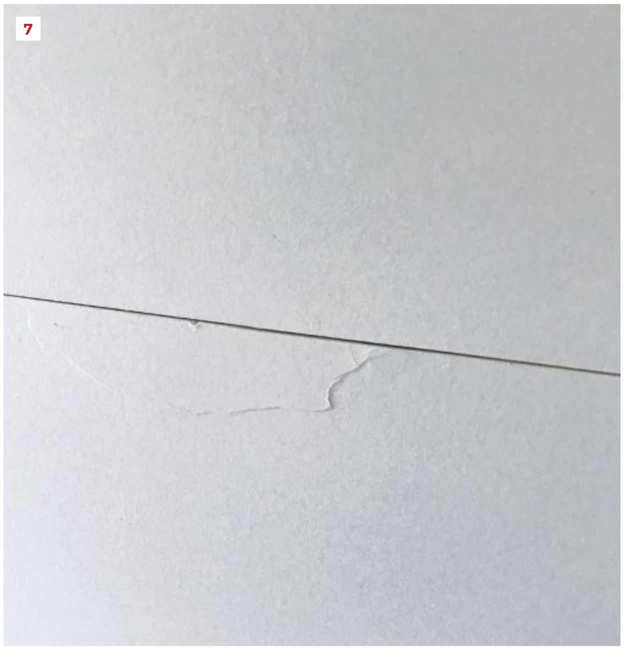
Screws should penetrate into the wood framing $^5/_8$ inch; longer is not necessarily better. (Nails, if used, need to penetrate the framing at least $^7/_8$ inch.) I typically use $1^1/_4$-inch (32mm), coarse-thread screws for both $^1/_2$-inch- and $^5/_8$-inch-thick drywall, and 1-inch (25mm), fine-thread screws when fastening drywall to steel studs or resilient channel.

Don't use too many screws. For walls framed 16 inches on-center, place screws every 16 inches along studs, no more; for 24-inch-o.c. framing, every 12 inches. For ceilings, space fasteners every 12 inches along joists for both 16- and 24-inch-o.c. framing.

When properly set, a screw should not damage the drywall core or even tear the paper face. The screw head should be set about 1mm below the drywall face. If a screw is set too deep, the panel is more likely to pop loose.

Underdriven screws are obvious and easy to detect. Just run a taping knife over the screw before applying compound. If you hear the knife click when it hits the screw head, then the fastener has to be set deeper. If you try to hide an underdriven screw by coating it with more compound, you'll end up with an unattractive bump of compound.

With an overdriven screw, the fastener breaks through the paper face of the drywall, creating a much weaker connection than an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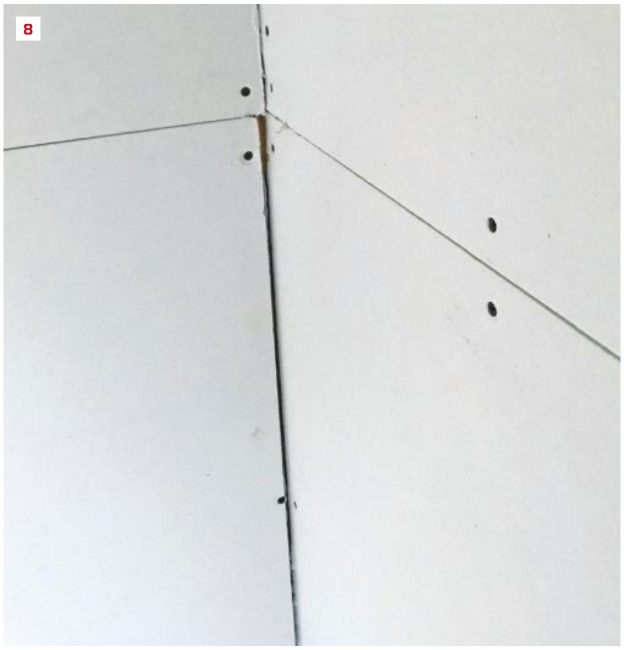
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Broken edges need to be repaired (the broken area cut out and the void prefilled with a setting compound) before taping and finishing the seam **(7)**. Any large gap (wider than 1/4 inch) needs to be prefilled with a setting compound before taping **(8)**.

underdriven screw. Often, an overdriven screw shows up right away because a panel is loose. Overdriven fasteners typically are corrected by tapers when they do their pre-taping inspection (see "Prep Work Before Taping," Aug/19). A worse case is having this weak connection pop when subject to even minimal structural movement or expansion and contraction of the building materials.

I prefer to use adhesive, as well. It's not a must, but it improves the job and limits the number of problems common to fastening drywall. I also use it to reduce the number of fasteners. With adhesive on each stud or joist, the number of fasteners needed can be reduced by up to 75%. An added benefit is that the adhesive strengthens the structure by increasing the panel's tensile strength by up to 100%, and its shear strength by up to 50%.

When using adhesive, apply a 3/8-inch-wide bead to each framing member to within 6 inches of the edge of the drywall. Install fasteners on 16-inch centers along the perimeter of each panel immediately after hanging it.

JLC: You began by saying we can't depend on the taper to fix what the hanger has done. Besides fastening, what are the other mistakes that can result in drywall blemishes or callbacks?

MF: One of the most common is installing panels so the butt end aligns with the edge of a window or door opening. This is a rookie mistake; it seems plausible for layout, but the butt joint will crack the tape if there is shrinkage in the header. Wood shrinks more across its width, so the wider the header, the more likely this will happen. The crack can appear below a window, too. Butt joints are very vulnerable to cracking. The way to prevent this is to not place seams close to the edge of an opening. Place the sheet so the panel covers the corner, and the butt joint falls somewhere in the middle of the opening, then cut out drywall in the opening. The joint should be no closer than 7 or 8 inches from the corner.

Butt joints anywhere on the wall are often problems because they don't start out as a recessed seam. They basically start as a bump that needs to be blended in properly. The best way to handle them is by "floating" butt joints between joists or studs and securing them to beveled backing boards that create recessed seams (for more on this technique, see "Hanging Drywall Smart," Mar/15).

On finishing jobs, I don't always hang the drywall and sometimes have to deal with butt joints that land on studs and joists. In those cases, I will prefill butted seams, using a setting compound. Prefilling is also needed for any large gaps and for any repairs.

Overcuts and blowouts at electrical boxes are common problems. The cover plates don't cover much more than a 1/4-inch gap. The tapers will usually catch these while taping, but to help them notice, I circle the box and point out the area that needs to be patched. Fixing a blowout requires tape embedded in compound and a couple of finish coats to conceal it. I always encourage people to take their time and be careful cutting out with the drywall router. Each mistake will cost the finisher at least four minutes.

Water seeping through a basement slab is a good recipe for drywall problems, which will appear once all the materials dry out **(9)**. This joint **(10)** cracked because the first coat hadn't cured before the second was applied. The building was not heated, which delayed curing.

JLC: What are the most common taping problems?
MF: There's a lot of detail to know about taping drywall. Inexperience is often the problem. For example, rookie tapers often don't bed the tape in enough mud. This is the kind of thing we covered in the article "Taping Drywall Seams" (Jul/17).

But even experienced tapers run into problems. The failures I see when I am called in to consult are often climate related. When drywall seams are taped, the air, surface, and compound temperature should be at least 55°F, with 65°F to 70°F being ideal. It's a good idea to establish the ideal temperature at least a few days before the drywall hanging starts. Once the hanging and taping are underway, maintain a constant temperature—don't work in 80°F weather during the day, then let the temperature drop to 45°F at night. The drywall phase is an important part of the job, so don't try to save a few dollars on heat. In addition, provide adequate ventilation and airflow to help remove excess moisture.

Cold and damp weather will adversely affect the taping job, delaying drying times and possibly softening the panels. Hot and dry weather can cause problems, too. Heat can affect the joint tape bond. Hot, dry weather hastens drying, which can result in poor bonding of the tape, edge cracking, and excessive shrinkage of compound. So take some precautions in hot and dry conditions. Eliminate drafts, work shorter joint lengths, use faster setting compounds, and don't weaken the compound by adding excess water.

JLC: How about sanding? We often see ridges telegraphing through the paint where it looks like the mud wasn't sanded enough.
MF: Undersanding is common over screws in the face of the drywall. Just the indentation has to be filled and then sanded flat so that there is no buildup of compound around the screw head. There is a smear of mud between fasteners that occurs on the second and third coats, but not a buildup.

Oversanding can certainly happen, too; it creates concave seams or exposes the tape, which is especially common on inside corners when not enough mud was applied in the first place. Because lightweight compounds are preferred for the finish coats nowadays (these compounds are softer than the traditional heavyweight compounds), you should never use coarser than a 220 sandpaper grit. A 220 grit will minimize scratches in the compounds and won't rough up the paper face.

JLC: What should a contractor look for before calling the painter?
MF: I often ask about how different parts of a job will be painted before I even bid on a drywall job. If ceilings will be painted with anything but a flat paint, I will usually recommend a level 5 finish. Large, well-lit walls will often need a level 5 finish, as well.

Don't rush the paint. Do not allow painters to begin work before all taped joints are thoroughly dry; painting over wet joints is a major cause of joint discoloration. Differences in suction between the paper facing and the joint compound may cause the paint color to appear lighter or darker, making the joint conspicuous.

A coat of primer is necessary to help equalize the porosity and texture of the taped drywall surface. I recommend using a good-quality latex primer, such as USG's First Coat, that's formulated with a high solids content, and applying it undiluted. However, even a good primer coat may not be enough when glossy paint will be used. In that situation, I recommend applying a skim-coat of compound to the entire wall surface first to equalize the surface reaction.

I know some painters damp-sponge surfaces after sanding to remove dust and knock down any raised fibers of the paper. Brushing with a very fine broom also helps. But I have found that sanding with 220 grit after the primer is dry works best and is less likely to do damage compared with sponging or brooming.

Myron Ferguson is a drywall contractor in Middle Grove, N.Y. Follow him on Instagram: @thatdrywallguy.


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Photos by Roe Osborn/JLC

Tiling Over Existing Tile

BY TOM MEEHAN

Recently, I was called in to look at a 12-year-old shower floor. The floor was intact, but the grout lines had darkened over time, and it was unsightly **(1)**. The house is a seasonal rental on the beach that rents for top dollar, and the owners wanted the bathroom to be presentable.

Often, a situation like this can be addressed by cleaning with a strong detergent acid. So I tried that, but the powerful cleanser didn't touch the grime. Apparently, the grout had never been properly sealed.

Since I couldn't clean the shower floor, I suggested a simple solution: Given that the existing tile floor was sound and wasn't leaking, why not tile over the floor with new tile? I've done this many times before. The owners liked the idea, so I went ahead.

Before I started, I removed the existing drain cover **(2)**. I wanted the new drain cover to be flush with the new tile, so I inserted some spacers cut from a sheet of Schluter Ditra mat. I applied a little dab of thinset mortar to the Ditra pieces and set them in the corners of the existing drain **(3)**. That way, the new drain I would install later would come flush to the surface of the new tile.

In this case, the existing floor was porcelain tile, but this tiling technique can be used over any kind of tile—porcelain, ceramic, or natural stone. I started by scarifying the surface of the tile using a grinder with an aggressive blade **(4)**. I roughened up about 85% of the surface, which is enough to give thinset mortar a powerful grip. I was careful to ventilate the space, and I wore a respirator mask to protect my lungs.

Before I started to apply mortar, I checked the pitch of the existing tile floor **(5)**. I made sure that the pitch was at least 1/4 inch per lineal foot and that there were no low spots. Had I found a problem, I would have made up for it when I applied the cement. But in this case, the floor had an adequate pitch and there were no low spots.

Having roughened up the floor, I began to apply a skim coat of thinset mortar, about 1/16 inch thick, to the existing tile **(6)**. I used Laticrete Platinum 254, an extremely tacky, dense polymer-modified formula that bonds tenaciously to anything (laticrete.com). This is the kind of stuff that if it gets on your jeans, you don't launder them—you just throw them away.

Next, I set the new drain and drain cover. I buttered the back of the drain first **(7)**, and then, with its cover

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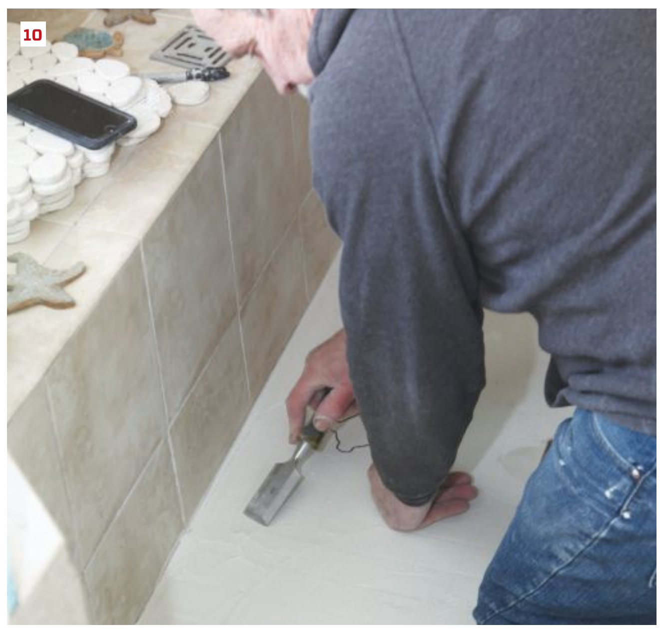

screwed on, I set the drain carefully in place over the existing one **(8)**. I buttered it carefully, putting on just enough to make a good seal but not so much that it would squeeze out and go inside the drain.

When I had applied thinset to the entire shower floor, I stopped for the day and allowed the cement to harden overnight. The next morning, I positioned the decorative tiles, marking their locations with a Sharpie marker **(9)**. These custom-made tiles, in the shape of sea creatures such as fish, crabs, and clams, came from my wife's business, C Shore Designs (cshoredesigns.com), so I got them locally, but they're available worldwide by mail order. Earlier, I had asked the homeowners to position the sea-creature tiles on the shower floor, and I took a picture so I would remember where to place them. Now I would use the Sharpie markings as a guide.

Laticrete Platinum 254 is extremely strong and tenacious, but it's as sticky as salt-water taffy to work with. It's hard to apply it perfectly flat and smooth it the way you can a traditional mortar bed. After

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I applied it, there were a few ridges in the surface. So the next day, when the Laticrete was set up but still not fully cured, I used a sharp chisel to cut off the ridges and make a flat surface **(10)**.

Now it was time to start setting tile. I used natural stone tiles in a mesh sheet, supplied by Island Stone (islandstone.com). I like this brand because tiles always interlock perfectly—you can turn them left or right, and they still mate up. This variety was flat river stones. I started by cutting the edge of a sheet to make a flat side **(11)**. You have to cut the stones on a wet saw—you can't score and snap them the way you would a ceramic or porcelain tile. But for trimming or cutting small pieces, you can use hand tile nippers.

With a 1/4-inch V-notch trowel, I spread a second coat of thinset mortar to make a setting bed. For this coat, I didn't use latex-modified thinset—I used regular thinset. Then I began to set the sheets of river stone **(12)**. Where the sea-creature tiles would be, I cut out the shapes in the sheets of stone, cutting the plastic mesh with a utility knife.

As I worked, I set the decorative tiles in the voids I had created. I back-buttered the decorative tiles carefully **(13)**, making sure to evenly spread the mortar over the claws of the crabs and the fins of the fish and the arms of the starfish. The decorative tiles are strong, but they're still delicate until they're supported evenly by mortar. I put on enough mortar to hold the decorative tiles a hair higher than the surrounding stones, to make a lifelike presentation **(14)**. When the sea creatures were in place, I cut some small pieces of stone with the nippers and pieced in around them.

Once all the tile was in place, I pressed the stones down with a rubber grout trowel to make sure there were no high edges **(15)**. That way, I knew the floor would be flat, with a smooth pitch to the drain.

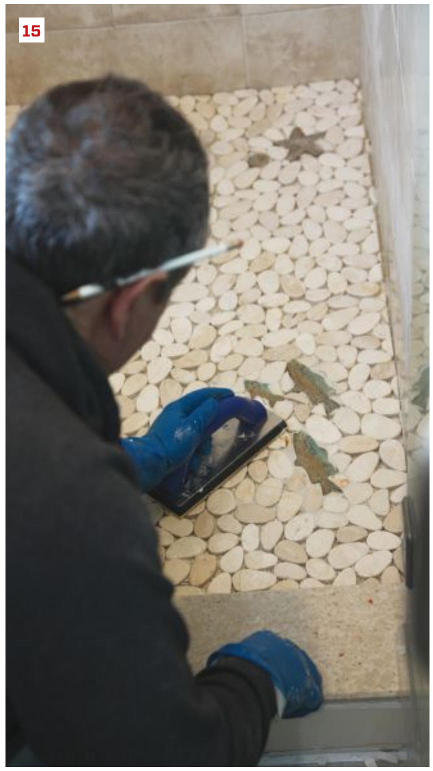
The next day, before grouting the floor, I cut some mortar out around the decorative tiles using a utility knife. I wanted to be sure that the grout would go down at least 1/8 inch below the surface of the tile, so that the grout would have enough substance to take hold. I used a vacuum to pull out the dust as I cut **(16)**.

After grouting the tile using Power Grout from TEC (tecspecialty.com), I cleaned the surface of the stones with a sponge **(17)**. When I was finished, I had a brand new floor **(18)**.

There's one more step that you don't want to skip: sealing the tile. I used 511 Impregnator by Miracle Sealants (rustoleum.com). And in this case, because I was using natural stone, I applied sealer twice: once before grouting, and once a few days after grouting and cleaning. It's always good to put two coats of sealer on natural stone (overkill is always a good thing).

If you didn't know about this method, you might think that to replace an existing tile floor, you have to chisel out the old tile and start over again. But this way is much simpler. In addition to saving labor, it has the advantage that you don't jeopardize the integrity of the existing drain and shower pan by chiseling.

Tom Meehan, co-author of Working with Tile, *is a second-generation tile installer who lives and works in Harwich, Mass.*



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The Licensing Board meetings are held at 9:30 am
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