October 2013 $4.95

JLC

THE JOURNAL OF LIGHT CONSTRUCTION

Prefab Shear-Wall Components

"Stone" Veneer Best Practices

How to Install Replacement Windows

jlconline.com

It's not a party without you!

Celebrate 35 years of **Grace Ice & Water Shield®** with up to **$12 OFF** per roll!

Roof it right.®

...with the Original and Best In-Class Self-Adhered Roofing Underlayment.

Purchase any of these Grace Ice & Water Shield® products to qualify for your rebate in the form of a Visa Prepaid Card. This offer is valid for purchases in the USA only from September 1, 2013 through December 31, 2013.

- **Grace Ice & Water Shield®** (200 or 225 sq.ft. roll) – $12/roll
- **Grace Ice & Water Shield® HT** (200 or 225 sq.ft. roll) – $12/roll
- **Grace Ice & Water Shield®** (108 sq.ft. roll) – $6/roll

GRACE

For details visit **www.graceresidential.com/35yearsIWS**

DETAILS MATTER

THE RIGHT BALANCE OF FEATURES FOR A FINE FINISH

BN200C NS150C

It's all about the details. In your finishing touches and our finishing tools. The Porter Cable BN200C 2" Brad Nailer has been updated from its previous version to be more compact, lightweight and easy to use. All at a lower price. Touting an oil-free design, rear exhaust, tool-free depth of drive, tool-free jam release and more, it's the right balance of features to add your finishing touches. The same great features also available in the NS150C Finish Stapler.

To learn more about Porter Cable Finish Nailers, visit portercable.com or stop by a retailer near you.

www.PorterCable.com

PORTER CABLE®

EXPERIENCE

BEHR® PRO

Products that Perform

Dedicated Behr Pro Reps

Free Job-Site Delivery
(Where available)


Remodeler


Painting Contractor


Property Manager


General Contractor

For every professional, for every need, **BehrPro** is on the job.

BehrPro is committed to fulfilling the needs of professionals just like you by offering quality products and services you rely on. We'll even help you stay informed on the latest industry news. Sign up for a subscription of **a brand new magazine created just for the professional**, compliments of **BehrPro**. Just scan this code, visit **behrpro.com/prtjlc** or call 877-776-3961.

Competitive Pricing

Quality & Value Important to the Pro

Color Services

Factory Tinting

National Reach

facebook.com/behrpro
twitter.com/behrpro

BEHR® KILZ®

Available at: The Home Depot

JLCONLINE.COM

Contents

On the cover: Hardy Frames field rep Al Potter (orange vest) helps a framer install a Hardy Panel unit for a home under construction by Taylor Morrison, in Irvine, Calif. Photo by Isaiah Cushman

FEATURES

DEPARTMENTS

THE JOURNAL OF LIGHT CONSTRUCTION (ISSN 1056-828X), Volume 32, Number 1, is published monthly by Hanley Wood, LLC, One Thomas Circle, NW, Suite 600, Washington, DC 20005. Annual subscription rate for qualified readers in the construction trades: $39.95; nonqualified annual subscription rate: $59.95. Publisher reserves the right to determine recipient qualification. Canada Post Registration #40612608/G.S.T. number: R-120931738. Canadian return address: Pitney Bowes Inc., PO Box 25542, London, ON N6C 6B2. Periodicals postage paid at Washington, DC, and at additional mailing offices. POSTMASTER: Send address changes to The Journal of Light Construction, PO Box 5853, Harlan, IA 51593-1353.

BPA WORLDWIDE BUSINESS

JLC

JLCONLINE.COM

Editorial Director Sal Alfano, salfano@hanleywood.com
Chief Design Director Gillian Berenson, gberenson@hanleywood.com
Executive Editor Clayton DeKorne, cdekorne@hanleywood.com
Art Director Sarah Bell, sbell@hanleywood.com
Managing Editors Ingrid Bush, ibush@hanleywood.com;
Laurie Elden, lelden@hanleywood.com
Assistant Managing Editor Carey Hodges, chodges@hanleywood.com
Illustrator Tim Healey, thealey@hanleywood.com
Senior Editor Roe Osborn, rosborn@hanleywood.com
Graphic Designers Jen Aranyi, jaranyi@hanleywood.com;
Kim Lofgren, klofgren@hanleywood.com
Contributing Editors Michael Byrne, Michael Chotiner, Ted Cushman, David Frane, Bruce Greenlaw, Dave Holbrook, Joe Stoddard, Jon Vara, Charles Wardell, Andy Wormer

Senior Web Developer Braddock Bull, bbull@hanleywood.com

Production Director Theresa A. Emerson
Digital Ad Manager Annie Clark
Ad Production Coordinator Bernadette Couture

Group Director, Audience Marketing & Circulation Christina Lustan
Audience Marketing Manager Amy Barcomb
Customer Service Manager Lois Landa
Circulation Promotions Designer Chara Anderson

Operations Manager Pam Brown

Group President, Residential Remodeling Rick Strachan
General Manager Online, Residential Remodeling Kim Heneghan

HANLEY WOOD BUSINESS MEDIA

President, Content Bob Benz
Executive V.P., Executive Programs Warren Nesbitt
Executive V.P., Strategic Marketing Services Tom Rousseau
Senior V.P., Strategic Marketing Services & Consumer Media Jennifer Pearce
Senior V.P., Audience Operations Sarah Welcome
Senior Director/Media Services & Account Coordination Mari Skelnik
Senior Director/Print Production Cathy Underwood

PUBLISHED BY HANLEYWOOD, LLC

Chief Executive Officer Peter Goldstone
Vice Chairman Frank Anton
Chief Customer Officer Dave Colford
Chief Financial Officer Matthew Flynn
President, Digital Andrew Reid
President, Exhibitions Rick McConnell
President, Marketing Jeanne Milbrath
President, Metrostudy Christopher Veator
Executive V.P., Corporate Sales Paul Tourbaf
V.P., General Counsel Mike Bender
V.P., Marketing Sheila Harris
V.P., Business Planning & Analysis Ron Kraft
V.P., Corporate Controller Keith Rosenbloom

JLC LIVE RESIDENTIAL CONSTRUCTION SHOW

Director Jayne Dalton
Conference Manager Julie Clifford
Construction Events Manager Don Dunkley
Conference Coordinator Olivia Espinosa
Senior Operations Manager Rana Cham-Schultz
Associate Operations Manager Nicole Rohmer
Marketing Manager Nathan Huber
Associate Marketing Manager Katie Lewis
Senior Account Executive Kelly Gutermuth
Online Sponsorships Bob Martin
Registration Manager Vila Snider

Editorial & Advertising Offices: The Journal of Light Construction,
186 Allen Brook Lane, Williston, VT 05495, 802.879.3335, Fax: 802.879.9384.

DIABLO®

BREAK-THROUGH INNOVATION FOR 4X CUTTING LIFE

IN BI-METAL RECIPROCATING BLADES

Diablo's Demo Demon™ and Steel Demon™ Bi-Metal Reciprocating Blades deliver break-through 4X performance versus standard blades; allowing you to get the job done faster and finish the cut. These blades are the first to combine innovative features such as Dual Tooth Design, Perma-SHIELD® Non-Stick coating and Ultra-Hardened cutting edge for maximum durability and speed.

ITEM# DS0914BF

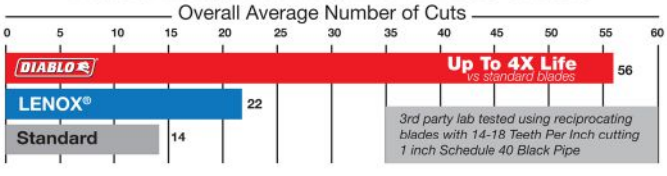
WATCH DEMO NOW!
SCAN WITH A SMART PHONE

DARE TO COMPARE...TRY IT FOR FREE!

Try It Yourself For Free!

Don't just take our word for it, try it yourself for free! Ready to get the same results as our 3rd party objective testing shows below? Try either the Diablo Demo Demon™ Bi-Metal Reciprocating Blade for wood cutting applications or Steel Demon™ Bi-Metal Reciprocating Blades for metal cutting applications. To receive your Diablo blade, you must go to www.DiabloTools.com/DareToCompare. Promotion runs through **October 31, 2013** while supplies last. Limit one per person.

Diablo Reciprocating Life versus Others



LENOX® is a registered trademark of Newell Rubbermaid

To Enter and For More Details Visit:

www.DiabloTools.com/DareToCompare

www.DiabloTools.com www.facebook.com/diablotools www.youtube.com/diablotools

Diablo powered by Freud America, Inc. | 1.800.334.4107 | Red reciprocating blades are a registered trademark of Freud America, Inc.

JLC

INFORMATION DIRECTORY

CONTACT INFORMATION

jlconline.com; 802.879.3335
JLC
186 Allen Brook Lane
Williston, VT 05495

EDITORIAL

We welcome letters and article submissions from our readers. Contact us by mail at the address above, **Attn:** Editorial Dept., or via email at jlc-editorial@hanleywood.com. Keep copies of all original materials.

SUBSCRIPTION SERVICES

For help with your **JLC** subscription, contact us:
Online: jlconline.com/cs
Email: jlc@cdsfulfillment.com
Phone: 877.277.2721
Mail: JLC, P0 Box 5853, Harlan IA 51593-1353
You can subscribe online at: jlconline.com/getjlc.
Subscription rates for qualified readers: 1 year/ $39.95; 2 years/$64.95. Canada, International: add $15/ year for surface delivery. Sales tax required on subscriptions mailed to DC (5.75%), GA (4%), VT (6%).

JLC ARCHIVE/BACK ISSUES

JLC subscribers have free access to every issue of **JLC** since 1986. Enable your free access at jlconline.com/register. You can also purchase a USB flash drive of all issues since 1986 at jlconline.com. Copies of individual back issues can be purchased for $4.95 each, plus $5 shipping per order. Call 877.277.2721 for availability.

ARTICLE REPRINTS

For custom reprints of **JLC** articles, call **Nick lademarco** at Wright's Media, 877.652.5295, ext. 102; niademarco@wrightsmedia.com.

JLC UPDATE EMAIL NEWSLETTER

JLC Update, our email newsletter, is free to **JLC** readers. Each issue contains industry news and the latest tips on building materials, techniques, tools, and technology. Subscribe online at omeda.com/jlcupdate.

JLC LIVE

For information about the **JLC** LIVE Residential Construction Show, visit jlclive.com, or call 800.261.7769. For exhibitor and sponsorship information, call **Kelly Gutermuth** at 972.536.6473.

Privacy of mailing list: We rent our subscriber list to reputable companies. If you do not wish to receive promotional materials from other companies, please call us, toll-free, at 877.277.2721.

NISSAN

Innovation that excites

NV® CARGO

RENE SAID HIS NV CARGO SURPRISES A LOT OF PEOPLE. THEN WE SURPRISED HIM.

We filmed Rene Peña Jr. with hidden cameras to get his real opinion about his Nissan NV Cargo. He talked about the added cargo space, thanks to square instead of curved cargo walls. And unlike GM or Ford vans, his NV Cargo's engine is mounted forward of the passenger cabin, which means more leg room and added storage solutions. "It seems like it was built more for technicians and service people." Our hidden cameras completely agree. See Rene's video at CandidCargo.com.

800,000 miles road-tested | Over 7 million door tests | Body-on-frame tough

NISSAN Commercial Vehicles

For more information, visit www.nissancommercialvehicles.com.
Always wear your seat belt, and please don't drink and drive. ©2013 Nissan North America, Inc.

BUILT IN CANTON MISSISSIPPI

Congratulations

TO HANLEY WOOD'S JESSE H. NEAL AWARD WINNERS

Hanley Wood is committed to publishing quality content that serves the information needs of construction industry professionals. Our editors have once again been honored by the most prestigious editorial awards program. Join us in congratulating them.

2013 WINNERS

POOL & SPA NEWS—Best Technical Content

REMODELING—Best Profile

2013 FINALISTS

ARCHITECT

BUILDER

ECOHOME

JOURNAL OF LIGHT CONSTRUCTION

PROFESSIONAL DECK BUILDER

PROSALES

RESIDENTIAL ARCHITECT

JLC

SALES OFFICES

HEADQUARTERS

Rick Strachan Group President, Residential Remodeling
202.736.3332 Fax: 202.785.1974
rstrachan@hanleywood.com
Fredderick Chandler Vice President, Sales
202.729.3544 Fax: 202.785.1974
fchandler@hanleywood.com
Kim Heneghan General Manager Online, Residential Remodeling
202.380.3831 Fax: 202.785.1974
kheneghan@hanleywood.com
Helene Slavin Executive Support Coordinator
202.736.3428 Fax: 202.785.1974
hslavin@hanleywood.com

NORTHEAST/MID-ATLANTIC

Jamie Volpe Senior Strategic Sales Manager
(Including CT, DC, DE, GA, MA, MD, ME, NC, NH, NJ, NY, PA, RI, SC, VA, VT, WV)
203.397.1231 Fax: 203.397.1168
jvolpe@hanleywood.com

MIDWEST/SOUTH CENTRAL/SOUTHEAST

Kay Ross-Baker Strategic Sales Manager
(Including AR, FL, IA, IL, IN, KS, LA, MN, MO, MS, ND, NE, OK, SD, TX, WI)
773.824.2576 Fax: 773.824.2401
krossbaker@hanleywood.com

MIDWEST

Fredderick Chandler Vice President, Sales
(Including AL, KY, MI, OH, TN)
202.729.3544 Fax: 202.785.1974
fchandler@hanleywood.com

WEST COAST

Carol Weinman Senior Strategic Sales Manager
(Including AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA, WY)
831.373.6125 Fax: 831.373.6069
cweinman@hanleywood.com

NEW ENGLAND/MID-ATLANTIC REGIONAL EDITIONS

Larry Rice Account Manager
802.324.0913 Fax: 802.879.9384
lrice@hanleywood.com

CANADA

D. John Magner York Media Services
416.598.0101 Fax: 416.598.9191
jmagner@yorkmedia.net

UNITED KINGDOM/EUROPE

Stuart Smith Regional Sales Manager
+44 (0)20 8464 5577 Fax: +44 (0)20 8464 5588

CLASSIFIED ADVERTISING

Maura Jacob Account Manager
678.451.8627 mjacob@hanleywood.com

HIGH HIDE.
LOW COST.

GET MORE DONE FASTER.
PUT MORE MONEY IN YOUR POCKET.

High-hide commercial grade paint for professional painters.
Reformulated for even better hide, improved sprayability and easier touch-ups.
Compare the performance and cost to your current brand of paint.

Learn more about KILZ PRO-X® paints by scanning this QR Code, or visiting www.kilzpro-x.com/betterhide

KILZ

Only available at
THE HOME DEPOT

IF ONLY EVERYTHING AT THE JOB SITE WORKED THIS WELL.

THE RIDGID JOBMAX. 7 POWERFUL TOOLS IN ONE.

Only The Home Depot® has the 3 Amp RIDGID® JobMax™ multi-tool system with seven interchangeable heads run by one powerful motor. So you can do more jobs faster. Plus it comes with a Lifetime Service Agreement featuring free service for life,* free batteries, and free parts. But best of all, you get all this versatility starting at just $99. **That's the power of The Home Depot.**

*Registration for the RIDGID Lifetime Service Agreement is required. Visit homedepot.com/RIDGID for more details.

THE HOME DEPOT PRO
More saving. More doing.®

"Bracing Walls for Wind," by Ted Cushman (July/13)

Great article. I agree that the 2009 IRC [International Residential Code], though longer, was much easier to comply with due to its flexibility. Sadly, though, in Pennsylvania they repealed that section of the IRC and reverted to the 2006. This was mainly due to politics and the lack of understanding of wall bracing by the Pennsylvania Builders Association (PBA). While rightfully repealing the residential sprinkler portion that was added in by a special interest group, they covertly added a couple of other sections they didn't understand. The politicians voted on the sprinkler issue and overlooked any attachments.

This left most municipalities scratching their heads as to what to enforce, since they had little understanding of either the 2006 or 2009 versions. Now [the towns] in a 100-mile radius of the center of the state that we build in loosely enforce a sketchy version of the 2006 IRC. While the PBA thought that stepping back in time is always easier, it wasn't the case with wall bracing. They removed the flexibility and made it more difficult for builders to comply with the code. —*design guy*

I am an architect with about 35 years' experience, the last 15 or so years designing primarily wood buildings. Several years ago I designed a fairly simple two-story house using the IRC R602.10 provisions for lateral bracing design, instead of employing a structural engineer. My conclusion was that this was a big mistake.

It is very time-consuming to understand the requirements, design the building, and document your design to the satisfaction of the building officials. I spent significantly more time and fee money (even at my lower billing rate) than I would have paid to a structural engineer to provide a complete structural package. The building costs were higher since there were more braced wall lines and other elements compared to an engineered approach.

All in all, in my experience this is really not a useful approach to lateral design, with perhaps the exception of a very small and very simple one-story building. My recommendation is to establish a relationship with a local structural engineer, and pay them for your structural design needs. You will end up with more design flexibility, a more economical and easily constructed building, faster design time, and quicker permit review. And since you will be spending your time doing what you are good at (building or managing or whatever) instead of what you are not good at (structural design), you should be more profitable. All those things seem to me to outweigh the goal of not hiring a structural engineer for the sake of not hiring a structural engineer. —*JBGary*

"Fall Protection for Holes," Timothy Carlson (Letters, Aug/13)

[in response to "Are Guardrails Needed if Workers Wear Harnesses?" (Q&A, Oct/12)]

Another consideration would be an elevator pit on the ground floor of a residential multifamily building that's under construction. An elevator pit on the ground floor is actually a floor hole and must be guarded or covered as soon as the hazard is created. Sometimes contractors opt for putting caution tape around the pit, but caution tape is not going to stop anyone from falling into the pit. —*Safetyfirst*

"Retrofit Toilet," by Charles Wardell (Products, June/13)

Anyone installing one of these rear-outlet toilets, be sure to use a sponge rubber-type bowl seal. Do NOT EVER use a wax-type seal ring. It will leak over time, no matter what you do. The rubber one will allow for expansion and contraction between the frame and the bowl. Use the same rubber seal that you would use on a wall-mount chair carrier bowl connection. —*Icesailor*

"Replace the Deck Framing or Just Re-Skin?" by Greg DiBernardo (Q&A, July/13)

When underneath the deck framing, I also check the nails used in any existing hangers. You'd be surprised how many times the original hangers or hold-down hardware was attached with roofing nails, since they obviously "fit" and were readily available. —*WJParker*

"Recessed Can Covers," by Charles Wardell (Products, Aug/13)

These new can covers are so awesome. Just a few years ago recessed lights were so energy inefficient. Today's are better. If you covered the older versions with insulation, the resulting thermal build-up could, and probably would, burn down the structure. The problem is getting people to retrofit their old [recessed lights] with new ones or new covers. —*Jon Wright*

Engage. Connect. Succeed.

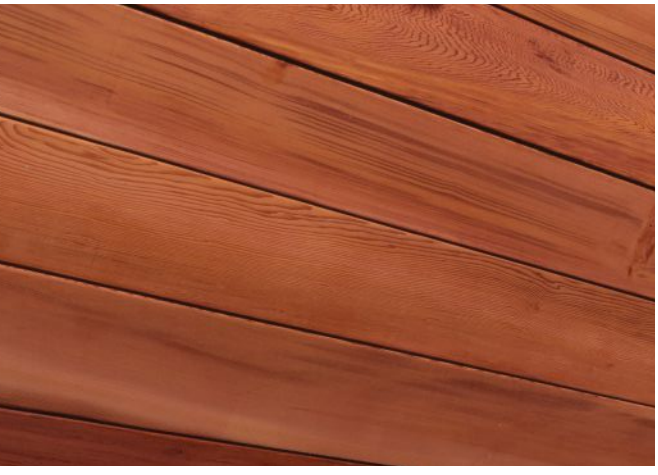
Seize the opportunity and see what happens.

When you become a member of the American Institute of Architects, you immediately expand your professional network to include over 80,000 colleagues.

Through our national allied membership category, if you are in a position allied to the field of architecture, such as engineering, construction, and interior design, you're eligible to join. Not only will membership help you build relationships with architects, you will also get resources to build your business too—including discounts on a subscription to the Architecture Billings Index, a leading economic indicator for nonresidential construction, and AIA Contract Documents.

THE AMERICAN INSTITUTE OF ARCHITECTS

www.aia.org/join_allied



REAL CEDAR

MORE THAN JUST A PRETTY FACE

Real western red cedar's natural lustre and depth make it a favourite of architects, designers and builders. But there's more to Real Cedar than meets the eye. Here are just a few other reasons that make Real Cedar the real, professional choice:

- Extremely versatile and easy to work with.
- Wide range of finishing options; stain or let weather to a silvery gray.
- Cell structure keeps homes warm in winter, cool in summer.
- Structurally solid.
- Naturally rot-resistant.
- Sustainable and renewable.
- Very affordable.

Interested in specifying Real Cedar for your next project? Contact us below.

WESTERN RED CEDAR LUMBER ASSOCIATION
REALCEDAR
WRCLA

www.realcedar.com
1 866 778 9096

NEW

Milwaukee®

M18 FUEL™

DRIVEN TO OUTPERFORM.™

UP TO 2X MORE RUN-TIME

UP TO 30% FASTER CUTTING

UP TO 5X LONGER TOOL LIFE

M18 FUEL™ is engineered for the most demanding tradesmen in the world. Delivering unrivaled performance in a compact structure, all M18 FUEL™ products feature three Milwaukee®-exclusive innovations — the POWERSTATE™ Brushless Motor, REDLITHIUM™ Battery Pack and REDLINK PLUS™ Intelligence Hardware and Software — that deliver unmatched power, run-time and durability. Simply put, the M18 FUEL™ SAWZALL® reciprocating saw is the most powerful 18V cordless reciprocating saw on the market, the first to deliver true corded performance without the cord.

www.milwaukeetool.com/m18fuel

PART OF THE M18™ SYSTEM OF OVER 50 TOOLS.

Hiding Drywall Touch-Ups

Strategies for preventing paint flash over drywall patches is the topic of this May 2011 thread

I have had to do a lot of touch-ups on a place that was a photography studio. There are close to 100 nail holes on every wall and most of the walls are 20 feet by 12 feet. The nail holes are all sizes. The owner did not want to use a primer, figuring that the majority of the spots were so small that it would not be a problem, so we decided to use 20-minute mud for patching, then we sanded and painted almost as soon as the mud dried.

The problem is that all of these little spots are flashing through the walls. The larger patches show through because of differences in the texture of the surrounding wall, which has had several coats of paint applied over the years. So you have roller texture and smooth drywall patches. I also noticed that the 20-minute mud seems to sand to a more polished finish than regular mud.

Any suggestions on how to make the patches disappear? *—m beezo, St. Louis*

High-build primer with a ¾-inch lambs wool roller. Then one to two finish coats. On problem areas, lock it up first with oil-based [Zinsser] Cover Stain and lightly skim with a light drywall compound. When dry (about one hour), prime again, then apply a finish coat.

I think even if you used high-build primer over all those holes it would still flash. I seem to have to pull a tight coat of ready mix over all hot mud on random patches, then prime/texture with a roller. *—Happy Home, Greensboro, N.C.*

I do small patches only with "topping" or AP mud—they really do not take that long to dry on small patches. And I have always primed touch-ups. When I have not primed, larger ones have shown through. *—Davenorthup*

We deal with this a lot, and there are a few issues involved.

When you skim pops or joints, it is tough to rush it or skip a step. The hot muds dry harder and the sand more polished. Whether you use regular or quick mud, it's important to prime. If you don't prime and just paint over them, the patch has a different rate of absorption from the surrounding painted wall. It sucks the sheen in and creates a low flash condition. Meanwhile, you are adding to the sheen of the rest of the wall. It can look OK when viewed straight on, but from angles, it kills.

We use a mini roller and regular drywall primer. Then we set up another mini roller in the paint and feather again. Then we paint the whole wall.

One critical step is the use of rollers (not brushes) for feathering. This way you build up and blend roller texture to match the field of wall. It's a blending exercise of sheen and roller texture. The idea is to make it disappear from all angles in all light conditions. The skimming and sanding have to be right on because even a slight bulge betrays it all. It's helpful to put a square or a level over the patch during sanding to ensure a flush surface. Hope this helps. *—Scott Burt, Topcoatfinishes, Vermont*

Thanks for telling me what I thought I was going to hear ... No primer is a mistake, but again, the owner's call. Now he is hoping we can do a second coat and hoping it hides. I am not so sure. I am leaning toward a system like Scott mentioned with a mini roller to feather in some paint to give it some texture and help hide things. Only on the biggest areas since it seems to be a money issue with the guy. *—m beezo*

I am sure: It won't hide. You can keep piling on the finish coats, but without a sealer, it'll just keep flashing. *—Frenchie, Brooklyn, N.Y.*

Absolutely 100% correct. I had a friend who had a contractor do an addition for him. The contractor swore up and down that primer wasn't necessary, and he painted the inside of the addition. Three coats, four coats, five coats later and it still looked like crap. All the spackle areas bled through. My friend fired the guy after the fifth coat and a month of BS, and primed and painted it himself. Took two coats after priming, but it finally looked right. *—always-learning, N.J.*

Follow Scott's advice. He is spot on. I hope you are charging for all the re-do work since they didn't allow you to do it properly the first time. It is OK for them to save money as long as they are not taking it from you. *—Kgphoto, Los Angeles*

I always spot texture (water-based) prime with Glidden PVA, then paint. Regular primers and even some PVAs are often too thick (almost like paint) and give me problems because they create their own little patch of smoothness by leveling too much of the repair and surrounding areas. *—scott2000*

Live and learn, Beez. A few months ago I did a bedroom chair rail and quoted paint in the owners' choice of color for the whole room. They picked a green pastel. Put the first coat on and about a dozen spot patches showed through. Had to re-skim them with Lite. My mistake, I thought they were going to go with off-white that had been there. *—Happy Home*

Tiny Bubbles

This June 2013 thread offers advice on preventing pockmarks in joint compound

I do a lot of drywall repairs in my business, and I get these annoying tiny bubbles as I apply joint compound. It seems to happen almost always when the joint compound is going over the surrounding area of the patch that has the wall paint on it. Someone said it was due to thinning the compound too much, but I'm not sure I agree with that since it happens with the premix compound without adding water. It also seems to happen with the setting type of compound. Unfortunately, these bubbles are hard to detect until I put primer on the patch, and they look like freckles all over the place. Can anyone help me with this? *—Toolmanbrooks*

It is a pretty common problem when going over paint. It's not due to thinning, it's because the water only has one way out. Patch the best you can; very light coat of primer; very tight coat of compound; then sand, prime, and paint. Only way I've been able to solve it. *—tjbnwi1*

Add a couple of squirts of dish-washing liquid to your compound to reduce the surface tension. *—RogerP, Northwest lower Mich.*

When joint compound dries, it has to be able to do two things: evaporate and be absorbed. The tiny bubbles, called "pocks," are trapped air bubbles created because there is a barrier—such as paint or primer or a harder mud, plaster, etc.—that will not let it be absorbed [into the drywall]. Thus, it has only one way to go and that is outward. When it dries from the outside in, the small amount of heat generated causes air bubbles that "pock" out of the skin. Adding dish soap or No-Pock Pro can help, but the compound may still "pock," just not as bad.

The only recourse is thinner coats with some type of air assist drying and work the bubbles out with your knife. I have in the past used a wallpaper perforator to make small holes so the moisture can be absorbed; it also helps to degloss or scuff up the area too. Thinning the mud is not better, it's actually worse because it adds more water [that has to evaporate or be absorbed].

My 2.5 cents and experience with it throughout the years. *—Mudmastah, East Central Iowa*

ONE 727.
ONE BLADE.

DON'T BELIEVE US?

Go to **oneblade.com** to see the making-of video and get a trial blade so you can take the UpBlade™ Challenge yourself.

Customer Support: 800-628-8810
Technical Support: 800-642-0010
lenoxtools.com
301 Chestnut Street, East Longmeadow, MA 01028-0504 USA

UPBLADE WITH LENOX

Q The 1960s house I'm working on has Romex wiring with a thin 16-gauge ground wire. We are doing a gut remodel of the kitchen and bath, including a new electrical panel. My electrician said that with the new panel, the 16-gauge ground wire in the rest of the house is completely fine. But I've had other people suggest that we should rewire the whole house with heavier gauge ground wire. Who is right?

A Cliff Popejoy, a licensed electrician in Sacramento, Calif., replies:

I agree with your electrician. The smaller-gauge grounding wire that was installed in your house should serve just fine to clear a short or a fault. But to do so, the wiring needs to have been correctly installed, and it needs to be in good condition.

I infer from his comments about the new panel that your electrician is installing arc-fault circuit interrupter (AFCI) breakers for most circuits. AFCI breakers, which are required by the National Electrical Code for new construction, will trip under the same three conditions as regular breakers:

- If there's a short circuit (unintentional contact between an energized or "hot" wire or part and the return "neutral" conductor);
- If there's a ground fault (contact between something that's hot and something that's grounded); and
- If there's an overload (more current flowing than the breaker and wire are rated to safely carry).

But an AFCI breaker will also trip in two other situations: 1) With ground fault current of 30 milliamps or more; and 2) with certain current patterns indicative of an arcing fault. An arcing fault can create a lot of heat (think arc welding on a smaller scale), but the current flows in spikes of such short duration that it usually won't trip a standard breaker. With AFCI breakers, the 16-gauge ground wire should be adequate.

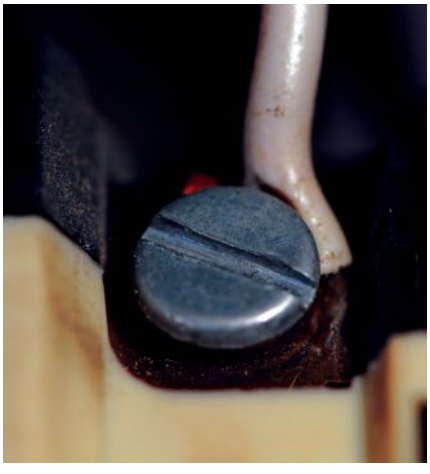
In a conventional circuit equipped with a ground wire, if there's a problem with something connected to the circuit where the hot wire is touching an exposed metal part, the ground wire is there to carry a fault current back to the panel. In doing so, it keeps the metal parts of the tool, table lamp, or appliance at zero volts, and therefore safe. If enough ground fault current flows, the circuit breaker will trip.

Even without AFCI breakers, the 16-gauge ground wire should be adequate in most instances to clear a short, a fault, or an overload. The 16-gauge wire is more fragile than 14-gauge wire and is more apt to break either while making connections, or later, from being flexed over time as things are plugged and unplugged in an outlet that is loose. So there is some advantage to replacing all of the wiring, but the advantage of having a more robust ground wire has to be weighed against the cost of rewiring the house.

What I'd be more concerned about with the 16-gauge ground wire is whether the connections ("splices," in electrician-speak) in the ground wire are all good. Every circuit that serves receptacles and lights is made up of segments of wire (inside cable in most houses) that run from box to box. And in each box the grounds are spliced together (as are the hot and the neutral wires).

With a hot wire or a neutral wire, a bad splice can give users some warning before it fails by causing flickering lights, a buzzing noise, or a burning smell. But the ground wire is different because it only carries current when there's a ground fault. A bad splice in the ground

This electrical meter (photo, left) measures voltage drop that can occur from bad connections or splices such as having wire insulation caught under a connection screw (photo, right).



wire keeps it from carrying the fault current adequately, so the breaker won't trip as quickly as it is designed to, which can lead to a fire.

To check the condition of the circuit, you need a specialized tester that measures voltage drop in the circuit when a controlled load is applied. Running a voltage-drop test will tell you the condition of the wiring and the integrity of the splices without having to open every box in the house to check the connections. Plus, the tester can tell you if there are bad splices that you can't see, such as in a hidden junction box, or worse, not in any box at all. These testers are expensive, but a good service electrician who does troubleshooting and repair work should have one and should also have enough experience to interpret the results of the test.

Q If you have two identical-length floor joist spans, from an exterior foundation wall to a center beam and then on to the opposite exterior foundation wall, is there a significant difference between framing this as two simple spans with the joists lapped over the center beam (the most common arrangement), or using one continuous joist?

A Mark McKenzie, an engineer from Brewster, Mass., responds:

There is a significant difference between the two framing methods. In engineering terms it would be considered a simple-span beam versus multiple-span continuous beam analysis. When you have multiple-span continuous joists, the design moments (bending forces) are reduced and the deflection (sag) of the joists decreases. In other words, with regard to deflection and vibration, continuous joists are stiffer than two simple spans because the two coupled spans act together.

But it is also true that with multiple-span continuous joists, the reactions (loads at supports) concentrate at the center span and decrease at the ends. With simple single-span joists that are overlapped at the center beam or girder, the reactions are equal at each end of the joists. The result is that you can use smaller-sized stock (be it conventional lumber or I-joists) for multiple-span continuous joists than with simple single-span joists. But with the continuous joists, the center beam has more load on it, so you may be required to upsize that beam from the standard tables in the code. In other words, with continuous joists the size of the center beam might have to go from three 2x10s to three 2x12s, or the lally columns might need to be spaced closer together to support the added load.

These days you really only see this

COSMOS GRANITE GLAZE FINISH WITH AEON™ 1870K-55

Affordable beauty that lasts. Introducing six new Wilsonart® HD® High Definition® Laminate designs that are inspired by the earth, not mined from it. Each mirrors the look of natural stone, with the easy care of laminate. Get inspired online.

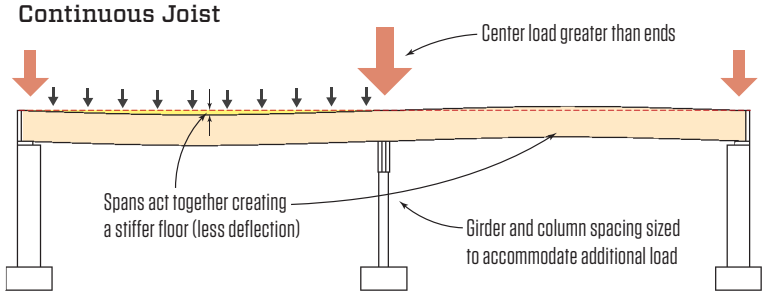
Wilsonart®

wilsonarthd.com | 800.433.3222 | @Wilsonart

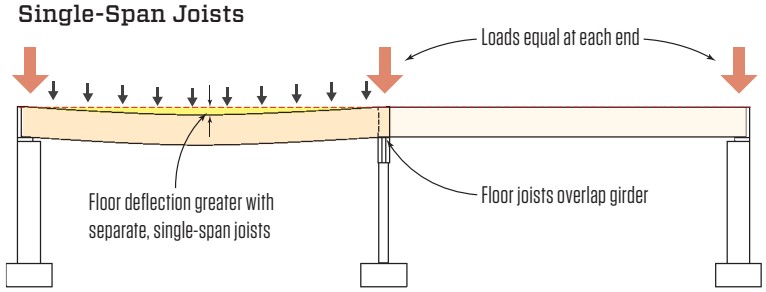
problem with engineered joists because it is difficult to find conventional lumber in lengths greater than 24 feet, which is pretty much the minimum width of a standard, modern-day house. Engineered joists come in lengths of up to 40 feet, so they are often used when you want to run full-span joists over a main carrying beam. By the way, this is only an issue with low girders (beams that are below the joists). Obviously, if joists are installed flush framed with the center beam, those joists would be considered simple single-span joists.

Continuous joists over a center beam give you the advantage of creating a stiffer floor. But with that arrangement, you may need to install a larger center beam or increase the number of support columns, negating any advantage.

Continuous Joist



Single-Span Joists



Breakthrough!

VOC Compliance

Advantage, Pro.

It's here. The breakthrough professional contractors, builders and remodelers have hoped for.

It's PROvantage. The industry's first complete line of construction adhesives that meet the most rigorous performance standards and the most stringent VOC regulations.

Advanced solvent technology
VOC compliant in all states
Performance without compromise™
Best-in-category value

PROvantage™
VOC COMPLIANT ADHESIVES

titebond.com/PROvantage
800.347.4583

Titebond®
THE PRO'S ADVANTAGE™

4-Pack
exclusively available at
LOWE'S
NEVER STOP IMPROVING

One of a Kind.

Beautiful. Strong. Durable. Unique NyloDeck combines the best of today's decking and makes it better. Made using 100 percent recycled carpet fiber, eco-friendly NyloDeck is the superior, yet affordable decking solution that sets the standard for a new generation of decking materials.

- Containing no wood or PVC, NyloDeck is impervious to water, mold, mildew and termites so it won't swell or rot.
- Looks like real wood; durable and rated twice as strong as other leading composites.
- Backed by extensive testing and a 25-Year Fade and Stain Warranty.

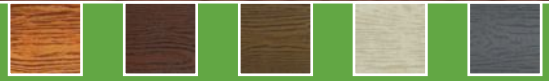
NyloDeck will help you create the ideal, worry-free deck today and for years to come. Learn more at **www.nylodeck.com**

NyloDeck®
No Wood. No PVC. No Worries.

Find us on:

VISIT US AT BOOTH #2615 ON OCTOBER 17-18 AT DECK EXPO IN CHICAGO

NyloBoard – Made in GA, USA – 877-NYLO-909 (877-695-6909)



Desert Spice | Saddle Rose | Mountain Mocha | Newport White | Harbor Gray

WHAT MOVES US:

How Contractors Rate Their Trucks

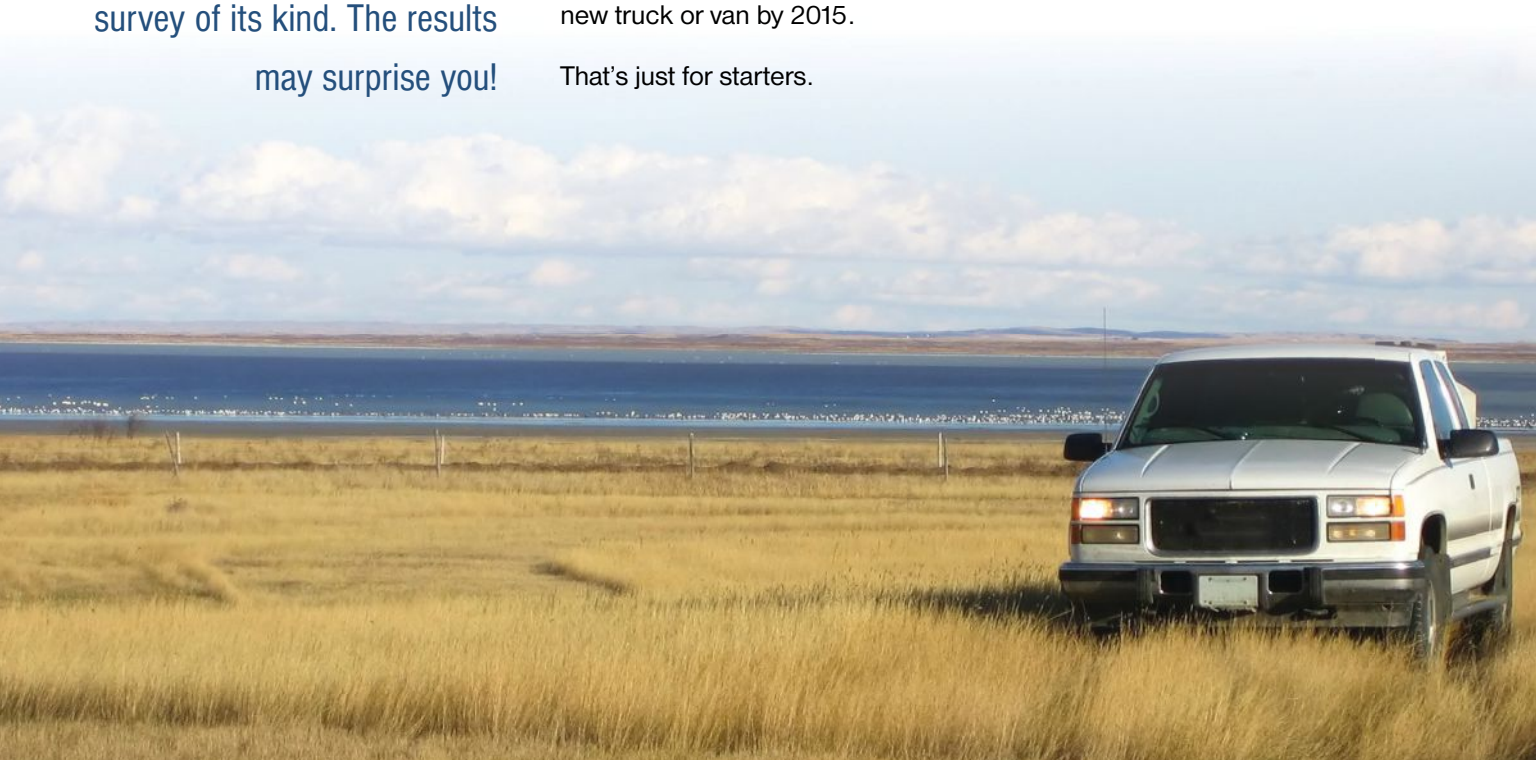
We asked thousands of your colleagues what they really think about trucks—brand, model, size, accessories—in the largest independent survey of its kind. The results may surprise you!

The Hanley Wood 2013 Truck Survey offers an exclusive look at what contractors nationwide use to haul, deliver, tow, transport and, yes, run their business. The results are particularly revealing because few other professions are as truck-dependent as yours. You won't find a tougher, more demanding audience of pickup owners.

How does your pickup stack up? What do your colleagues say about size, accessories, gas vs. diesel, buy vs. lease and other available features? Discover what America's toughest truck buyers have to say as we detail the results of the largest truck/van survey ever commissioned by Hanley Wood (see sidebar: About This Survey).

Gear up, Detroit. A long-overdue 'truck rush' is headed your way. Thanks to the recession, a truck-buying splurge is expected to hit Motor City. Nearly seven out of 10 contractors surveyed held on to their wheels for far longer than expected (seven-plus years on average). That's why a majority of our readers—a remarkable 64%—plan to purchase or lease a new truck or van by 2015.

That's just for starters.



Who rules the road?

Hint #1: It's a Detroit company.
Hint #2: It's not Chevy or Ram.

Our survey shows more contractors drive a Ford (57%), than any other model. Ford's F-150 just edges out the Chevy Silverado for the model more contractors drive. But as you might expect, Ford, Chevy (45%), Ram (22%) and GMC (21%) dominate the market with double-digit owner/lease rates.

Other makes, notably Toyota (11%), have their fans. But clearly Detroit rules the road for commercial pickups.

ABOUT THIS SURVEY

Hanley Wood commissioned independent polling consultant Readex Research (readexresearch.com) to conduct a confidential email survey in July, 2013, utilizing sample sets across the databases of eight Hanley Wood publications: Builder, Concrete Construction, Custom Home, The Journal of Light Construction, Pool & Spa News, ProSales, Remodeling, and Tools of the Trade. The results are based on 2,585 responses (a 1.9% response rate), reflecting a margin of error of less than 2% at a 95% confidence level. For an in-depth look at survey results, visit www.toolsofthetrade.net/truckstudy.

Low price vs. durability.

Like bidding a job, it usually comes down to price, right? Not quite. The biggest decision factor at buying time is durability. That shouldn't be a surprise…no wheels, no job.

Cargo area/payload size and then price rank as the second and third most important factors when choosing a truck model.

Since cargo area is such a big factor, you might expect a 26,000 GVWR (class 7 heavy duty pickup) would be more popular than a 6,000 GVWR (class 1 light duty truck). It's not. Most of our readers (53%) are happy with a class 1 or 2 light-duty pickup. Twenty-two percent of our pro readers however are looking for a medium duty truck and nine percent need heavy duty vehicles.

So while price helps drive sales, other considerations play a large role in purchasing decisions:

- Well-engineered design (81%)
- Ease of maintenance (80%)
- Ease of handling/driving (79%)
- Fuel efficiency (71%)

Power train options are not optional.

Readers we surveyed were in solid agreement on these options:

- Gas or diesel? It's no contest: Gas powers your rides by a 3 to 1 margin.
- 8-cylinder vs 6-cylinder? 8-cylinder is the clear preference with 68% of respondents. Only 27% opt for a 6-cylinder version.
- Automatic vs manual? Nearly 91% choose an automatic.
- 2-wheel drive vs. 4-wheel drive? Here we see a fairly even distribution, with 48% opting for 2-wheel and 51% opting for 4-wheel drive.

MAKES OTHER TRUCKS SUCK IN THEIR GUTS

★ BEST-IN-CLASS 25 MPG HIGHWAY FUEL ECONOMY[1] ★

STANDARD SPRAY-IN BEDLINER AND CLASS 4 TRAILER HITCH ★ BETTER RESIDUAL VALUE THAN FORD & CHEVY[2]

NEW 3.6 PENTASTAR® & TORQUEFLITE 8™ 8-SPEED TRANSMISSION

AVAILABLE RAMBOX® CARGO MANAGEMENT SYSTEM ★ UNSURPASSED 5-YR/100,000-MI POWERTRAIN WARRANTY[3]

THE NEW RAM 1500 TRADESMAN

GUTS·GLORY RAM

RAMTRUCKS.COM/COMMERCIAL

RAM COMMERCIAL

[1]Standard pickup class EPA est. 17city/25 hwy mpg based on V6 4X2. [2]Based upon Auto 2013 MY forecast effective May-June 2013 sales weighted average of all light duty trims for each model at 36 mos. 15,000 per year. See dealer for a copy of the powertrain limited warranty. Ram and RamBox are registered trademarks of Chrysler Group LLC.

"Crank up that air!"

Accessories you can't live without.

Contractors love their bed liners and tool boxes, no question about it. But when it comes down to one must-have, can't-be-without accessory when purchasing a new truck, your colleagues chose…air conditioning (77%)! Bed liners (44%) and rear step bumpers (44%) take the number two and three spots on the list.

When it comes to must-have accessories, contractors are split pretty evenly between adding those options when they purchase a new vehicle or waiting to purchase aftermarket products:

	Aftermarket Sales	New Purchase
Tool Box	#1 choice: 42%	#2 choice: 44%
Bed Liner	#2 choice: 34%	#3 choice: 24%
Cover/Cap	#3 choice: 23%	#6 choice: 20%
GPS Nav. System	#4 choice: 19%	#8 choice: 14%

Replacement tires are a necessity and represent the one recurring purchase we all have for our vehicles. According to our survey, none of the major tire brands hold an overwhelming favorite spot among contractors. Michelin rides in as the number one choice (38%) with Goodyear (35%) and Bridgestone/Firestone (33%) following close behind. BF Goodrich (28%) and Cooper (17%) round out the brands that capture double-digit results with tires by Toyo and Yokohama as part of a large group of smaller competitors.

Buying time

According to this survey, 63% of contractors own their trucks while 37% opted to lease. With an average fleet size of 22 per respondent, our readers clearly know their trucks and place heavy demands on their use. But whether the fleet size is five or 50, all companies share the same vehicle issues, from maintenance and accessories to replacement. If you are like our survey respondents, we predict you'll be out kicking tires on the truck lots within the next few months trying to strike the best deal possible. Good luck truck shopping!

Geothermal is *easier than you think*

With more than 1 million units in American homes today and ClimateMaster leading the way, that number just keeps growing.

Create a high performance design with the industry leader - Include a geothermal heating and cooling system from ClimateMaster. Long Life, reduced operating costs, low maintenance with no outdoor equipment and 30% federal tax credit on installed cost are just a few of the benefits that home buyers, remodlers, home owners, architects and designers will appreciate.

Call 866-246-3190 or visit us at cmbuildernet.com for more information today.

CLIMATEMASTER®
Geothermal Heating & Cooling

Member NAHB
NAHB Leading Suppliers Council

HomeSphere®
The Building Universe

BY KYLE DIAMOND

First Time Using R-Sheathing

Though I've used Zip System sheathing on several past jobs, I recently began work on a project where we used the insulated panel, Zip System R-Sheathing, from Huber Engineered Woods (huberwood.com). It's basically the same 7/16-inch OSB wall sheathing bonded to either a ½-inch (R-3.6) or 1-inch (R-6.6) poly-iso foam panel. The project—a new 1,600-square-foot one-story apartment built slab-on-grade—called for R-24 in the walls, which we achieved with R-18 open-cell foam in the walls and R-6 from the R-Sheathing. We planned to install the 4x8-foot panels vertically after the walls were framed and in place, which would reduce the number of seams and keep us from having to install a ton of manufacturer-required horizontal blocking. We also decided to cut out all window openings after the panels were in place.

Framing. The slab wavered up to ½ inch in places along the longest wall, so we decided to set the foam sill seal and PT 2x6 mudsills back 1½ inches off the edge of the concrete (1, next page). This setback would also help protect the exposed edge of the insulation from rodents and insects. Although the R-Sheathing specs allow for 24-inch on-center spacing, we switched to 16 inches for the 2x6 exterior walls because we wanted the extra nailing. We framed "California" corners (2) instead of adding an extra stud nailer, and we accounted for the panel thickness in the wall layout so we could install full-width 4-foot panels at the corners.

To save the labor of cutting a couple hundred studs, we decided to use 92 5/8-inch precuts. And so we wouldn't have to add blocking for nailing at the top of the wall, we planned to align the bottom edge of the R-Sheathing with the bottom plate of the wall, then fill in with PT strips at the mudsill and strips of sheathing at the second top plate. We realized after the building was mostly dried in that the sheathing did not connect the wall framing to the mudsills, which were bolted to the concrete. I'm currently working with the architect to come up with a solution, and I may have to go back and install additional anchor bolts through both the bottom plate and mudsill to pass inspection.

Cutting. We used a Festool track saw with a 48-tooth blade for precise cuts at angled rakes, and a circular saw with a Diablo 24-tooth framing blade for almost everything else. We didn't encounter any wear and tear on the blades, but we wore dust masks to protect against some fine dust

kicked up by the polyiso and its backing.

Installation. We used 1½- by 1½-inch PT spacers (3) as stand-offs to help put up the panels. A full sheet is fairly light, but it's a two-man job install (4), especially at the outside corners where the panels lap each other. We took time to square them up properly (5). It's important to orient panels the same way and to work in one direction because the foam overhangs the OSB slightly on one long and one short edge to ensure proper gapping. In a few places, we installed panels horizontally to save material; this meant adding horizontal blocking for edge fasteners (6).

Fastening. We used full-head 3-inch, 0.131-diameter, smooth-shank collated stick-framing nails (bostitch.com), which met Huber's fastening specs, and followed nail-spacing requirements of 4 inches on-center at edges, 12 inches in the field. We nailed at a deliberate pace, trying to drive the nails slightly below flush, but being careful not to overdrive. (We taped any overdriven nails in the field.) We hammered flush any nails standing proud in the field, but avoided this at the edges where hammering can compress the foam (7).

Taping. The main difference in taping R-Sheathing stems from its added thickness. We used Huber's 6-inch-wide Zip System Tape at outside corners, which provided the required minimum 1-inch lap onto the OSB. For the rest of the seams, we used 3¾-inch-wide tape. (See "On Site With Zip System Sheathing," Feb/11, for more information about taping.)

For the windows, we set up a mobile cutting station to cut tape for the head, jamb flashing, and the four-piece pan (8). We started at the pan flashing, using Zip System's corner/valley tool (9) to set 9-inch lengths of 6-inch tape in the corners, with 3 inches on the sill and running up the trimmer, and the 9-inch dimension flush with the inner edge of the 7-inch-deep sill. This left 2 inches overhanging the sheathing, which we stretched (10) and pressed onto the panel face (11). This doesn't always work perfectly, but corner flashing gets covered with the next couple of pieces, plus sealant under the window's nailing fins.

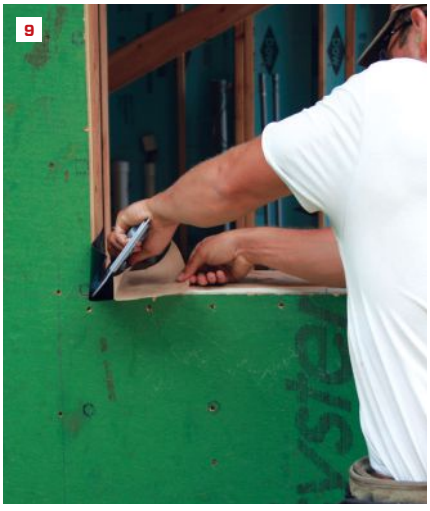
Everything you need to go from rough opening to bragging rights.

Whether it's remodeling or replacement, Marvin has the broadest range of products and energy efficiency solutions for any job. All backed by four generations of craftsmanship, innovation and local retailer support. And now it's your opportunity to showcase a job well done. Submit before and after photos of your proudest projects and be featured in the myMarvin Remodelers Gallery.

Show off your remodeling project at **pros.myMarvin.com/Gallery**

MARVIN Windows and Doors

Built around you.®



Next, we ran 6-inch tape the full length of the rough opening, plus 2 inches up each trimmer. This piece is adhered half at a time. First, fold it to half its length, peel back the release paper on one side, and press it onto the sill with the fold on the centerline mark and the outer edge overhanging the sheathing by about 2 inches. Burnish the tape with the corner/valley tool, including the 2-inch vertical legs, then peel back the other half and adhere it to the sill and trimmer (12). Make a 1¼-inch cut down the 2-inch vertical legs and stretch the overhanging strip of tape down onto the panel surface.

Next, install an 8-inch length of counterflashing tape in each corner, first adhering a 6-inch leg vertically, then the 2-inch leg horizontally. This piece should also overhang the sheathing by 2 inches, so cut and stretch it as before, and press it onto the panel face. Finally, cover the remaining exposed sill with a second full-length strip running across the sill and 2 inches up the trimmer, then roll the entire pan using the Zip System J-roller (13).

When installing the windows, we put a healthy-sized bead of sealant about 3 inches back from the sill's edge to act as a dam. With the windows in place, we applied a strip of tape at each jamb, running it about 3 inches above and below the window frame (14). Lastly, we applied the head flashing and rolled everything with the J-roller (15).

Finishing up. We plan to use PVC trim stock to create a water table at the slab, install metal Z-flashing over it, then apply 8-inch beveled cedar siding over Benjamin Obdyke Home Slicker.

One small complaint: Though I wouldn't call the material "fragile," the corners were dinged on a few of the 50 sheets we used, and the edges on a few sheets were damaged by the metal banding.

In general, we liked working with R-Sheathing and had no problems with it. I'd welcome longer-length panels, but the main issue is convincing people to invest in wrapping the house in foam to create a good thermal envelope.

Kyle Diamond is a partner with New Dimension Construction, in Millbrook, N.Y.

Cutting the fine line between perfection and obsession.

Festool's durable and versatile new Carvex is unlike any jigsaw you've ever used. A versatile quick-change system of baseplates is ready for your full range of applications, while zero-clearance splinterguards, triple-blade guidance, and stroboscopic lights combine for straight and true cuts with virtually zero tearout. With the robust Carvex, you'll cut through the heart of your most challenging tasks.

Visit www.festooljigsaws.com to learn what makes a Festool jigsaw different from all the others.

FESTOOL®

Tools for the toughest demands

STEP IT UP.

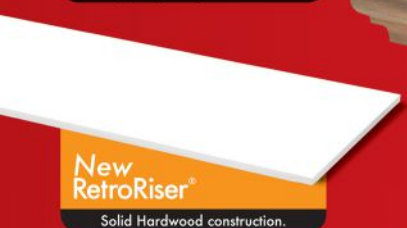
Young RETROTREAD® & RETRORISER®

US Patent #8,141,321 B2, D661,816 S & other patents pending.

make it easy to renovate any carpeted stairway to premium hardwood.

Not just easier, but more affordable, simply tear away your old carpet and install the Young RetroTread® over your existing stairway. You get a solid hardwood upgrade without having to rebuild.

Young RetroTread® is made in the USA by the same family of craftsmen who have been helping to build America since 1858.



YOUNG®
OAK MILLWORK FOLKS

MADE IN USA

1-800-545-6595
YOUNGMANUFACTURING.COM

BY GEORGE WEISSGERBER

Building a Unit Price

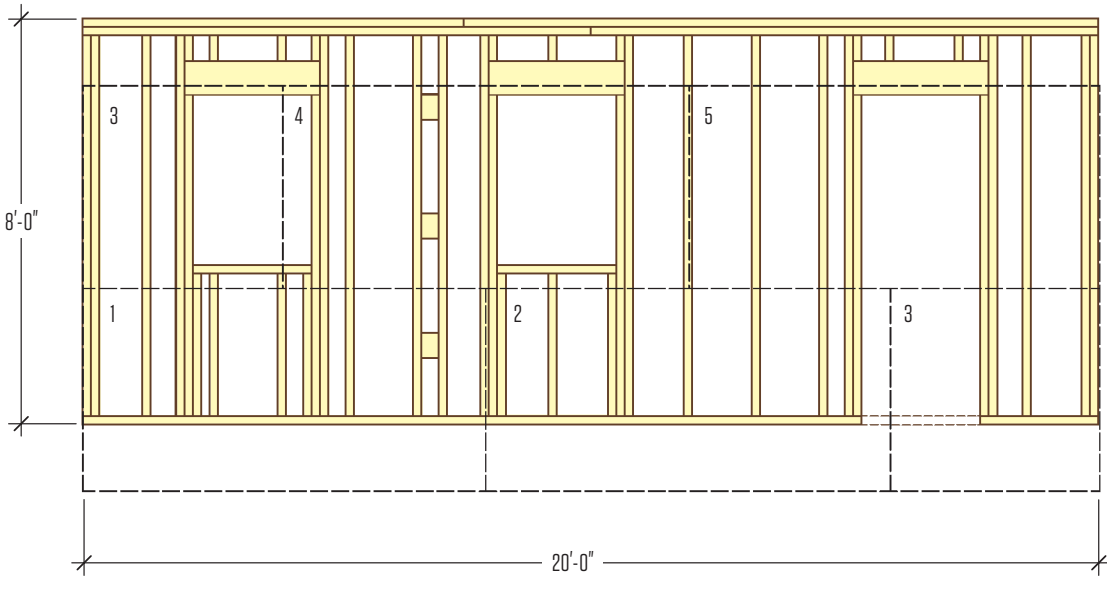
The foundation of every computerized estimating system is its database of unit prices. This type of pricing looks at typical project components, such as an exterior wall or a floor system, and calculates the cost per a particular unit of measure, such as a square foot, a square yard, or a linear foot. To develop a unit price, you need to do a stick estimate, but you only need to do it once for each component in your database. The stick estimate worksheet I discussed in my last column (Business, Aug/13) has all the elements needed to create a unit price.

Let's look at how you might go about calculating a unit price to frame a typical exterior wall. I find that working from a sketch of the wall, such as the one below, makes it easier to visualize all the parts and pieces that need to be included. As with the custom item worksheet, the unit price worksheet uses a unit of measure that fits the kinds of materials and dimensions for the task at hand. In this example, I have chosen to build a unit price based on the materials needed to frame an exterior wall that is 20 feet long and 8 feet high. (We'll look at adding labor to this unit price next time.)

Waste is something to consider when making this initial takeoff. For example, I've listed 24 8-foot studs for this wall, which is the actual count. But you may discover over time, as I did, that jobs keep coming up short by a few 2-bys. My solution today is to add one additional stud. Similarly, the actual count for OSB sheathing is a little over 5 ½ sheets (remember, the OSB has to cover the rim joist, so a narrow strip is needed to fill out the top of the wall), but I've rounded this up to 6. There are other strategies: Some contractors add a waste factor to allow for damaged material or to provide lumber for bracing; others simply round up (as I did for sheathing) or add a separate line item. However you treat this issue, in the end it's cheaper to have figured a little extra than to have to make a run to the lumberyard for more material.

Because the base wall has a total area of 160 square feet (8x20), all of the costs listed in the worksheet will have to be divided by 160 to yield the price-per-square-foot (see table, next page). I've also included calculations for a price-per-linear-foot, which some contractors prefer. The difference is that a linear-foot price applies to a wall of a

Framing Diagram for Exterior Wall Unit Pricing 2x4/6 at 16" o.c.



This rough framing plan depicts a typical exterior wall of a length and height that are easy to visualize and convert to square-foot or linear-foot units of measure. With its three openings, this wall has a little more material than a wall with no openings, but the takeoff is accurate enough for sales pricing.

2x4 Ext. Wall, 16" o.c. 2 windows, 1 door	Material Estimate by Count							
	Qty	LF or SF	+	Qty	LF or SF	=	Total	Units
Studs/jacks/cripples	24	8	+	7	4	=	220	LF
Top & sole plates/sills	3	20	+	2	4	=	68	LF
Headers (2x8)	3	3.5	+	3	3.5	=	21	LF
Sheathing (4x8 OSB)	6	32	+	0	0	=	160	SF

2x4 Ext. Wall, 16" o.c. 2 windows, 1 door	LF Material per SF of Wall					
	Total	Units	÷	Wall Area	=	LF/SF
Studs/jacks/cripples	220	LF	÷	160	=	1.38
Top & sole plates/sills	68	LF	÷	160	=	0.43
Headers (2x8)	21	LF	÷	160	=	0.13
Sheathing (4x8 OSB)	160	SF	÷	160	=	1.00

2x4 Ext. Wall, 16" o.c. 2 windows, 1 door	LF Material per SF of Wall					
	Total	Units	÷	Wall Length	=	LF/LF
Studs/jacks/cripples	220	LF	÷	20	=	11.00
Top & sole plates/sills	68	LF	÷	20	=	3.40
Headers (2x8)	21	LF	÷	20	=	1.05
Sheathing (4x8 OSB)	160	SF	÷	20	=	8.00

Material Estimate by Count
To build the unit price, count quantities for each wall element—studs, plates, headers, and sheathing. In this example (top), doors and window rough openings are assumed to be 3 feet, and sheathing is assumed to be applied horizontally in staggered courses. Waste from jack studs provides blocking, but cripples are counted at a rough length of 4 feet each. Some contractors add a waste factor to allow for damaged material, or to provide lumber for bracing; others add a separate line item for these.

Unit Price per Square or Linear Foot
The middle table converts quantities from the material takeoff to a quantity per square foot of wall area. This value, combined with a dollar cost, will yield the unit price per square foot. The bottom table converts quantities to linear feet. Combined with a dollar cost, this value will yield the unit price per linear foot of wall.

particular height, while a square-foot price can be used on shorter or taller walls, provided they are constructed in more or less the same way. A square-foot price could also be applied to a gable wall, although labor might vary with wall height and roof pitch, as well as whether the walls are framed "on the ground" or in-place.

This is a fairly simple example, but you get the idea. You could create similar linear-foot and square-foot unit prices for exterior walls constructed using 2x6s at 24 inches o.c. And you could create linear-foot versions for 9-foot- and 10-foot-high walls, and the square-foot unit prices for 2x4 or 2x6 exterior walls could also be used to find the cost of walls taller than 8 feet. All together that would give you six options for basic exterior wall framing.

You could also expand the materials covered by the unit price to include metal connectors, insulation, drywall, even siding. And you can build these so-called "assemblies" for other parts of the building, including floor and roof framing, siding and roofing, exterior and interior trim, and so on. Assemblies are common in computerized estimating systems, which often come preconfigured with unit measures and pricing. But if you want to customize estimating software to reflect the way you actually build, you'll want to go through something like the process I have just described.

You can create as many assemblies as you find useful, but it's possible to over do it. This process works well for those building elements for which you have a "standard" method of construction. If you include an element that is used only occasionally (rain screen siding in a wall assembly, for example), that assembly becomes useless to you on jobs that aren't built to that spec.

Note that this system gives you a rough material quantity, but it won't deliver a bill of materials that a lumberyard can use to quote current pricing and build a pick list the way a computer-based system can. Estimating software can also introduce rules that improve accuracy, and they can use menu systems that allow you to specify number and size of windows to change the dimensions of the lumber used in a wall or floor.

That said, once labor hours and prices are added, it will give you a reasonably accurate price for direct costs of a job. We'll look at adding these, plus menu systems in future columns. But even a simple, manual unit-pricing system will keep you from investing too much time in projects for which you may never sign a contract.

George Weissgerber is senior vice president at Case Design/Remodeling, in Bethesda, Md.

BUILD A BETTER WALL

with HydroGap Drainable Housewrap

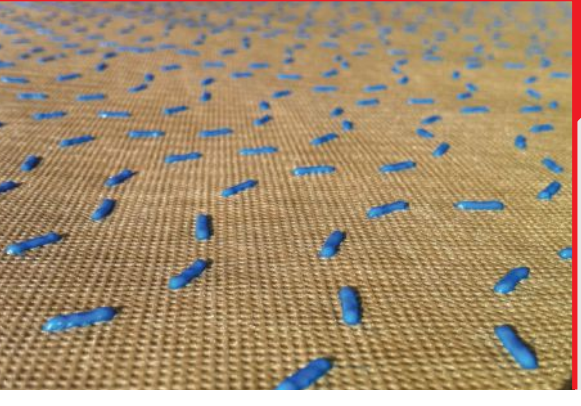
PROTECT YOUR WALL

from damage due to moisture build-up. Use **HydroGap Drainable Housewrap** behind your siding as the water-resistive barrier *and* drainage plane.

HydroGap is a perfect match for absorptive siding like fiber cement and wood. It provides a 1mm drainage gap that removes 100X more water from a wall versus standard housewraps.

Don't settle.

True drainage performance means less potential for mold and moisture damage - and less worry of call backs or warranty complaints for you.



NEW

ACHIEVE A 15-YEAR PRODUCT & LABOR WARRANTY WITH

HydroGap® DRAINABLE HOUSEWRAP + HydroFlash™ SELF-ADHERED FLASHING

VISIT HYDROGAP.COM FOR FULL WARRANTY DETAILS

BENJAMIN OBDYKE
roof & wall products

benjaminobdyke.com
800.523.5261

Get to know HydroGap®

Three Changes to Your SEO Strategy

BY APRIL WILSON

The world of search engine optimization (SEO) has radically changed in the last year. (SEO is marketing lingo for how easy it is for search engines such as Google, Bing, and Yahoo to find your website.) The search engines have made several big changes—you may have heard of Google's "Penguin" or "Panda" updates—in the way they calculate which websites best match a user's search query. Everything you thought you knew about SEO is likely to no longer be true. Gone are the days when your HTML code and tag structure were important, and today repetition may hurt your ranking.

Subject Matter Expertise (Not Keywords)

Search engines aren't dumb. They quickly figured out that spammers were working very hard to "game the system" by repeating high-traffic keywords over and over. Unfortunately, many legitimate business owners were also using those same strategies. If you've noticed in the last year that instead of being on the first page of Google you're now showing up on page 12, you are probably overusing keyword repetition.

In the new world of content marketing, what you choose to talk about on your website is more important than how you talk about it. Ideally, focus on no more than three featured topic areas. For example, you might choose bathroom remodeling, kitchen remodeling, and basement finishing as the top three things your business does. Everything you post on your website (blogs, project photos, events, news, etc.) should focus on one of those topics. Remember, the search engines are now looking for subject matter experts, not generalists.

Illustration: 2013 Michael Austin c/o theispot.com

Content Structure (Not Page Titles)

"Old" SEO had some very basic rules to follow: Make sure you have keywords in your page title; use keywords at least four or five times in the text on those pages; and make sure all of your meta-tags and meta-keywords are coded in your HTML. None of these are very helpful anymore, and overuse of keywords in your writing can actually result in a lower ranking in today's search engine algorithms. Remember, search engines are wary of people gaming the system.

Because search engines rank subject matter experts higher than sites that seem like they're trying too hard to do well on certain topics, consider redesigning your navigation to classify all of your content into one of your specialty topics. Using the example introduced above, we might change that website's navigation to read: Home, Bathroom Remodeling, Kitchen Remodeling, Basement Finishing, About, Contact Us. Any new content posted should fit into one of those categories, and the URL for anything would include those keywords (for example: http://www.awesomeremodelers.com/bathroom-remodeling/main-street-project-photos).

Experts (Not Amount of Content)

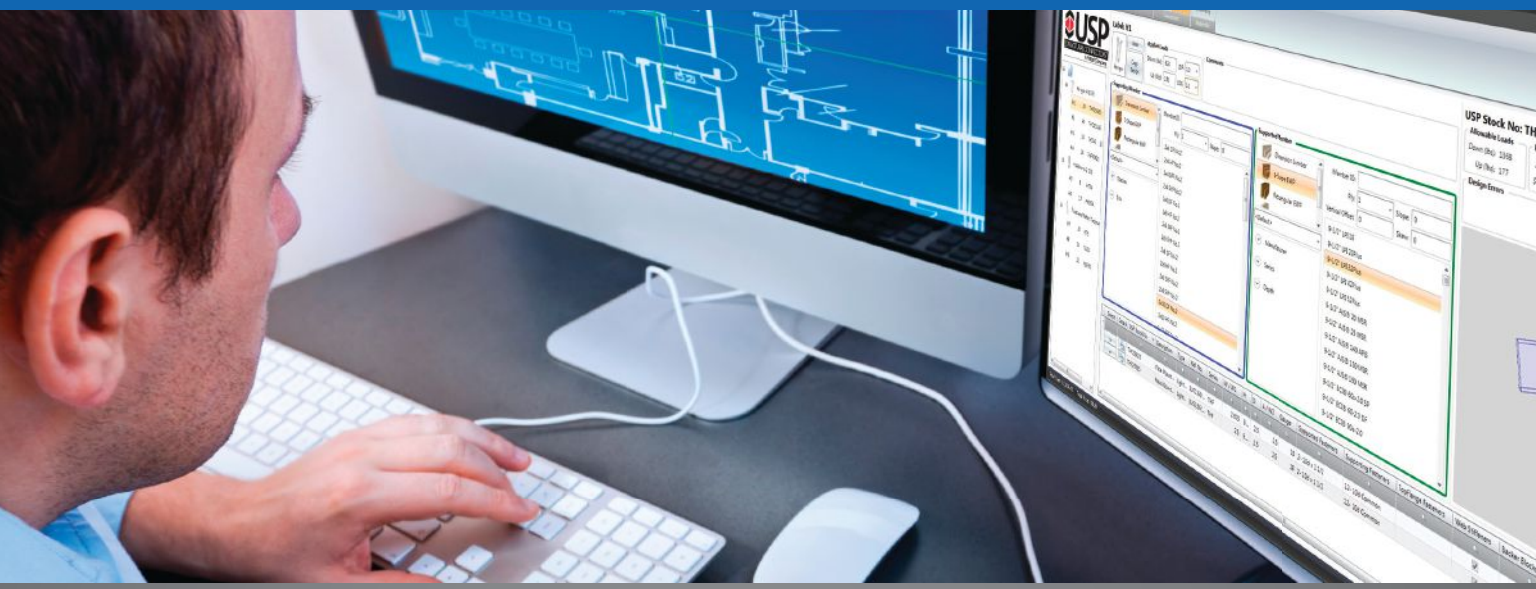
Finally, start paying attention to who writes for your website. Author rank is becoming extremely important for SEO in the new landscape, because Google now assigns a higher search ranking to people who write about the same topics on multiple websites. Their logic is that because these people write for many sites on the same topics, people must believe them to be an expert. Your SEO strategy must include incorporating author rank into every new piece of content created to make sure that the author's influence is part of a search engine's process.

In short, the new SEO technologies operate less like computer algorithms and more like reporters sniffing out a good story and chasing down qualified sources. In coming issues, we will focus on how to change your strategy accordingly for each of these three areas.

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

The USP Specifier.™

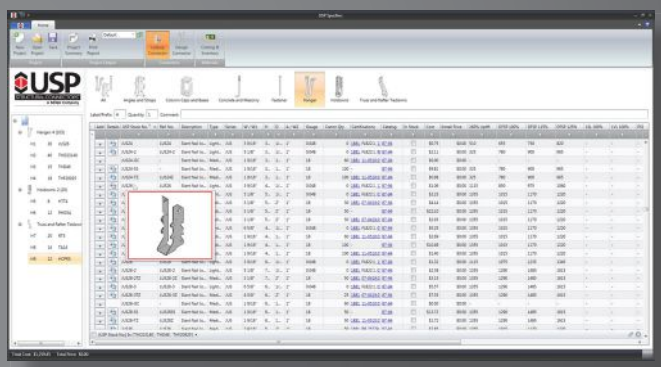
Our newest production and design software for engineers and estimators.

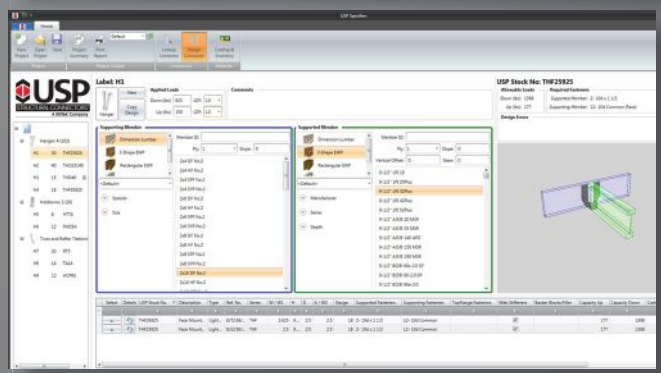


Our USP Specifier™ software puts you in command with instant product and design information. Search through our comprehensive catalog of connectors, compare products, price out jobs and produce the most accurate, cost effective solutions possible.

We are committed to providing you with the best software tools possible to make your job easier. **Download and activate your free copy of the The USP Specifier today at www.uspconnectors.com/specifierPro**

- Manage the complexity of the proper selection of hangers
- Provide project management and cost control
- Generate summary reports, bid and connector conversion information
- Conveniently transfer project summary, schedule tables and installation details to CAD working drawings.... and much more





USP STRUCTURAL CONNECTORS® A MiTek® Company

800.328.5943 / 952.898.8772 www.uspconnectors.com
info@uspconnectors.com

Better Technology. Better Building.

MiTek®

A Berkshire Hathaway Company

VERANDA™ HP

High Performance Deck & Trim

LIFETIME LIMITED WARRANTY

Experience

a comfort of life in a new scale.

Designed to accent and give your home the wood look, without the wood maintenance. Our High Performance PVC TRIM and DECK won't splinter or crack, so there's no annual painting or staining.

Veranda® HP's advanced technology provides the ultimate protection against the outdoor elements so that it requires less effort and enjoy more out of life!

ACORN DECK


Won't rot, crack, splinter or split


Flame Retardant


Mold Resistant


Ultra low Maintenance


Termite Resistant


Moisture Resistant

Made in the U.S.A.

www.VerandaHP.com / 877.977.2386

Available at THE HOME DEPOT®

BY ALLISON BAILES

The primary purpose of housewrap is water protection, as shown here where it serves as a drainage plane to keep wind-driven rain and snow out of the walls. Housewrap doesn't make a good air barrier. While the seams can be taped to improve its air resistance, it should never be taped at the bottom, otherwise it can trap water. You're better off air sealing with a combination of peel-and-stick tapes, sealants, and gaskets.

Top 10 Building Science Secrets

***Editor's note**: In reviving JLC's Energy column, we are pleased to offer a contribution by Dr. Allison Bailes. Don't let the "Dr." worry you. Yes, he's a Ph.D. physicist (which means he knows something about heat and moisture transfer through buildings), but Dr. Bailes is also one of the most down-to-earth practitioners of the building sciences, and his blog postings (energyvanguard.com) and twitter feeds (twitter.com/Energy Vanguard) are must-reads for anyone interested in the energy performance of buildings. You can read more about these top 10 "secrets" in-depth on the Energy Vanguard blog, and we will be exploring them more here in the future.*

Overall, the state of the construction industry is improving. Many builders and remodelers are learning, either out of interest or coercion, about building science and how to apply it. But while we're headed in the right direction, plenty of builders and remodelers aren't getting the message, and plenty of houses are being built with problems that shouldn't be that difficult or expensive to fix. Here, then, is a start. The 10 "secrets" below aren't really secrets, but judging by some of the conversations I have with people in the construction industry, they might as well be.

1 Housewrap isn't installed to be an air barrier. Many people believe that by putting housewrap on a building, they have their air barrier taken care of. But the air barrier's job is to minimize the amount of air that crosses the building enclosure between conditioned and unconditioned spaces. The

Power ventilators, even solar-powered ones, can cool the attic only if the fan pulls outside air into the attic. This air cannot come from the house, or you're just sucking away conditioned air. This means the ceiling plane must be airtight. But if you have an airtight ceiling, you don't need an attic fan. Bottom line: Power ventilators are a waste of money and a liability.

An attic pull-down stair, all 10 square feet worth, doesn't seem like much area. But in a 1,000-square-foot attic insulated to R-38, that 1% increase in area can result in a 27% decrease in the ceiling insulation R-value.

real purpose of housewrap is to be the drainage plane behind the cladding, and although housewrap can theoretically qualify as an air barrier material, it must be meticulously installed to effectively stop air leakage.

Builders usually do a decent job taping seams in the field, but rarely at the top edges. To qualify as an air barrier, housewrap would also need to be sealed at the bottom edge, but there's a good reason why this should never be done: You'll trap water inside when it gets behind the housewrap and can't drain out at the bottom of the wall.

Then there are all the mistakes. For example, housewrap at an inside corner often "cuts the corner." This sometimes prompts cladding contractors—who need to install siding tight to the corner—to slit the housewrap to get it to lie flat. And the innumerable tears, rips, and cuts that occur rarely get sealed before cladding, allowing air to move across the housewrap.

Finally, research shows that housewrap doesn't work effectively as an air barrier in both directions. We want an air barrier that works in both directions because the building is subject to both infiltration and exfiltration, depending on the direction of pressure gradients acting on a building.

But when we test homes for air leakage, we pretty much always test them in only one direction: from outside to in. We put the house under negative pressure with a blower door and then measure the air flow through the fan, which tells us how much air is leaking in through the building enclosure.

When homes that are air sealed with housewrap are tested under positive pressure, they perform far worse than those same homes tested under negative pressure. The reason for this is probably that air leaking out of gaps in the sheathing pushes the housewrap out, filling it like a balloon, and then the air readily finds the leaks at edges and penetrations through the housewrap and siding.

2 Power attic ventilators are a liability, not a feature. While power attic ventilators will probably keep your attic cooler, a significant portion of the cooling in your attic will be provided by your air conditioner.

When that power attic ventilator runs, it's going to pull air from wherever it can find it. Since air takes the path of least resistance, some of it will likely be coming from the conditioned space in your home. So basically what you're doing is air conditioning your attic. The longer the fan runs, the more conditioned air it pulls into the attic.

3 A house does not need to breathe. People need to breathe. A house needs to have good "control layers":

- A thermal control layer, also known as insulation.
- A water control layer, or weather-resistive barrier, that limits the entry of rain and snow.

PrimeGuard MAX™ STAINLESS STEEL

BUILT RIGHT

Trust Not Rust

Grip-Rite® PrimeGuard MAX™ Stainless Steel Fasteners defy rust, corrosion and stains – no matter the wood or the weather. We're so sure of it, we back with a lifetime guarantee!

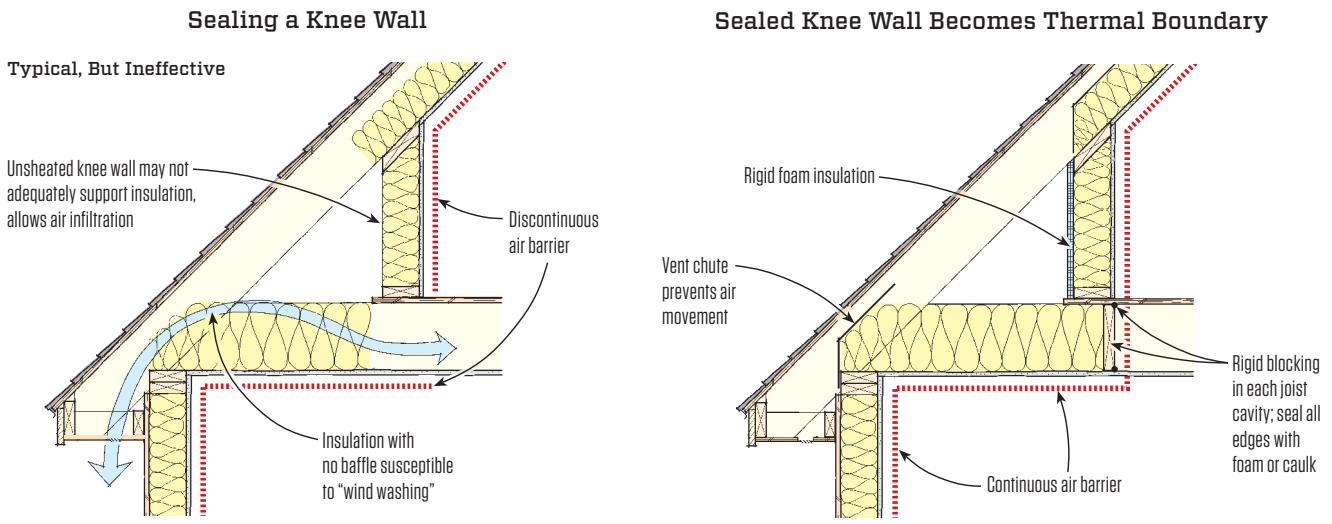
- Certified 100% solid STAINLESS STEEL
- Uniquely designed and recommended for outdoor construction
- High quality fasteners to match your premium building materials

Grip Rite®

BUILT RIGHT. GRIP-RITE.

To learn more about why MAX is your best choice for STAINLESS Fasteners, call 800-862-3848 or visit grip-rite.com and see the complete product offering.

PRIMESOURCE® BUILDING PRODUCTS, INC.



Unprotected knee-wall insulation is prone to falling out and allows air to flow through it, as shown in the illustration above, left. To solve this problem, the exterior side of the knee wall should be sheathed, as shown on the right. Rigid insulation works well as a sheathing to cover the knee-wall insulation because it adds R-value to the knee-wall assembly. Be sure the floor below the knee wall is blocked off, as well. Otherwise airflow will short-circuit through the floor framing.

■ An air-control layer, also known as a continuous air barrier, to stop unconditioned air from leaking into the building and conditioned air from leaking out. Air also carries water vapor, and this can be a significant source of moisture in buildings. So the air barrier will also help control humidity.

A house cannot be too tight in my opinion. Yes, a tight house can have problems, but it's generally not because of the air sealing. The problem is the lack of systems thinking.

Here are the three main problems that may occur with tight houses:

■ Poor indoor air quality (IAQ)
■ Backdrafting of combustion appliances
■ High humidity, mold growth

The solution to the first of these problems is source control and mechanical ventilation. The solution to backdrafting is to use sealed combustion equipment or to isolate atmospheric combustion appliances from the living space and give them their own combustion air supply. The third problem, humidity, is often solved by properly sizing the cooling system, having a good ventilation system, and using materials that don't trap moisture.

So instead of saying that the house needs to breathe, we should substitute these three rules:

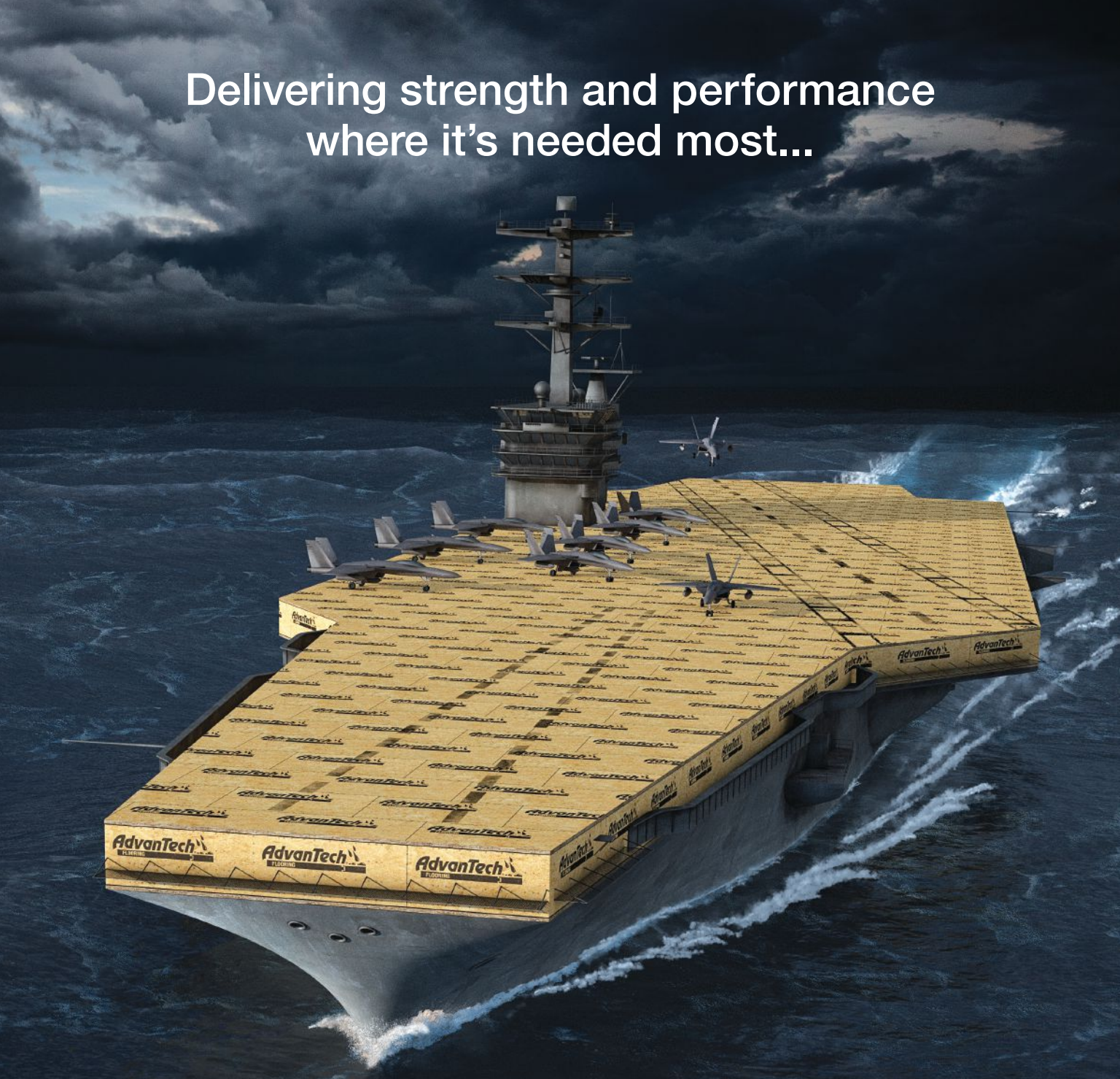
■ People need to breathe.
■ Don't mix combustion air and people air.
■ Houses need to be able to dry out.

4 A small uninsulated area can make a huge difference in heat gain or loss. Uninsulated can lights, attic scuttle holes, and other bare spots can lead to efficiency and comfort complaints from your clients. One example: Say we have 1,000 square feet of ceiling area and we put R-38 everywhere except at the 10 square feet of the attic pull-down stairs. That mere 1% of uninsulated ceiling results in a 27% decrease in the ceiling insulation's average R-value. This decrease applies to insulation that's not uniformly distributed, as well. If you have a lot of lumps in blown attic insulation, for example, you could drastically increase the actual R-value of the ceiling just by raking it smooth.

5 The quality of processes, more than the quality of products, determines the quality of the house. Just because you spend a lot of money to install spray foam insulation, heat-pump water heaters, and ground-source heat pumps doesn't mean that you're building a great house. What matters is how careful you are when installing housewrap, insulation, and air-barrier materials. If you do these right, you have a good chance of actually achieving a high-performance home.

I know that mastic, caulk, and insulation installed to grade aren't as sexy as geothermal heat pumps and photovoltaic modules. But the basic design details, material choices, and installation methods

Delivering strength and performance where it's needed most...



AdvanTech® flooring is specifically engineered to outperform OSB and plywood panels. Featuring industry-leading strength and fastener holding power, AdvanTech panels deliver the quiet, solid feel of a quality-built home. And thanks to superior resin technology, AdvanTech panels resist the damaging effects of moisture such as edge swell, cupping and delamination so you can spend less time on costly rework and sanding. Voted #1 in quality for 12 straight years,[1] AdvanTech flooring performs where you need it most.

See for yourself at
AdvanTechPerforms.com/warranty/JLC5

LIFETIME[2]

500 DAY NO SANDING GUARANTEE[2]

AdvanTech® FLOORING

HUBER ENGINEERED WOODS

1. Builder Magazine's 2012 Brand Use Study; 6,000 builders surveyed. 2. Limitations and restrictions apply. Visit advantechperforms.com for details.

are actually a lot more important than trendy "green" products.

6 Ductwork is important. When you attach high-efficiency HVAC equipment to crappy ducts, you're the equivalent of a snake-oil seller. Homeowners end up paying a lot of money for super high-efficiency equipment that often gets installed with an average or below-average duct system. Undersized, kinked, entangled, and leaky ducts rob all the high-efficiency afforded by the equipment. In most cases, a home would be better served by spending less on the heating and cooling equipment and more on the duct system.

The duct shown in the photo at left fails on two fronts: 1) It runs through the attic, which may be the most stupid place you can put ducts in an air-conditioned home. 2) The duct run is pinched where it passes through the truss webs. This constricts airflow, increasing duct pressures so the conditioned air carried in the duct flows out of the leaks faster.

7 Attic knee walls need more insulation and an attic-side air barrier. Those walls around the room in a finished attic separate conditioned space from unconditioned attic space, and they need to be air sealed and insulated like an exterior wall. The problem with many knee walls is that they have fiberglass batt insulation with nothing covering them on the attic side. If the batts don't make contact with the air barrier (the drywall), air moves through and around them, and they fall out of the attic knee wall. In other words, they're pretty much worthless.

The state of Georgia, where I work, recognized this problem about a decade ago and started requiring all attic knee walls to have sheathing on the attic side and to be insulated to at least R-18.

The best way to provide the sheathing is to use a rigid material. I've seen OSB (oriented strand board), rigid insulation, and structural or non-structural cardboard sheathing materials such as Thermo-ply. I've also seen attic knee walls sheathed with non-rigid materials—mainly housewrap—but I think the rigid material will do a better job with air sealing and will stay intact longer.

But no matter what material you use, keep an eye on the electricians, HVAC contractors, and other trades who get in there. Anyone who cuts a hole in the knee-wall sheathing must be held responsible for sealing it.

8 Duct systems should not be in unconditioned attics, especially in hot climates. The rate at which heat flows by conduction depends on the temperature difference. An attic can get up to about 130°F in the summer, and the conditioned air entering the ducts is about 55°F or so. With hundreds of square feet of duct surface area in the attic and a temperature difference of 75°F, the air coming out of the vents in your home will be significantly warmer than 55°F. Duct leakage makes the problems even worse.

The report, "Ducts in the Attic? What Were They Thinking?" (nrel.gov/docs/fy10osti/48163.pdf) summarizes research about putting ductwork in unconditioned attics. This report basically says it's about the stupidest thing we can do in homes that frequently run air conditioners. I encourage you to download it and read it. And if you're building or remodeling a home, make sure the HVAC contractor gets a copy.

9 Heat pumps can be more comfortable and efficient than furnaces in high-performance homes, even in colder climates. As you add insulation to a home and tighten up the building envelope, the heating load drops much faster than the cooling load. This makes sense because the temperature difference between inside and out in winter is much greater, and infiltration rates are typically higher. Heat pumps and/or hydronic forced-air heat are more appropriate because system capacity can be aligned more closely with the load. This ensures good air mixing at design conditions, an important prerequisite for comfort.

There's a lot more to say about this topic, which we can explore in-depth here in the future.

10 Ventless gas fireplaces are a liability. Manufacturers like to call these "vent free," suggesting you're being liberated from a burden by not having an exhaust vent. I think it's essential for people to know that they're actually missing something important when they go with a ventless gas appliance. Yeah, the gas industry lobby is powerful enough to have kept them legal this long, but these things can be dangerous.

Here are the main reasons why ventless gas fireplaces should be avoided:

- Even when working perfectly, they put a lot of water vapor into the house.
- Drafts, fans, candles, and tight houses can mess up the combustion process.
- Many homeowners don't understand how to operate or maintain them.

They may have fancy technology built into them now (oxygen-depletion sensors and catalytic converters), but the bottom line is that the risks can outweigh the benefits. It's not that hard to build a chase and cut a hole to install a direct-vent model, so why take the risk.

Allison Bailes owns Energy Vanguard, a home-performance and training firm in Decatur, Ga.

Kleer PVC Trimboard and Moulding get the job done well so you can, too.

You can trim out a garage door surround again and again and again. Or you can choose Kleer and **do it right the first time**. Unlike wood, Kleer PVC products **won't rot, delaminate or swell due to moisture**. They also come backed by a **lifetime warranty with labor for the first two years**. Which makes everybody happy.

See how Kleer continues to **think beyond wood** at kleerlumber.com

KLEER®
TRIMBOARD
+PLUS
A DIVISION OF THE TAPCO GROUP

YOUR COMPETITIVE **EDGE.**

NO FASTENERS ON THE SURFACE

NO INSTALLED GAP

NO EXPENSIVE PRICE TAG

When the job calls for treated wood, choose the **CAMO® MARKSMAN® EDGE™** to bring out the very best. Designed for installing treated lumber with CAMO Hidden Fasteners, the MARKSMAN EDGE attaches to any drill. Deck boards can be installed with no gap to allow for natural contraction, and side-angle fastener entry leaves the surface fastener-free. All at a price that gives you a competitive edge.

Why would you use anything else?

CAMO® MARKSMAN® EDGE™

COMING JANUARY 2014

SEE IT AT DECKEXPO 2013 - BOOTH 2337

ENTER TO WIN

Scan the QR code or visit
camofasteners.com/edge.html
for a chance to win a tool!

Photo: Isaiah Cushman

Manufactured Shear-Wall Components

When you need to handle seismic or wind loads with a narrow wall section, these products supply the solution

BY TED CUSHMAN

Some houses are simple. You have a shoebox shape to work with, there aren't too many big window or door openings, and you're not in a seismic zone or high-wind area. But some builders work in seismic zones, and some builders work in hurricane country. In those regions, any structure—high-rise or house—has to be designed for lateral loads, the sideways force of wind pressure or earthquake action.

Whether it's of a Florida beach, a Los Angeles hillside, or a Colorado mountaintop, homeowners love a beautiful view, and designs often call for high ceilings, walls full of windows, and large open rooms; and, of course, there's always the garage door. The result is structural situations where an extreme wind or seismic load has to be handled by a very small amount of solid wall. Facing that challenge, a typical stud-and-plywood wall—or even a site-built shear wall— can't always do the work.

If that's your situation, your engineer is likely to specify manufactured shear walls and moment frames—most likely supplied either by Hardy Frames (Panel or Brace Frame components and

SIMPSON STRONG-TIE

The company (strongtie.com) offers designers a range of solutions. Its wood Strong-Wall was its first entry into the field. Made with 2x4 or 2x6 studs and OSB faces, the components come in a range of widths (18, 24, 32, and 48 inches), and at heights suitable for framing an 8-foot, a 9-foot, a 10-foot, or a 12-foot wall, taking plate thicknesses into account.

For greater strength with a narrower wall, Simpson developed the steel Strong-Wall, substituting a corrugated steel panel for the OSB shear panel of the wood version. Available widths are 12, 15, 18, 21, and 24 inches, and there are eight available heights: 80, 85 ½, 93 ¼, 105 ¼, 117 ¼, 129 ¼, 141 ¼, and 151 ¼ inches.

Falling between the wood Strong-Wall and the steel Strong-Wall—in width, structural capacity, and price—is the Strong-Wall SB Shearwall, originally developed by Trus Joist and formerly marketed as the Trus Joist TJ Shear Brace. Simpson Strong-Tie purchased the product line from Weyerhaeuser in February 2013 and is launching the rebranded component into the market this fall. Based on a laminated strand lumber (LSL) column, the Shear Brace comes in widths of 12, 18, and 24 inches, and in heights ranging from 7 feet up to 20 feet high. Conveniently, the Shear Brace is field-trimmable to custom heights—just order the next greater size and cut the top to fit.

Simpson Strong-Tie also offers two types of prefabricated steel moment frames: the Ordinary Moment Frame and the Special Moment Frame. Moment frames cost more than prefab shear-wall panels but supply the greatest structural capacity, as well as the narrowest wall profile. The Ordinary Moment Frame has rigid corners and is well-suited to hurricane situations, where it's expected to stay stiff while standing up to the wind pressure on the house. The Special Moment Frame, introduced by Simpson just a year ago, was developed to address earthquake situations. A special ductile connection tab at the frame corners will yield under stress to protect the frame's main members from damage and allow for a quick post-earthquake repair in place.

1

Photo: courtesy Simpson Strong-Tie

engineered Moment Frames; hardyframe.com), Simpson Strong-Tie (Strong-Wall panels and Ordinary Moment Frame or Special Moment Frame assemblies; strong-tie.com), or, in parts of the western U.S., Shearmax (the Shearmax panel system; shearmax.com).

"I kind of see manufactured components as a necessity now, to design what people actually want and to give them the structural integrity that they need," says Santa Barbara, Calif., framing contractor Don Gordon. "You've got an ocean view and you need a big window, but that only leaves you room for 8 feet of plywood. Well, in 4 feet, these things can give you the equivalent of 16-feet worth of site-built shear wall."

In this story we'll survey the whole field—wood shear-wall components, steel shear-wall components, and steel moment-frame assemblies. We'll look at how the products are the same and how they're different, and take a look at the issues you'll want to be aware of when you frame with them. We'll also discuss which product type is best suited for which situations, including both new construction and retrofits of existing structures.

UNDERSTANDING LATERAL LOADS

When the ground moves in an earthquake or the wind blows against the walls in a hurricane, houses in seismic or wind zones experience a "lateral force." To remain standing, walls have to withstand this force and transmit it into the foundation. The fine points of wall performance vary depending on whether the design accounts for wind, earthquakes, or both (see Seismic Versus Wind, page 56). But in general, engineers look at four issues: Shear—will the wall rack? Overturning—will the wall topple? Sliding—will the wall slip sideways? And uplift—will the anchors pull out?

The narrower the wall involved, the more problematic these forces become. A narrow wall has less material available to pick up the shear load, and fewer locations for anchoring to the foundation to prevent sliding. And as walls become narrower, the "aspect ratio"—the ratio of height to width—becomes higher, which increases the risk of overturning. That, in turn, creates greater leverage at the base of the wall, which applies a greater uplift force to the wall anchors.

Simpson Strong-Tie's wood Strong-Wall **(1)** was the company's first entry into the market. The steel Strong-Wall **(2)** offers greater capacity in a narrower form, with simpler base attachments.

The Strong-Wall SB Shear wall **(3)** is made of laminated strand lumber (LSL) and is field-trimmable.

Simpson Strong-Tie's Ordinary Moment Frame **(4)** holds the frame stiff in a windstorm. In an earthquake, the steel column and frame bend to absorb the quake's energy, saving the building, but ruining the moment frame. Simpson's new Special Moment Frame (not shown) has a "fusible" connection between the columns and beam that is designed to yield in an earthquake, preserving the main members of the frame.

Photos: left, top right, courtesy Simpson Strong-Tie; bottom right, Ray Castillo/Gordon-Fiano

David Lopp, who handles product support for Hardy Frames, explains: "As a panel gets narrower, the uplift on the hold-down bolt, and the compression on the other corner of the panel—that overturning force goes up. If you put a panel in the wall that is 12 inches wide, or you put a Brace Frame in the wall that is 44 inches wide, when you push with the same force at the top, the uplift on the narrow panel is going to be much greater than it is on the wider frame."

All the big suppliers offer a variety of pre-built panels and frames, in a range of widths. And because the narrower components need to do more work and be more securely anchored, the narrower the component, the more it is likely to cost.

THE MAKERS

Most of the manufactured-shear-wall industry is made up of two top companies: Simpson Strong-Tie, headquartered in Pleasanton, Calif., and Hardy Frames, based in Ventura, Calif. Both of these big players ship components nationwide and offer extensive design and technical support. Simpson Strong-Tie also manufactures hangers and connectors; and Hardy Frames has been acquired by a larger company, MiTek, which also owns United Steel Products Co., the makers of USP Structural Connectors. So both Simpson and Hardy Frames can help engineers specify a complete solution for a home's structural load path, tying together roofs, walls, floors, and foundations to resist all the applied loads.

Shearmax, a much smaller company, is important in the California market and also ships panels to Utah and some other western states. Like Hardy Frames, Shearmax started out life as a framing company in Southern California; company engineer Tim Timmerman II (son of the founder, Tim Timmerman Sr.), credits that background for the company's emphasis on making a user-friendly panel.

Hardy Frames' Lopp makes the same argument for his company: "We started out as a production framer. You have to be efficient, you have to be effective, and you have to be the low price. And there

HARDY FRAMES

There are two flavors of manufactured shear wall offered by Hardy Frames (hardyframe.com): a "Panel" version made with continuous sheet steel; and a "Brace Frame" version made with steel vertical members and a diagonal cross-brace.

The Brace Frame, offered in widths of 32 and 44 inches, is the lower-cost and lower-capacity alternative for situations where wall length allows a wider component; the higher-strength, narrower Hardy Frames Panel is available in widths of 9, 12, 18, and 24 inches.

Hardy Frames' Moment Frame, made of steel I-beams, was the first prefab moment frame to gain a code listing. Standard sizes are available for opening widths from 1 foot up to 23 feet wide, and various opening heights (non-standard sizes require a special order).

SHEARMAX

The wood-based Shearmax panel is Shearmax's (shearmax.com) one flagship product. The product's unique design gives it a relatively high capacity for a wood panel: The OSB panel is set into a routed rabbet on the inside edge of the Doug fir 4x4 frame, so that wood-to-wood contact supplements the strength of the nails attaching the sheathing element to the frame. Light-gauge steel flanges around the perimeter of the frame add strength but maintain the "ductility," or capacity to yield, that allows the panels to function well, even at very high aspect ratios. Shearmax also developed an outside-mounted bracket with a small offset, which company engineer Tim Timmerman says transmits forces more efficiently from the foundation to the frame.

Shearmax panels come in nine standard widths (16, 18, 21, 24, 28, 32, 36, 42, and 48 inches), and the company can produce custom lengths up to 20 feet at no extra charge (odd widths are also available as a special order, but cost more). The panels can be custom cut in the field, either square or, if necessary, at an angle to match a roof rake.

Photo: courtesy Hard Frames

are a lot of things we know how to do that will save money in the framing while still using these high-capacity panels."

Making the panels cost-effective and easy to use is on Simpson Strong-Tie's radar as well. For example, after acquiring the Trus Joist TJ Shear Brace system (a laminated strand lumber shear-wall component) from Weyerhaeuser this year, Simpson started addressing complaints from the field about the product's anchoring method. The system, re-branded by Simpson as the Strong-Wall® SB Shearwall, allows framers to make top cuts in the field to fit a roof height and rake angle. But accessing its attachment hardware at the bottom can be awkward.

Competition among the top suppliers is keen. As a result, every year brings improvements to product lines, and companies put a lot of energy into technical support for their products—on site, as well as over the phone. For the smaller companies, it's personal: Hardy Frames' Lopp says, "If somebody calls with a question, they can talk to me." And California builder David Moore says that when he got into trouble with a Shearmax installation, Shearmax president John Jenkins came out to the site to help him set panels. "He figured out what to do in a half hour," Moore says. "It would have taken me half a day."

CHOICES AND CHALLENGES

All the products in the market are designed to do the same job—strengthen the building against lateral loads. And their code listings, based on verified testing, are evidence that you can rely on all of them to perform as advertised (as long as you follow the directions when you install them).

Depending on the situation, a framer might prefer working with one or the other. Unfortunately, however, framers—or even builders—who are working in high seismic zones aren't usually the ones choosing which product to use. Bay Area builder and remodeler Jeff Kerr says, "It depends on the engineer who's actually specifying it, based on the seismic requirements. The architect draws his plans, which are basically a wish list. Then he sends the plans to an engineer who determines the loads and specifies the

Hardy Frames offers two flavors of shear wall: the Panel, made of sheet steel; and the Brace Frame, an open stud frame with a diagonal brace. Shown here are two Brace Frames **(1)** on an outside corner, and two Hardy Frames Panels **(2)** installed back to back for a doubled capacity.

Hardy Moment Frames **(3)** come in widths up to 23 feet. Custom sizes and two-story frame assemblies can be special-ordered.

Shearmax panels, a versatile solution for high-end custom work, are available in a wide range of widths and custom heights (but only in the California market). Shown here **(4)** are tall panels combined into four-sided box columns to support a high roof over open walls.

Photos: left, top right, courtesy Hardy Frames; bottom right, courtesy Shearmax

products. Our job is just to price it out and install it."

Typically, framers set the shear-wall panels directly on the concrete foundation or on the first-floor frame before they start stick-framing the surrounding walls. Kerr describes the installation process: "You form for your concrete (we do most of our own concrete work), you get all your rebar in, and you get a set of drawings from your engineer. All the panels come with a template, and you attach the template to the forms. Then from the template, you hang off your threaded rod or your anchor that is going to get embedded in the concrete in the forms. You just have to follow the instructions. ... Once we've poured it, it only takes two guys a couple of hours and they're in. Then you just frame around the thing and attach it."

Sometimes, however, because of delivery issues or job schedules, wall framing is completed before the panels are installed. You can set a shear-wall panel into an already framed wood wall, but it may be a little fussier and slower (see photos, next page), so framers usually prefer to set the panels first.

"Probably the most critical thing is to get the bolts in the right spot to start with," Gordon says. "You have to use the templates. We've had bolts misplaced a couple of times, to where the panel is sitting outside of the wall."

Kerr agrees. "You better do your layout carefully, and be sure you've looked at all your framing members so that you've given it enough space to fit, you've put it in the right spot, you've set the template just so, and you've set the right bolts and hardware in place. If you blow it there, you can take care of it, but that's only going to cost you time and money. If you missed a bolt, you have to drill a new bolt and epoxy it in. If you've got something in the wrong spot, well, you might be chopping the whole thing out."

That happened more when the products were new and unfamiliar, says Simpson Strong-Tie's Don Simon, a trainer who helps manage the company's builder education outreach. "In the early days, we had guys in the field all the time helping builders fix mistakes," he says. But these days, it's old hat, at least on the West Coast.

Carpenters have one good reason to like Simpson Strong-Tie or

Framers typically set panels before they stick-frame the surrounding walls; here (1), panels stand alone on a slab waiting for walls. But you can also set panels into an existing wall (2). Accurately locating bolts during layout is a key step—and even with a good layout, panels may have to be persuaded into place (3). Fortunately, this steel Hardy Panel offers easy access for tightening down mounting nuts (4).

Hardy Frames moment frames, Gordon notes: It puts the ball in their court. "It becomes my work, not the structural-steel guy's work," the framing contractor says. "So I buy the $2,000 moment frame, charge profit on the materials, and then charge labor to install it."

But shear-wall panels aren't that expensive, Kerr says: "I just priced a pair out for a master bedroom addition with a large patio door. They were $330 apiece, plus tax."

Where a builder does have control over design and product specification, there's a lot of variety to choose from—and what you select depends on what you care about. If you want to be able to trim panels in the field, you have two options: Simpson's Strong-Wall SB Shearwall or Shearmax. If you need the maximum wall opening possible, you'll have to choose a moment frame. If you have a lot of wall area to work with, you can use a less expensive and wider component, such as a wood Simpson Strong-Tie Strong-Wall or a Hardy Frame Brace Frame.

What you don't have to worry about—if you install the panels right—is performance. Consulting engineer Zeno Martin says, "They've all been engineered to do what they say they can do. You've taken engineering out of the equation. So for a builder, I think it all comes down to cost and lead time. How much am I going to have to pay for it, and how long is it going to take me to get it?"

FIXING EXISTING BUILDINGS

New construction is one thing, but in the years to come, contractors will face a much more complicated challenge: plugging shear-wall and moment-frame components into existing buildings.

Investigators in California noticed a common mode of failure in many buildings after the Loma Prieta (1989) and Northridge (1994) earthquakes: A "soft story" on the building's first floor buckled and failed, and the building's upper stories fell to the ground. According to Dan Friedman, who was in L.A. just weeks after the Northridge earthquake (see "Eight-Penny News: Earthquake Aftermath: On-Site

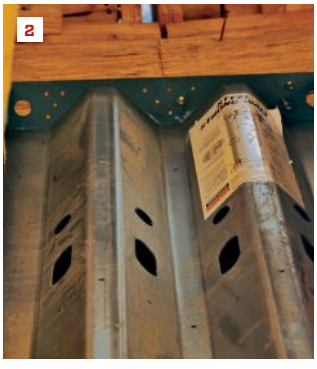
Photos: Isaiah Cushman

MOMENT FRAMES AND UPLIFT CONNECTIONS

Unlike a shear-wall assembly, where the anchor points between the wall base and the foundation are assumed to pick up an overturning load on the shear wall, moment frames do their work in the upper corners of the frame. There they resist the "moment"—the force of bending or rotation—with a rigid connection at the joint between the column and beam, rather than relying on the joint between the base of the column and the foundation it rests on.

In terms of overturning, a moment frame is analyzed like a single large shape. Its two narrow columns aren't considered to be overturning independently; instead, the entire frame around a garage door or large window may be trying to overturn as a 9- by 20-foot unit. If the weight of an upper story is resting on the header beam, the uplift on either column from the overturning motion could be completely outweighed by the gravity load on the whole structure. This means that, in total, the uplift stress on the bolted connections between each column and its concrete base is less problematic than is the case with narrow shear walls, even though each of the frame's two columns may be quite narrow.

This difference is reflected in the connection details of the various systems. The Simpson steel Strong-Wall at right, for example, has heavy bolts tying it to the foundation at its base, where the overturning and uplift forces could be extreme **(1)**. At the top of the panel **(2)**, by contrast, the connection consists only of Simpson SDS screws—lighter-duty fasteners. But in the upper corner of a Simpson Ordinary Moment Frame **(3)**, heavy-duty bolting is required to hold the joint stiff.



Report," April/94), "Collapsing second stories reduced parking areas and, in some cases, first-floor apartments to as little as a few inches in height, resulting in a record number of deaths."

Years later, federal, state, and local governments are getting serious about addressing the "soft story" problem. San Francisco passed a city ordinance on April 18 this year (the anniversary of the 1906 earthquake) requiring mandatory retrofits of thousands of buildings in the city to strengthen "soft story" first floors. San Francisco's new law will apply only to buildings with five or more apartments built before 1978. But that's still a lot of work.

Simpson Strong-Tie engineers say their new Special Moment Frame is tailor-made to address the problem. Unlike earlier types of steel moment frames, the Special Moment Frame is connected at column-to-beam joints with a tab of softer steel that is designed to bend and give in a way that will absorb the energy of an earthquake without subjecting the frame's main members to the quake's full force. Standard steel moment frames, says Simpson engineer Steve Pryor, absorb the energy in the main beam of the frame instead. "When the steel in the beam starts yielding, it becomes soft throughout its whole depth," Pryor says. "So you have to hang onto it so that it doesn't buckle and move sideways. ... That stability bracing is critically important in a seismic event."

But this bracing is a problem when retrofitting wood structures. "When you're putting steel frames in wood buildings," Pryor says, "you cannot anchor your brace into the wood floor next to the beam strongly enough to stop that twisting and buckling. So the Special Moment Frame technology that we have developed is a game changer because the special fusible links, top and bottom, do all the bending, instead of the rest of the frame. You don't have to worry about this twisting and buckling problem."

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

Photos: Ray Castillo/Gordon-Fiano

Seismic Versus Wind

Shear walls and moment frames are the standard solutions for handling lateral forces on building walls in both seismic and high-wind zones. But the ways in which earthquakes and hurricanes act on a building differ, so the job that shear walls or moment frames do varies depending on whether they're facing a seismic load, a wind load, or—to make things a bit more complicated—both.

Engineer Steven Pryor, a Simpson Strong-Tie expert on designing for lateral loads, gave *JLC* some insight into that topic in a September interview.

"When you design for hurricane forces, you have a force applied to your building for a long time in the same direction ... The wind can keep pushing on you for 15 or 20 minutes; the building has to tough it out for as long as it takes. So for wind, we design for strength."

SEISMIC IS DIFFERENT

Unlike wind, "the earthquake doesn't apply a force directly to your building," Pryor points out. "The foundations just move, laterally and up and down." Pryor focuses on the lateral movement because good gravity design will handle the up-and-down motion, which is in the same direction that gravitational forces work.

The building's inertia tends to keep it stationary, so shear walls and moment frames are designed to help the building keep up with the motion of the foundation. Without them, Pryor says, "you find a situation where the foundation is in one spot and the mass of the building is in another spot. If the difference gets too big, the weight of the building and gravity will just drive that building down. We call that 'pancake' or 'collapse'—and that's what you see in the 'soft story' buildings in Loma Prieta in 1989 and Northridge in 1994" (see "Eight-Penny News," April/94).

Earthquakes are more powerful than wind, and it's too expensive to fully resist their lateral forces. So engineers compromise. "Unlike a hurricane that blows in one direction for 20 minutes, an earthquake creates ground motion that goes to the left for half a second, then back to the right," Pryor says. "If you let the beam and column connections yield, you can design for a force that is one-sixth to one-eighth the force that you would need to keep that building strong enough to not yield at all."

The good news is that if the design works, the building won't fall down and kill somebody. The bad news, Pryor says: "Your building is getting damaged. We accept limited damage to the building, as long as the building doesn't collapse. Your home may get red-tagged after the event, but nobody got killed."

WIND AND SEISMIC TOGETHER

The trickiest cases, Pryor says, are those rare situations where wind and seismic rules both apply. Engineers use the "R factor," or "reduction factor," for building assemblies that yield in an earthquake. The R factor for wood-frame construction is 6.5, which means that, for calculation purposes, the earthquake load is considered as one-sixth the equivalent wind load because the building is designed to yield and deform, soaking up and dissipating the energy of the motion. If the building were designed to stay stiff throughout the movement, the forces would be much higher.

Combining wind design with seismic design can be confusing, but the key is always to detail the structure for a seismic event, even if the wind forces are higher. The allowable reduction factor is based on an assumption that the building's connections will yield and absorb the shaking energy of the quake. If the house were built instead with stiff details that wouldn't yield, the connections would perform well in a windstorm, but in an earthquake some components could experience actual forces that were many times the design shear, leading to failure and collapse. —*T.C.*

In an earthquake, shear walls help upper stories stay connected to the foundation, which moves rapidly back and forth. Without them, the movement gets too far out of sync, and the building "pancakes," as in this 1994 photo from Northridge, Calif.

Photo: FEMA/Andrea Booher

WE HAVE STRONG SAFES AND LOW PRICES ALL LOCKED UP

SENTRY® SAFE ELECTRONIC SAFE

If you own or run a small business, The Home Depot® has the perfect place to keep your valuables. This SentrySafe electronic safe with a key-override system is constructed of solid steel and can even be bolted down for enhanced security. It's built to protect your business and priced to protect your budget. **That's the power of The Home Depot.**

homedepot.com/pro

THE HOME DEPOT® **PRO**

More saving. More doing.®

JLC

WE'VE NAILED IT

Introducing the New JLC Website

The team at JLC has been working hard building a whole new online home just for you. With more content and easier navigation, you'll be able to access the information you need to complete your projects efficiently and effectively. Take advantage of our newest features:

- More Feature Articles
- More News
- More Ways to Connect
- More Slide Shows and Videos
- And now the JLC Archive is accessible to subscribers **for free**

We've worked harder so you can work smarter. Our open house has officially begun, so come by to discover what's new at **jlconline.com** today.

hanleywood

real endurance. thick skin.
Kasey Kahne and Endeck.

Endeck® has a 100% cellular core with our proprietary HardCover™ capstock to protect the deckboard on all sides.

Endeck—where endurance and strength come together.

Just because our decking looks handsome on the outside doesn't mean it isn't tough as nails on the inside. Endeck capped cellular PVC decking is slip-resistant, impervious to stains and scratches, plus it stands up to the daily torture from pets, kids, and guests who drag heavy deck furniture from one end to the other.

Endeck is covered by a Limited Lifetime Warranty and comes in six colors—three monochromatic and three variegated—with fascia to match or contrast. You'll need railing, of course—and Enrail® is the perfect complement to Endeck.

See Kasey on his new deck at www.endeck.com, and contact us at 888-329-7428 for your "Kasey Kahne Sales Kit."

ENDECK PVC DECKING

See us at NAWLA • October 23-25, 2013 • Booth #706

"STONE" VENEER

Adhered Concrete Masonry Veneer

To avoid water damage, treat faux stone like stucco

BY MARK PARLEE

Most of my work is in exterior remediation, both as a builder specializing in exterior work, and (more and more these days) as a building consultant inspecting and advising owners and builders when moisture problems arise. I see a lot of failures, and most of the hands-on work we do is fixing other builders' mistakes. Daily I am reminded of the need for wider understanding of best practices, and that is especially true with adhered concrete masonry veneer (ACMV). We call this material "stone," but we all know that it is a non-load-bearing concrete cladding made to look like pieces of stone set in mortar that is bonded to a stucco scratch coat. We really need to be treating this material like stucco with chunks of concrete in it. When we lose sight of that, problems arise.

ACMV has been increasing in popularity as a cladding on mid-range and high-end homes for the last decade, and across the Midwest where I work, a huge number of these homes are now showing signs of water-damage because the ACMV wasn't installed correctly the first time. I am an Exterior Design Institute (EDI) third-party EIFS and building envelope inspector, and this work has recently led me to work with relocation service companies. When a person is relocated by a company to a home with an EIFS exterior, it has for a long time been an automatic trigger for an inspection, owing to

Photos: Mark Parlee


1


2


4

all the acute moisture problems, often leading to severe mold problems, suffered by buildings with EIFS. Now, at one of the three national companies I do inspections for, ACMV on the exterior of a home has become an automatic trigger for inspection, too. I believe that the problems are worse with ACMV, and they will make the EIFS problems look like a drop in the bucket.

The best practices described in this article apply equally well to new construction, when they should always be used, as well as to remediation. But if you apply them in new construction, you won't have to apply them as a repair.

I've written a number of articles for *JLC* about both ACMV and EIFS failures (search "Parlee" at jlconline.com). In this article, I'm going to focus on doing it right the first time. But the photos come from a remediation job. It cost $33,000 to repair the problems on this 14-year-old home. Adding a drainage membrane from the outset would have cost only about a buck-and-a-half per square foot installed. That's pretty cheap insurance to keep the envelope dry and performing well, considering the alternatives.

DRAINABLE SYSTEM

If you get anything from this article, let it be this: ACMV must drain. This is true of any cladding system, but with ACMV it's especially important because all those chunks of concrete hold a lot of water. If that water can't drain, it's more likely to get sucked into the framed wall than it is to evaporate to the outside. Brick veneer works the same way, except that most builders know (and code demands) that there is a minimum 1-inch air space behind the veneer (although a 2-inch gap is recommended by the Brick Institute of America). While there can still be problems with this detail (namely from mortar droppings and squeeze-out that fills the space and creates numerous bridges for water to wick to the framing) for the most part the assembly works to allow moisture

to drain to the outside from behind the brick. To create a drainable system, I always use a rainscreen material, such as Keene Drywall (keenebuilding.com), which is shown in the photos for this job. Recently I have been using MTI Cavity Gravity (mtidry.com), which was developed for brick walls but also works with EIFS and ACMV. It stays rigid, which makes applying the lath easier and helps to maintain an even thickness for the scratch coat.

A rainscreen material makes the whole wall very forgiving, so you can get away with holes, thin spots in the scratch coat, and other mishaps in the assembly that are bound to occur no matter how diligent you are when inspecting the work. But what you can't skimp on is providing a place for the water to drain at the bottom. In fact, if you provide drainage but don't allow it to exit, you can accelerate the water damage because a build-up of water will concentrate at the base of the walls.

To ensure good drainage at the base of walls, we always apply a weep screed. This is the essential piece that will allow drain water to exit the cladding assembly. At the exterior steps on the house, we had to install aluminum flashing first to bridge over the sheathing transition (1). This flashing extends down the wall into the drainable subgrade beneath the steps and sidewalk. This gave us a clean surface against which to adhere the sealant after installing backer rod in the gap between the concrete steps and the flashing.

After installing the weep screed, we cover the walls with housewrap and building paper (2), and finally, install the rainscreen material (3). Lath and the scratch coat will go over the rainscreen mat, followed by mortar and stone (4).

I get a lot of flak from builders about specifying both housewrap and black paper, but it doesn't cost that much more, especially if it prevents the high cost of a remediation. Without the rainscreen material, black paper would serve as an essential sacrificial layer over the housewrap, allowing water to drain between the two sheets. By itself, housewrap can form a capillary bond to mortar or when the two materials are pressed directly against each other. Either way, this can allow water to pass through the housewrap.

With a rainscreen material, this is less of an issue, but I like having black paper to slow solar vapor drive. Because ACMV holds a lot of water, it is prone to evaporation toward the inside when the sun is beating down on a wet wall. Housewraps are made to be permeable to promote drying, but that means moisture vapor can pass through them from outside to inside. The black paper will not prevent solar vapor drive, but it will slow it down. If we can slow down the wetting time, we have a better chance of avoiding problems.

STUCCO BASICS

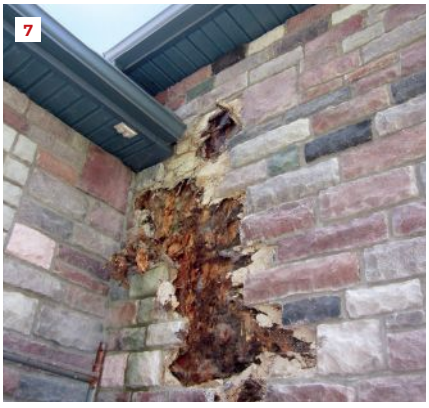
In addition to always applying a weep screed, there are a few other basic rules for stucco that apply to ACMV.

Lath. Metal lath must be installed with the right side up, or the scratch coat will slide off the building. On wood framing, lath must be installed with the long dimension perpendicular to studs. At corners, make sure that the lath is not installed too tightly, or the scratch will pop off. Best practice calls for securing lath with furring nails, which place the lath roughly in the center of the scratch coat. But when securing lath over a rainscreen, staples work well, too. Just turn down the pressure so you don't compress the mat too much.

Scratch coat. Clean sand is the key to creating a strong scratch coat. Dirty sand, or sand intentionally mixed with clay to improve workability, will become porous as the clay dissolves, leaving behind air pockets. The mix for a scratch coat should be rich (high cement content) so that it cures hard. Perform a "nail test" on cured scratch coat: If dragging a nail across the surface leaves a white line, it is hard enough to apply the mortar that adheres the stone cladding.

Ideally, the scratch coat must cover the lath. As mentioned, this doesn't always happen in the field, but it is important that this happen at the edges, otherwise the lath will rust. When we first inspected this house, most of the edges where uncovered and showing a lot of corrosion (5).


6


7


8

9


10

Solid, dry structure. Stucco can't tolerate a lot of movement and is prone to cracking. To minimize cracking, walls must be rigid. Sound framing, with particular attention paid to wind bracing, applies (see "Bracing Walls for Wind," July/13). In addition, it's important to protect the structure from water during construction to avoid trapping moisture or soaking OSB sheathing, which can lead to swollen panel joints.

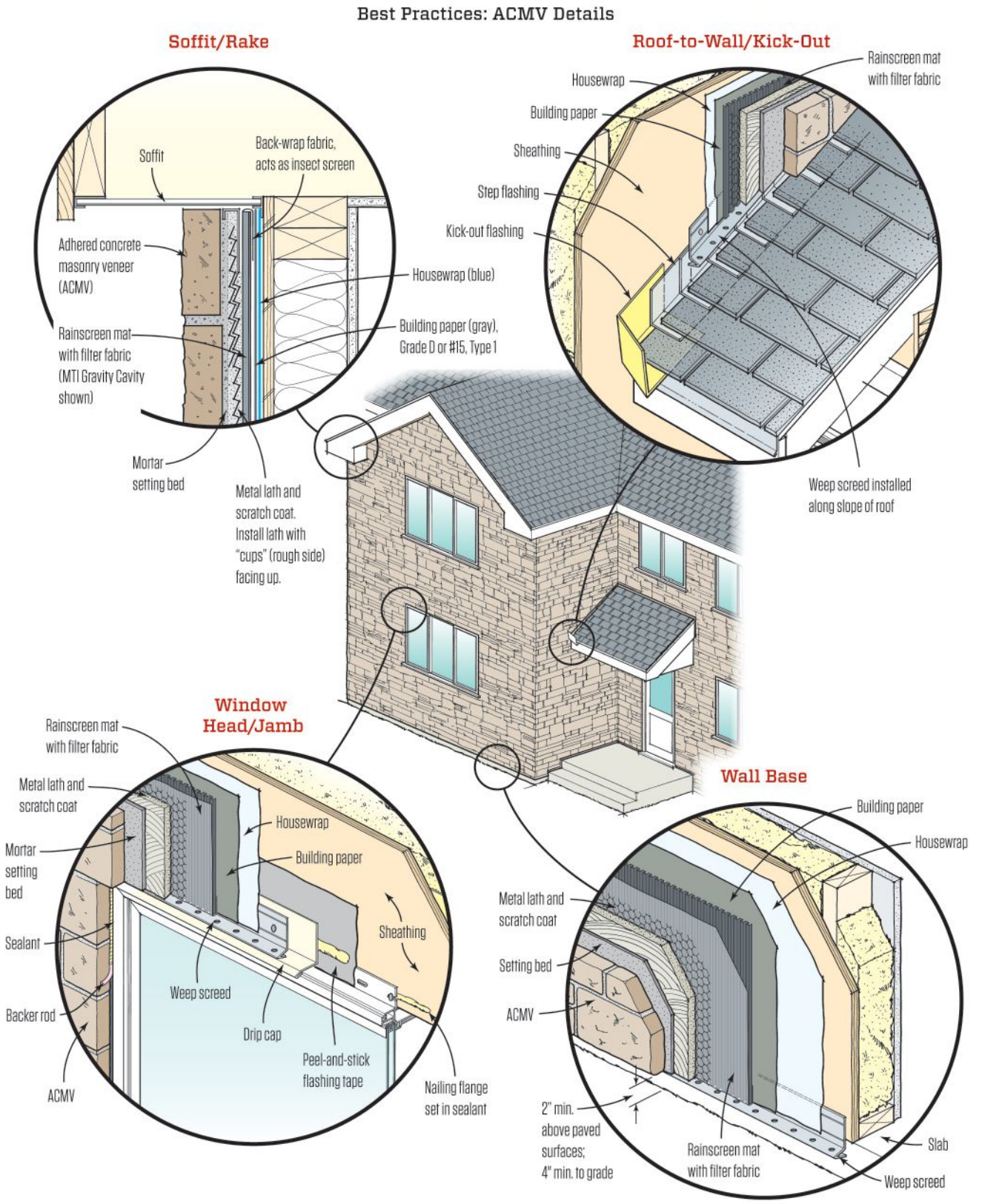
ROOF-WALL INTERSECTIONS

The intersection where a roof meets a wall turns out to be one of the most important details on the entire exterior. On this particular house, we found some attempt to install kick-out flashing above the gutters on roofs intersecting sidewalls. The kick-out shown above (6) had probably been installed after-the-fact, and it was much too little, much too late. You can see clearly the tragic result of having such a wimpy kick-out flashing (7).

To do it right, we used a pre-formed kick-out flashing by DryFlekt (dryflekt.com) at the base of the run (8). A steep roof, like the one shown in the photo, will require a sizable area to prevent spillover that would load the wall with water. The illustrations at right show in detail how this kick-out needs to be integrated with step flashing woven into the roof shingles.

Over the step flashing, we completed our assembly, installing a weep screed along the slope of the roof. (Technically, you should hold the weep screed 2 inches above the shingles. But this detail looks strange, so we bring it right down to the roofline and have never had problems.) The weep screed was followed by housewrap, black paper, rainscreen mat, and lath, all terminating to a weep screed at the roofline before applying the scratch coat (9).

Note the small cricket at the end of the valley above the kick-out (10). This is a variant of the kick-out and it performs the same critical task of diverting water away from the walls.


Best Practices: ACMV Details
Soffit/Rake
Soffit
Back-wrap fabric, acts as insect screen
Adhered concrete masonry veneer (ACMV)
Housewrap (blue)
Rainscreen mat with filter fabric (MTI Gravity Cavity shown)
Building paper (gray), Grade D or #15, Type 1
Mortar setting bed
Metal lath and scratch coat. Install lath with "cups" (rough side) facing up.
Roof-to-Wall/Kick-Out
Housewrap
Building paper
Sheathing
Step flashing
Kick-out flashing
Rainscreen mat with filter fabric
Weep screed installed along slope of roof
Window Head/Jamb
Rainscreen mat with filter fabric
Metal lath and scratch coat
Mortar setting bed
Sealant
Backer rod
ACMV
Housewrap
Building paper
Sheathing
Weep screed
Drip cap
Peel-and-stick flashing tape
Nailing flange set in sealant
Wall Base
Building paper
Housewrap
Metal lath and scratch coat
Setting bed
ACMV
2" min. above paved surfaces; 4" min. to grade
Rainscreen mat with filter fabric
Slab
Weep screed

We have to constantly remind ourselves that ACMV absorbs and holds a lot of water, so we need to do everything possible to avoid loading the stone with water. Wide overhangs and meticulous detailing on gutters and valleys are critically important.

WINDOWS AND DOORS

Around windows and doors, care needs to be taken to integrate flashing tape and housewrap. On the sides and bottom, the flashing should lap over the housewrap; but at the head, the housewrap should lap over the flashing (11). If we had installed the windows to begin with, we would have installed a drainable sill pan that lapped over the top of the housewrap below the window. But on a remediation job, we have to work with the existing window installation. In this case, I am not too concerned that the sill is taped off, because the weep holes in the window frame drain to the outside of the tape where the rainscreen mat will be. I'd rather make sure that the water streaming off the glass and flowing over the sill doesn't seep into the wall along the top of the housewrap below the window. At the head we install a weep screed, followed by metal lath (12). Again, it's critical that water be allowed to drain, otherwise it can collect, eventually seeping inside. Along window jambs and sills we install metal casing bead, spaced about 3/8-inch from the window flange (13).

After the stone gets installed, the gaps formed by the casing bead (14) will be filled with backer rod and (after taping off the windows with blue painter's tape) finished with a bead of sealant (15). When we peel off the blue tape, we get a joint with crisp edges (16). Though I like this detail, I'm not too concerned about these joints around the opening because the whole assembly behind it is drainable. This also applies to the gaps in the scratch coat (13), which I'd rather not have. But I do like having the flexible joint between the window frame and the stone to accommodate the


15


16


17

18

thermal expansion of dissimilar materials. What usually happens is that the masons will simply fill the gap between the window and the stone with mortar, and the mortar cracks almost immediately. If nothing else, this looks bad. But usually the wall is not drainable, so the crack also allows for the speedy flow of water into the wall.

INSIDE CORNERS

Nothing special has to happen where stone wraps around an inside wall corner. It is the same materials on each face of the wall, and there's no reason for them to move at dissimilar rates. But on the inside corner shown above (17), one wall will get stone and the other has EIFS.

In this case we wanted a flexible joint to accommodate the potential for these two walls to move at different rates. We did this using the same detail we applied at the sides of window and door openings: installing a metal J-bead spaced about 3/8-inch from the corner. The gap then gets filled with backer rod and sealant before the stone is applied.

On another section of the house, where a wimpy kick-out spilled over the wall, we had to replace the entire cladding assembly. Since the new stone we had did not replace the old stone, we created a detail that was consistent with some of the EIFS detailing on this house, using HardiePanel with a stucco finish (an affordable alternative to EIFS) installed over housewrap and rainscreen battens. This created an inside corner where the old stone met new HardiePanel. Ordinarily we would wrap the inside corner with housewrap (being careful to avoid having a joint), but in this repair we took extra care to ensure that no water got behind the housewrap by flashing the corner with tape and using a healthy portion of sealant, tooled over the tape, to create as good a barrier seal as we possibly could (18).


19


20


21

TOP OF WALL

At the top of walls, we can bring the rainscreen mat right to the J-bead supporting the soffit (19). Some experts would argue that the top edge should be finished off with a metal J-bead held away from the soffit and the gap sealed with backer rod and caulk. But I don't think this joint will ever see much water, even along the rake. If anything, the top of the rainscreen should be allowed to vent, which it will through the inevitable gaps in the scratch coat and around the vinyl soffit bead, which is never installed too tight.

RAKE RETURNS

A rake return, like the ones on the gable ends of this house, is a different animal. Here we have a vertical joint that will see its fair share of wind and rain (20). We use the standard detail for any vertical joint, and just like the one used around windows and doors: We install a J-bead with a gap that we finish off with backer rod and sealant before the stone is applied. Along the small section of roof above a rake return (21), we need a weep screed above the shingles.

By now you are probably getting a good idea of what works with ACMV: The assembly needs to be drainable using a rainscreen material over a well-detailed weather barrier. We believe in a two-layer weather resistive barrier to slow any vapor drive to the interior when you have a cladding material that stores a lot of water. All horizontal transitions need a weep screed to allow water to exit the assembly, and all vertical transitions between dissimilar materials need metal J-bead with a small gap so you can create a flexible joint by installing backer rod and sealant. If you follow these rules, you will have a fighting chance of avoiding expensive repairs.

Mark Parlee, a building-envelope consultant and builder in Urbandale, Iowa, specializes in exterior renovations and envelope solutions.

We're stacked in your corner.

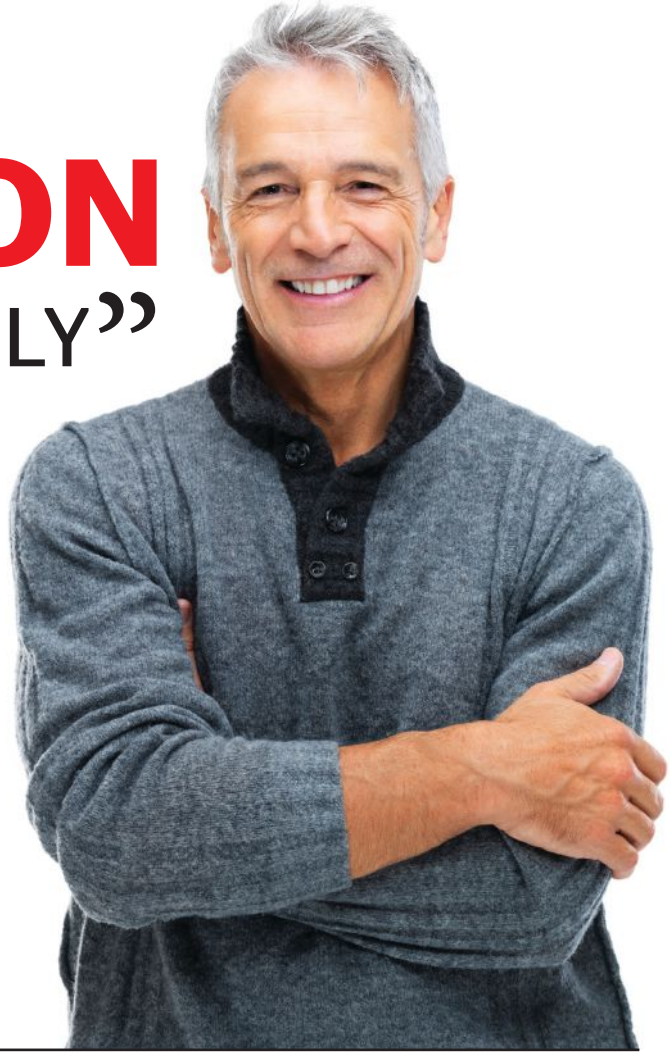
If you're planning to stack prefabricated shearwalls, make sure they're Steel Strong-Wall® shearwalls. The Simpson Strong-Tie two-story solution is not only code listed, but can be installed right at the corner to save wall space. And since our engineered shearwalls are available in widths as narrow as 15 inches for stacked applications, you can build multistory homes with larger windows, doors and open spaces without sacrificing strength and required load values.

To ensure your walls stack up, look to Simpson Strong-Tie for the widest selection of shearwalls code listed to the 2009 IRC/IBC (see ICC-ES ESR-1679). **Visit www.strongtie.com/strongwall** or call (800) 999-5099.

SIMPSON
Strong-Tie®

remodeling
Home for LIFE

"I HAVE $3 TRILLION TO SPEND ANNUALLY"



Nothing compares to Baby Boomer spending power. For you, it's a project bonanza like no other: Countless aging-in-place projects will go out for bid over the next 10 years. How will you claim your fair share of this renovation jackpot? Check out homeforlife2013.com. It's THE industry destination for remodeling pros, packed with ideas and insight to help you:

- **Identify** and scope-out the most requested aging-in-place projects
- **Market** more effectively to Baby Boomers
- **Leverage** exclusive content from Universal Design Summit 5 and AARP
- **Explore** room-by-room projects with a multimedia home tour

The online tour is open 24/7—check it out at **homeforlife2013.com**. Register to win a new Apple iPad® Mini when you take the virtual tour.

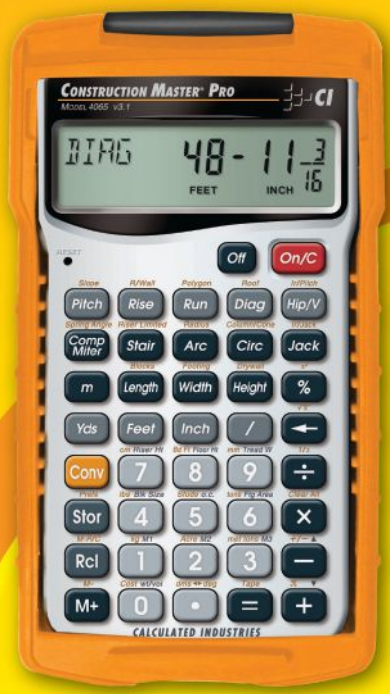
iPad® is a registered trademark of Apple Inc.

SPONSORED BY

BEHR PRO · DuPont Tyvek · Eldorado Stone · The Foundry · Gutter Helmet · Harmar · KLEER Decking · KLEER Trimboard · Lumber Liquidators · Marvin Windows and Doors · Owens Corning · Panasonic · ProVia · Sterling · Sunesta · warmboard · Waypoint

hanleywood

Now more than ever, you need this tool!



Model 4065 -Shown with Armadillo Case (now included)

From start to finish, our tools help you save time, reduce costs and win more bids.

CONSTRUCTION MASTER® PRO

- Work in and convert between building dimensions
- Complete Roof, Rafter and Framing solutions
- Automatic Stair layouts:Treads, Risers, Stringers

Visit Us
NAHB
Booth #C3254

Learn how this product can work for you:
www.calculated.com

See DEMOS on
YouTube™ Available on the App Store

CALCULATED INDUSTRIES®

For a dealer near you call 1-800-854-8075

PROFESSIONAL EQUIPMENT

Stay safe and confident on any jobsite

with tools from PE

Professional Equipment has the most reliable tools, safety gear and expertise to help keep you safe on the job and yield the best results.

At **Professional Equipment**, you'll find thousands of critical tools, including borescopes, respirators, distance and spatial measuring devices, roof and wall moisture scanners, low-e coating detectors, safety glasses… everything you need to ensure best practices and build your business.

SHOP AND LEARN ONLINE:
Professional Equipment.com

GET A **FREE** CATALOG:
1.800.334.9291

Flooring Solutions Designed for

TRADE • DESIGN COMMERCIAL

Morning Star
Forbidden City Strand Bamboo

Partner with Lumber Liquidators ProSales and you'll enjoy:

- The lowest mill-direct prices
- Volume discounts
- The best selection with over 340 quality floors
- 90+ million square feet in stock & hundreds of stores
- Sample program with racks & displays
- Commercial line of credit

HARDWOOD FLOORS FOR LESS!
LUMBER LIQUIDATOR$
ProSales

1-800-274-2360
lumberliquidators.com/prosales

Solutions are here.

Quality speaks volumes. We get amped up when we hear how contractors respect the integrity of our products. Time after time, they tell us there's a lot to like: low maintenance, strength of warranty, authenticity, how easily our exterior products install. And why they'd love to work with them again. It doesn't stop there, either. Happy homeowners speak volumes too.

Exceptional quality = one of many Tapco Solutions.

The Tapco® GROUP
A HEADWATERS COMPANY

Roofing ❖ Siding ❖ Shutters ❖ Siding Components ❖ Tool Systems
Egress Systems ❖ Trim ❖ Decking

www.TapcoSolutions.com

See why pros love SturdiMount® – the only mount with the "recommended by James Hardie" logo.

Photo: Susan Burnet

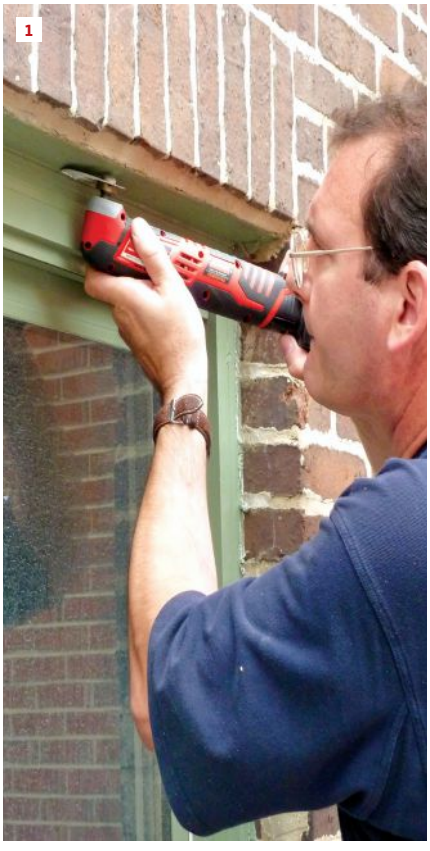
Installing Full-Frame Replacement Windows

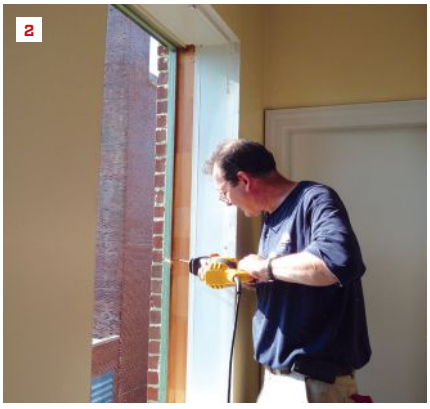
A recipe for speedy, painless, long-lasting installations

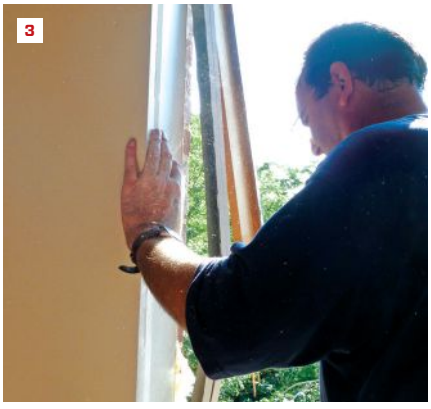
BY GREG BURNET

Replacement windows come in two flavors: insert, or "pocket," windows (which I discussed in a previous *JLC* article, "Quick Wood Replacement Windows," April/07) and full-frame units. Where to specify each type is something every remodeling contractor should know. We often replace windows less than 20 years old that have failed due to poor quality, improper installation, or both. On this particular job, a developer had converted a vintage YMCA structure into 35 condo units around 1990. The off-brand wood windows he installed were doomed to failure from the start, thanks to the manufacturer's liberal use of untreated, finger-jointed pine, and the lack of care paid by the carpenters during the installation.

We start the replacement process by measuring each window and window opening. We always try to maintain historically accurate details, such as elaborate trim, so accurate measurements are important. With this particular brick building, we measured each masonry opening at several different spots because openings are often not true, especially in vintage structures. I also always check whether the opening is plumb and level. If it's not, I may need to add blocking so that the window sits true in the opening, or I can add trim to mask the out-of-level or out-of-plumb condition. Either way, I want to be aware of any special requirements before ordering the window and attempting to install it.


1


2


3


4

One lesson I've learned over the years is to always install top-quality windows. We usually specify clad wood windows for our projects, assuming they're permitted by local (preservation) codes. The Marvin Clad Ultimate Double Hung (marvin.com) units we use have extruded aluminum exteriors, which have very crisp profiles and a finish that mimics painted wood. The cladding is durable and minimizes the maintenance required on the exterior. The interior and exterior jambs on these "block-frame" units are in-plane and come without any exterior trim or sill; instead, a nailing flange is affixed to the perimeter for installation.

In many modern buildings, windows like these are often installed without additional exterior trim—something that just doesn't fly in the older, well-established areas where we typically work. So when ordering, we deduct 2½ inches from all four sides of the opening, which allows us to use standard 2-inch-wide brick mold on the sides and top, leaving about ¼ inch between the trim and the opening and the trim and the window. Leaving these gaps, which eventually will receive backer rod and sealant, greatly simplifies the installation. The space between the window and limestone sill receives a custom-fabricated sill nosing, which mimics the appearance of a thick, traditional wood sill.

To speed installation, we order windows that have painted interiors—either primed or completely finished—directly from Marvin. This slightly increases the cost of the window but saves us the time and aggravation of painting all of the various nooks and crannies. For this project we had to match an existing color that was not available from Marvin, so we took delivery of the primed units at our shop and did the final painting there, including the PVC brick mold used for the exterior trim. While it was not as efficient as using pre-finished windows, we were able to paint several units at a time, and it eliminated the need to paint installed units from ladders.

For interior trim, we primed MDF sheets and added one coat of finish paint before ripping them into simple square-edge 1x3s. We then primed the exposed edges and applied a final finish coat to the sides that would be visible.

After the painting was done, we scheduled the installation. To use staging and site protection more efficiently, we generally try to work in one room or section of a building at a time. In this case, we worked on one condo unit at a time, completing the installation before moving on to others.

Photos: Susan Burnet

Tear Out Old Window
To remove the old window, first separate the trim from the opening by cutting through the old caulk with an oscillating tool **(1)**. After taking out the sash, the quickest way to remove the old frame and exterior trim is by cutting through it with a reciprocating saw **(2)**, then collapsing the frame into the opening **(3)**. Clean all remaining paint and caulk from the opening with an oscillating tool or scraping by hand **(4)**.

Install Window Buck
A window buck made from untreated 2-by stock provides a nailing base for the new window. Peel-and-stick flashing tape isolates the buck from the masonry sill **(5)**. The preassembled buck slides into the opening **(6)** and attaches to nailers embedded in the masonry **(7)**. A second layer of peel-and-stick tape goes over the sill section of the buck **(8)**.

DEMOLITION

Before new windows can go in, the old ones have to come out. This operation is generally straightforward and takes 10 to 15 minutes per window. We start by removing the sash, then use an oscillating tool with a straight blade to cut the sealant between the trim and the masonry (see photos, facing page).

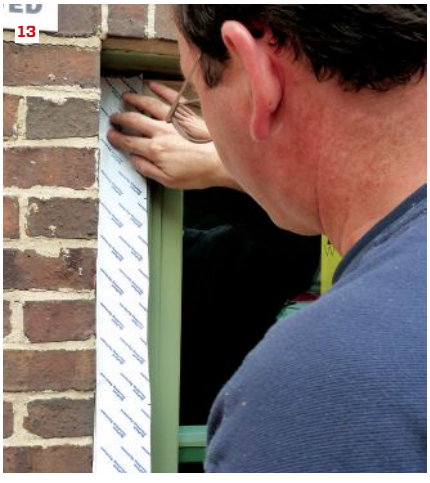
The easiest way to remove an old window is to leave as much of the frame and exterior trim intact as possible and collapse the frame onto itself. First, we cut through the trim and jamb with a reciprocating saw midway up each side jamb. Then, using a large pry bar, we pull each section of frame away from the masonry. The frame will hinge at the corners and fold into the opening. With the old sash and trim removed, we scrape off any residual lumps of paint or caulk in the opening and give the masonry a thorough sweeping.

INSTALLING THE WINDOW BUCK

The next step is to install the window buck—blocking that provides a nailing base for the new window (photos, above). In most masonry buildings we see, nailers are embedded around the window openings during construction for attaching the bucks. If those nailers are in good shape (as was the case here), we just nail our new bucks to them, taking care to level and plumb them as needed. If necessary, we replace any bad nailers with 2x4s attached to the masonry with Tapcon screws (tapcon.com).

To determine the thickness of the window buck, we measure the opening again and subtract the window dimension from the smallest measurement in each direction. Because of the deduction we made when we first measured the openings, we usually have enough room for a 2-by on all sides. If the masonry is irregular or the opening is way out of square, it's easy to rip 2-by stock to the thickness needed on a table saw.

The bottom of the window buck is usually in direct contact with masonry, so we install a piece of peel-and-stick flashing between the two elements to prevent any moisture in the masonry from wicking into the buck, which is untreated lumber. A word of caution here: I avoid using treated lumber for the buck unless it's required by local ordinance. Treated lumber often has a moisture content in the 20% range and, as it dries, this moisture can migrate to drier material—usually the new window or wood trim. This moisture migration can cause the drier wood to swell, potentially causing



problems with the appearance and operation of the window. If treated lumber is required, we use material that's been kiln dried after treatment. Sourcing KDAT is often problematic, however; few suppliers around here carry it and there's often a lead time. But if we do use it, we take care to isolate the window from the treated lumber with flashing tape.

We cut and assemble the buck as a unit, then attach it to the nailers in the opening with galvanized nails. As it goes in, I try to make sure that the sill of the buck is dead level, which eliminates the need to shim the window level during installation. After the buck is nailed in place, we install a separate piece of peel-and-stick flashing on top of the sill portion.

INSTALLING THE REPLACEMENT WINDOW

With the buck secure, we turn our attention to installing the window (photos, above). The process is fairly straightforward. First, we center the unit in the buck, then check level and plumb, shimming if necessary. When we have the window where we want it, we secure the corner of the bottom flange to the buck with a 2-inch hot-dipped galvanized roofing nail. Next, we plumb the side jambs and nail the adjacent top corner. Finally, we double-check all sides for level and plumb, and take diagonal measurements to confirm that the window is square. When the window is set, we drive nails every 6 to 8 inches around the perimeter, taking care not to ding the aluminum cladding. The nailing process is complicated by having to swing your hammer between the side of the opening and the vulnerable window cladding. If you have trouble with hammer accuracy, it might be best to use a hammer with an extended head, such as a Japanese-style "duck" hammer or an electrician's hammer.

FLASHING THE FLANGE

The window manufacturer provides precut pieces of peel-and-stick to bridge between the horizontal and vertical flanges at the corners (photo 12, above). We cut additional peel-and-stick flashing tape and apply it over the side and top flanges of the window. We leave the bottom flange without any tape, because any water that may make its way under the window has to be able to drain back out. We install the peel-and-stick flashing tape first on the sides, where it laps slightly onto the window

Photos: Susan Burnet

New Window Goes In
Slip the full-frame replacement sash into the opening. If the sill of the buck was installed level, shimming should not be necessary. Check the head jamb for level (9), shim if necessary, then nail one bottom corner (10). Check the side jambs for level and tack the adjacent corner. After taking diagonal measurements to check the window for square (11), nail off the rest of the flange every 6 to 8 inches.

Flashing the Flange
Corner flashing provided by the manufacturer joins the nail flanges at the corners (12). The sides are flashed next with the peel-and-stick flashing tape overlapping slightly onto the window frame (13). The sill is not flashed to provide a drainage path, but the head flashing overlaps the side flashing to complete the weather seal of the window (14).

Exterior Trim and Seal
The fastest way to apply the exterior trim is to preassemble it and install it as a single unit (15). Nail through the trim into the buck, but avoid going through the nailing flange, which can damage the window (16). Foam backer rod fills the gap between the trim and the opening (17). A bead of color-matched caulking completes the seal between the window and the trim, and between the trim and the opening.

frame. The head flashing goes on last, extending over flashing tape on both sides. Once the flashing tape is installed, the window is weathertight.

EXTERIOR TRIM

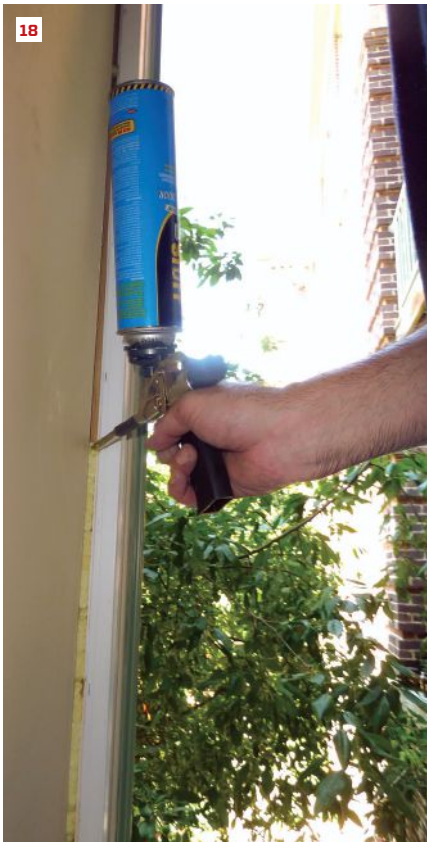
Because masonry openings are rarely true, we usually use PVC or engineered-wood trim, which is easier to work with than the extruded-aluminum panning systems that are available from the manufacturers. Whenever possible, I preassemble the trim so that it can be installed as a unit (photos, above). We make the decision to preassemble the trim based on how square each individual opening is. While installing a preassembled unit is usually faster than building it in place, we find it more difficult to scribe and fit an assembled frame to an irregular opening. So if the opening looks like it will require scribing, we opt for the one-piece-at-a-time approach.

A quick note about preassembly: We try to take advantage of our shop to fabricate and preassemble as much of the trim as possible ahead of time, both interior and exterior. Working in a controlled environment lets us be more productive, and all of our machinery is set up and ready for whatever operation is required. Plus, the shop gives us more space to spread out, and all of the materials we need are readily accessible. Finally, working in the shop keeps a lot of the mess away from the job site, so clean up is easier and the time spent on site is minimized.

Whether preassembling a trim unit or installing the trim on site, we always start with the sill, which is actually a piece of stock that measures about $1^{3}/_{4}$ inches square, with a slight bevel milled on its top surface. This sill stock mimics the profile of traditional window sills and provides a landing place for the vertical legs of the brick mold, which are angled to match the bevel on the sill. The header trim completes the assembly.

To attach it, we shoot 15-gauge galvanized finish nails through the trim and into the bucks, taking care not to drive nails through the window's vinyl nailing fin. (Nailing through the flange can cause it to crack in cold weather.) Next, we install foam backer rod between the trim and the masonry, as well as between the trim and the window frame if necessary. Don't skip this step; it increases the life of the sealant.

To seal the exterior of the window, we use a polymer sealant with a high solids content. These types of sealants are more expen-


18


19


20

Interior Sealing and Trim
The last step is sealing the inside of the window and applying trim. Low-expanding foam fills the gap between the window and the drywall to create an air seal (18). With the drywall returns on this project, the interior trim is thin 1x3 stock that cover the gap between the window jamb and the drywall (19). Beads of caulk between the trim and the drywall and along the reveal created at the jamb complete the interior finish (20).

sive than their latex or silicone counterparts, but they remain flexible and retain their color much longer. And they're available in hundreds of different colors, so matching the cladding on most windows is easy. In this application, we used OSI Quad (osipro.com).

INTERIOR SEAL AND TRIM

We seal the interior of the window with low-expanding spray foam, which fills the void between the jamb and buck, and creates an effective air barrier (photos, above). I've removed countless windows over the years where this step was omitted, or where fiberglass insulation was used instead of spray foam. The end results were windows that were always drafty around their perimeters because fiberglass by itself without an effective air barrier is practically useless.

The low-expanding foam we use is specifically formulated for window and door installations and, unlike other spray foams, it's unlikely to cause jambs to bow when installed correctly. We opt for a professional spray gun because it accepts larger cans of foam, which are more economical and produce far less waste than the individual "straw cans" that you get at big-box home centers. The professional spray gun also makes it possible to use just part of a can and save the rest for use at a later date. And they offer much greater control than the individual straw cans.

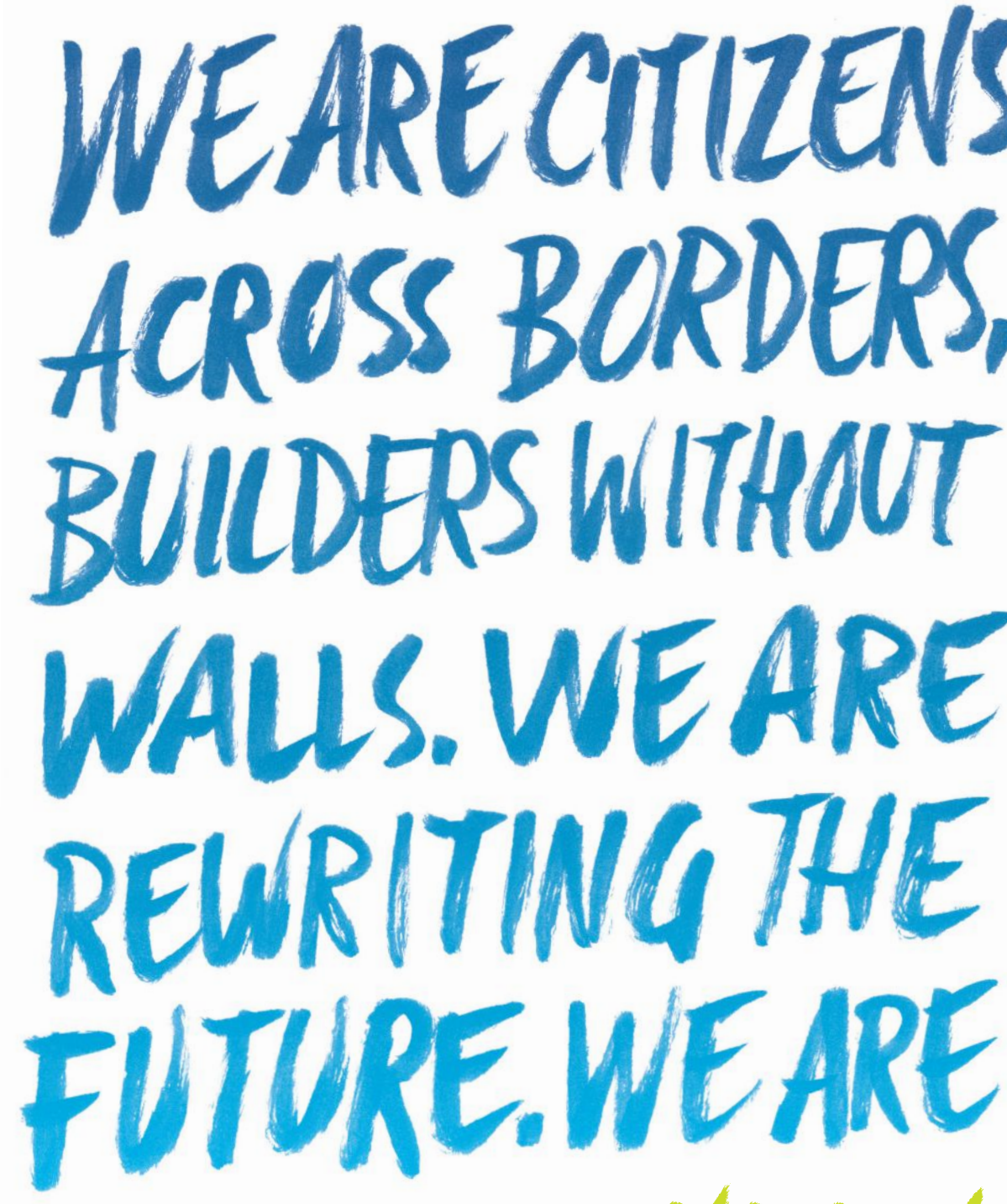
Once the foam has cured, we remove any excess with a knife or scraper and install the interior trim. In most cases, we preassemble the interior casing as well as any necessary jamb extensions ahead of time in our shop. If we are dealing with drywall-return openings, as we were in this case, we just install transition trim to cover the small gap between the drywall and the window on all four sides. This trim is simply thin 1x3 or 1x4 stock cut to length and attached to the wall returns with 16-gauge finish nails, leaving a small reveal on the window jamb.

Because the trim stock is prefinished, we use color-matched putty to fill the nail holes. Then we run a bead of caulk in the joint between the trim and the drywall and along the corner created by the reveal. The last step is to put sash lifts on each window.

Greg Burnet runs Chicago Window and Door Solutions, a carpentry contracting firm in Chicago that specializes in door and window installations.

Photos: Susan Burnet


thefacts
• Gutter Saws will not grab or twist gutter material.
High speed steel teeth set at 10 per inch (25.4 mm) plus shallow cup and short pilot drill projection ensure control.
• Hole slug will not hang up in saw cup.
A tapered compression spring collar on the combination Arbor / Pilot Drill Bit automatically ejects the metal slug.
• Drop and downspout fit snug and flush. Operation produces clean cut edge and distortion free hole.
Malco Gutter Saws have the capacity for cutting a variety of gutter including K-Style aluminum and Half-Round gutter made of zinc coated aluminum (ZincAlum), galvanized aluminum (GalvAlum), painted steel and copper.
• 5 sizes available including true metric.
60 mm (2.375 in.), 70 mm (2.75 in.), 78 mm (3 in.), 90 mm (3.5 in.) and 100 mm (4 in.)
Half-Round Gutter?
Round Outlets?
Malco has Gutter Saws!
YouTube
Malco®
Malco Products, Inc. | Annandale, Minnesota U.S.A. | www.malcotools.com | ©2013



GREENBUILD® NATION

INTERNATIONAL CONFERENCE AND EXPO

PHILADELPHIA NOV. 20–22, 2013 GREENBUILDEXPO.ORG

REGISTER TODAY: Join thousands of professionals, innovators, and experts at the world's largest green building conference and expo.

PRESENTED BY THE U.S. GREEN BUILDING COUNCIL

BY CHARLES WARDELL

Old-Look Laminate

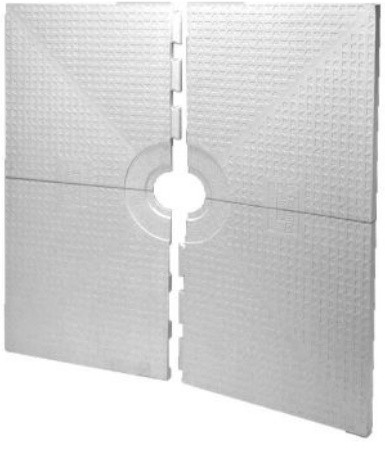
An embossed surface and a wear layer that combines multiple species and colors in random widths give Architectural Remnants flooring the look of reclaimed hardwood in a laminate product. The 12mm-thick flooring is available in eight colors and species and in varying sizes. Cost: $3 to $3.50 per square foot. Armstrong Floors, 800.233.3823, armstrong.com

Stealth Grab Bars

The Invisia Bath Accessories collection disguises grab bars as decorative flourishes to standard bath items. Made from stainless steel and available in a satin or polished chrome finish, the collection also includes aluminum-framed shower seats with walnut panels. Price ranges from $325 to $370. American Standard, 800.442.1902, americanstandard.com

Stone Pretender

The Foundry Stacked Stone Collection of premium vinyl siding offers the look of stone without the cost. Panels are cast in molds made from quarried stone and colored to provide tonal differences. Four colors are available. The material can be cut with snips and hung like traditional vinyl panels. Cost: about $3 per square foot. Tapco Group, 800.771.4486, foundrysiding.com



Mortarless Shower Base

Part of the Kerdi Shower system, which includes polystyrene shower curbs and waterproofing membrane, the Kerdi Shower Tray is a polystyrene tray used in place of a mortar base. Pricing varies by size and whether the drain is centered or offset. A 48-by-48-inch tray with a center drain costs $90; the 72-inch-square tray shown is $200. Schluter, 800.472.4588, schluter.com

Always in Balance
A heat recovery ventilator works best when an equal volume of air is moving through the supply and exhaust. That balance can be thrown off by various factors, from unequal-length duct runs to a strong wind blowing against the wall. The Self-Balancing HRV Deluxe Series solves the problem with internal circuits that measure airflow and adjust the speeds of the unit's two motors. Cost: $1,155. Reversomatic, 800.810.3473, reversomatic.com

Limited-Edition Doors
For clients who want something unique, Simpson's Artist Collection offers custom-designed doors from various artists—such as this door from architect James L. Cutler—featuring one artist at a time for a limited period. Doors can be made in any of more than 100 wood species. Pricing ranges from $1,000 to $1,500, depending on wood species, glass choice, and local market factors. Simpson, 800.746.7766, simpsondoor.com

Sidewall Boot
The Greenskin Envelope Seal makes flashing pipe penetrations easy: Just slip the 17-mil-thick polyethylene material over the pipe, slide building wrap under the bottom of the flange, then lap another layer of wrap over the top edge. Spacer buttons on the back of the flange allow for airflow. Available for 1/2-inch to 4-inch pipe diameters; suggested list price: $3.50 to $3.70. Mainline Backflow Products, 877.734.8691, backwatervalve.com

The Sump Is Calling
Unlike most other sump pumps, the Sump Minder sends a voice alert to cell numbers chosen by the homeowner if the battery needs replacing or there's some other problem. Able to pump 2,300 gallons per hour with a 10-foot lift, the pump's electronic controller monitors the 12-volt deep-cycle battery and cycles the pump every two weeks. MSRP: $490, not including battery. Wayne Water Systems, 888.299.2963, waynewatersystems.com

Easy

Easy to install and
to maintain.
Easy on the eyes and
the environment.

Our ***DesignRail® by Feeney*** pre-engineered aluminum railings are built for lasting beauty, structural integrity, and affordability. Made from heavy gauge materials with over 70% recycled content and available in a variety of styles with durable powder coated finishes and glass, picket, and ***CableRail by Feeney*** cable infill options. Simply snap and screw together. It's that easy.

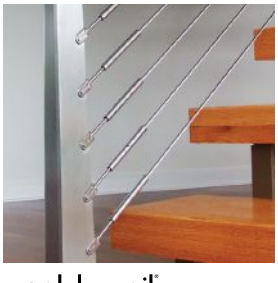
Learn about our entire line of garden and architectual products, and see why Feeney has been the easy choice among building professionals for over 65 years.

Free catalog, call 1-800-888-2418
or visit www.feeney5.com

design·rail® by feeney®

Aluminum Railing Systems

feeney® *makes it easy*



CABLE·RAIL® by Feeney
Stainless Cables & Fittings

design·rail by Feeney
Aluminum Railings

LIGHTLINE®
Door Canopies

TRELLIS Collection by Feeney
Cable & Rod Trellises

STA-LOK®
Stainless Rod Assemblies

Gas Double Slide-In
Double-oven electric ranges have been around for a while, but GE claims its Slide-In Double Oven Gas Range is the first one available in gas. Controls are on the front; unfinished sides and side tabs that fit over the top of the counter create a built-in look and eliminate the gap between range and counter. The range top includes a built-in griddle and a 20,000 Btu burner. MSRP is $3,300. GE Appliances, 800.626.2005, geappliances.com

Single-Coat Stucco
LP's CarraraFinishes Built on SmartSide are a cost-effective alternative to traditional three-coat stucco or EIF systems. The stucco finish is laid—with a trowel or a knife—directly onto the SmartSide panel, and can be used to create various textures. Priced from $2.50 to $3.75 per square foot. LP, 888.820.0325, lpcorp.com/smartside

Integrated Drain
Thin-Bed Drains are ideal for barrier-free applications because of their low profile. Noble says its Thin-Bed Drain goes one better, with a clamping collar that ensures a watertight connection between the drain and a sheet membrane. The drain is available with square or round strainers and comes in three finishes. The clamping collar and drain flange are stainless steel. Cost: around $95. Noble Co., 800.878.5788, noblecompany.com

Historic Faux Stone
The concrete "stones" in the Column Collection of stacking concrete columns are molded from a Civil War–era stone fence to provide a historical look. Stones are 6 inches thick, 14 inches square, and hollow in the middle so they can slip over a wood post. No mortar or special skills are required: Stones are simply stacked one atop the other. Cost is around $900 per column (13 blocks and a cap). Kroy by Ply Gem, 888.300.8208, kroybp.com

ZIP IT TIGHT.™

The fastest way to the perfect tight neighborhood.™

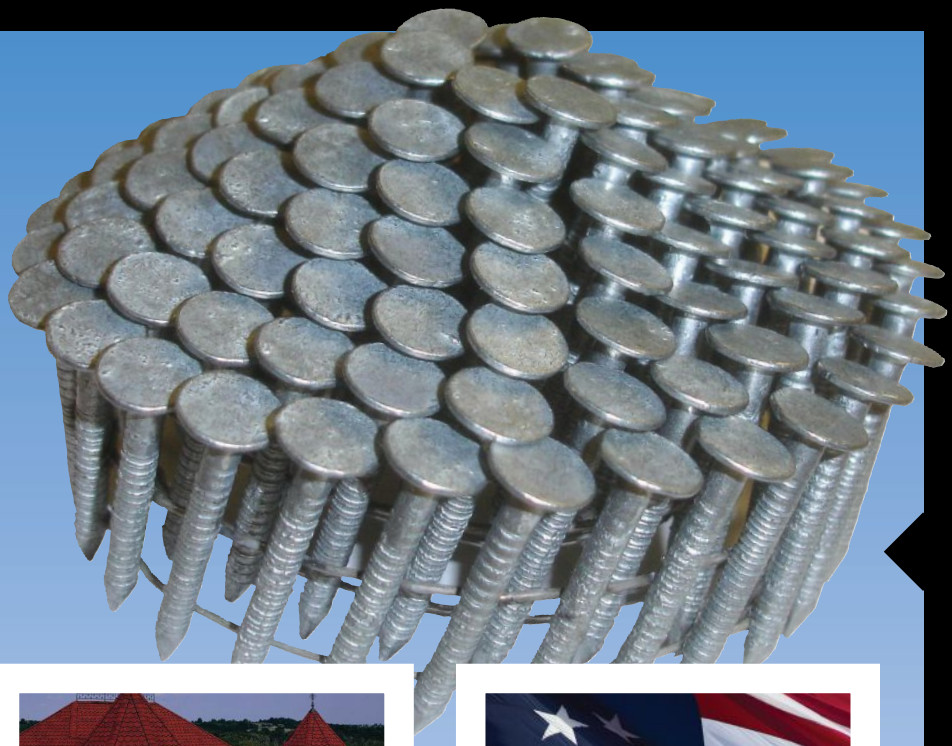
Discover ZIP System® sheathing & tape. It's a one-of-a-kind structural roof and wall system that keeps moisture out and reduces air leakage. This continuous moisture and air barrier offers superior drainage and permeance to keep structures dry and improve energy efficiency. Plus, it goes up in just two easy steps: 1. Install the panels, 2. Tape the seams. Fewer steps result in 40% faster installation when compared to traditional house wrap and felt. To save builders' time and homeowners' money, visit **ZIPsystem.com/JLC7.**

ZIPsystem™
SHEATHING & TAPE

FROM THE CREATORS OF AdvanTech

OUR severe weather solution.

MIAMI-DADE COUNTY APPROVED



MAZE ring shank HDG roofing nails are Miami-Dade County Approved.

MAZE roofing nails are available in bulk for hand driving and coils for pneumatic tools.

MAZE roofing nails are 100% MADE IN THE USA.

MAZE roofing nails are available in double hot-dipped galvanized, stainless steel, copper and aluminum.

MAZE ring shank roofing nails provide more than twice the holding power of smooth shank nails.

MAZE NAILS
Building America one NAIL at a time

NAIL IT *ONCE*. NAIL IT *RIGHT*.®

1.800.435.5949 · mazenails.com

Celebrating 165 Years • 1848–2013

A Division of W.H. Maze Company
Helping to Build America Since 1848

Manufacturing 100% Made in the USA nails with pride, honor and tradition.

Makita LS0714 Sliding Compound-Miter Saw

BY STEVE DEMETRICK

As a residential remodeling contractor, I'm always on the go. My tools need to keep pace by being portable, accurate, and easy to use. The Makita 7 ½-inch sliding compound-miter saw (model LS0714) has been an asset to my work in all of these regards. I've been using the saw for cutting everything from light framing to interior trim since Makita introduced it in 2005, and it's still on the market.

EASY CARRY

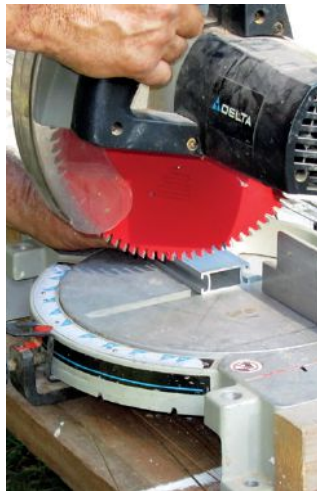
The LS0714 weighs only about 29 pounds, or about half as much as a comparable 10-inch or 12-inch slider. It's never an issue to drag it out for a couple of cuts, and when trimming interiors it's normally more productive to move this compact saw from room to room than to set up a fixed high-capacity miter-saw station and walk back and forth for every cut. Because I can lift the saw with one hand, I can easily bring it up a ladder and set it on staging for cutting siding or trim.

The cutting capacity is tremendous for such a small saw. For example, when building staircases, I use the saw for everything from crosscutting 1x12 skirtboards and 1x oak treads to fitting the cove moldings and balusters. I can also cut crown moldings up to about 3 inches wide by nesting them against the fence in the usual upright, upside-down position and adjusting the miter angle for a perfect fit. Wider crown needs to be cut on the flat, which forces you to adjust the bevel angle every time you tweak the miter angle. That's no trouble if I'm only making a few cuts in a

Photo: right, Bill Phillips

CONVENIENT METAL-CUTTING MITER SAW

When I recently upgraded to a new compound-miter saw for trim and general carpentry, I outfitted my old Delta 10-inch miter saw with a new 80-tooth Diablo D1080N Non-Ferrous/Plastics saw blade (diablotools.com). The Delta is now my dedicated saw for cutting aluminum track for rolling doors, aluminum window-screen frames, and other non-ferrous metal materials. It sure beats the hassle of using a hacksaw or an angle grinder, and the thin-kerf blade's triple-chip grind delivers clean, burr-free cuts. I even accidentally cut a mild-steel grid for a suspended ceiling with this blade, and it didn't damage it. That might be because of Diablo's special high-density carbide teeth and tri-metal shock-resistant brazing. The blade costs about $60 at homedepot.com. *—John Carroll is a remodeling contractor in Durham, N.C.*



The author's complete rig includes a compact DeWalt stand and a Festool vacuum.

The lightweight saw can easily be set up on staging so it's close to the work.

room, but I'll use one of my bigger sliders if I need to run wide crown in an entire house.

MITERS AND BEVELS

The LS0714 can miter 47 degrees to the left and a generous 57 degrees to the right. And although a detent override allows for a bevel up to 5 degrees to the right (a feature I often use to back-cut wide pieces), it's basically a single-bevel saw and can only bevel 45 degrees to the left. That doesn't help when trimming out-of-square old houses, and it sometimes means having to flip the stock end-for-end when cutting bevels or compound angles. (With dual-bevel saws, instead of flipping the stock, you can tilt the cutting head to either side—helpful when cutting long pieces in tight quarters.) But this beveling limitation has never been an issue for me; I plan my cuts, so I seldom have to flip the stock.

HELPFUL ACCESSORIES

I like the saw's small 7 ½-inch blade diameter because it limits deflection and wobble. Instead of the stock 40-tooth Makita blade, though, I use a 60-tooth Forrest Chopmaster blade (model CM07H606100), which costs about $107. It's about 50% thicker than Makita's blade and safely makes very clean cuts in the tiniest of moldings. My larger miter saws tend to grab small pieces even when using a wood backer, but my LS0714 never does. It can also use common 7 ¼-inch blades in a pinch.

I normally mount the saw on DeWalt's compact model DWX724 universal miter-saw stand equipped with extra-wide DW7029 work supports. The stand has a quick-release saw mount and folds for transport and storage. Together, saw and stand weigh under 60 pounds.

For dust collection, I hook the saw to a Festool CT Midi vacuum. Festool's 1 7/16-inch hose end would normally fit loosely over the plastic dust port, but a few wraps of duct tape around the port expand the outside diameter to create a snug fit. I've never measured the amount of dust collected, but would conservatively estimate it to be about 80% to 85%.

THE BOTTOM LINE

I wish the LS0714 could bevel a bit past 45 degrees, but that's my only complaint. After using the saw for eight years, I know it's built to last. It's my go-to saw for almost every aspect of my work, from light framing to finish.

LS0714 SPECS

Blade: 7 1/2 inches; 5/8-inch arbor
Weight (by mfr): 28.9 pounds
Amps: 10
No-load speed: 6,000 rpm
Cutting capacity, 0º miter/bevel: 2 1/16 x 11 3/4 inches
Cutting capacity, 45º miter/bevel: 1 9/16 x 8 3/8 inches
Max. miter angle: left 47º, right 57º
Max. bevel angle: left 45º, right 5º
Price: $450
Warranty: 1 year, 30-day satisfaction guarantee

Makita / 800.462.5482 / makita.com

Steve Demetrick is a residential remodeling contractor in Wakefield, R.I.

LOST SOLES

I was just about to write a rave review of the Keen Industrial "California" work boots that I've been wearing for more than a year. Now, I have a gripe instead: I just learned that the boots are being discontinued.

With welt construction, a rubber toe guard, and an extra-wide front end that helps prevent me from twisting my ankles—as I am prone to do—my California boots were comfortable right out of the box. Other Keen work boots also have those features, but only the California boot has wedge soles, which I consider mandatory. The soft soles don't collect debris or mark floors, and they give me enough traction to sheath an 8:12-pitch roof. What's more, the boots are still in great shape after I've poured several foundations under existing cabins, grinding my boots against rocks and tree roots. Based on that performance, I expect the boots to last at least another year, or about twice as long as my boots have usually lasted over my 37-year building and remodeling career.

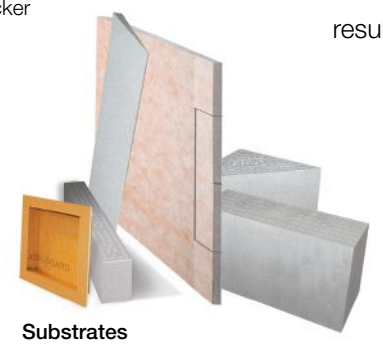
Keen says it is discontinuing these boots because wedge soles don't sell well anywhere but in California. I hope it reconsiders, because the boots are the best I've owned. *—Mitch Greenlaw, owner of Greenlaw Construction, Twain Harte, Calif.*

Waterproofing
Membrane or tile backer

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

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

Drain
KERDI-LINE linear drain
with 3 grate designs



Substrates
Tray, curb, bench, ramp and niche

Speedy One-Handed Clamps

My favorite jobsite clamp is the Stanley FatMax Xtreme Auto Trigger Clamp. It delivers a potent 450 pounds of clamping force and is spring-loaded to snap the jaws against the work at the press of a button. You only have to pull the trigger once or twice to apply the force. That's especially handy when you're holding up a material with one hand while clamping with the other, such as when clamping a temporary brace to a fence post or a guardrail newel to a deck joist. The clamp also converts to a spring-loaded spreader in a heartbeat.

All good, except that Stanley Black & Decker recently replaced that clamp with the new DeWalt Rapid Return Bar Clamp. Like the Stanley, it comes in a 6-inch and a 12-inch version. I tried both sizes to see if they work as well as their predecessors.

According to the specs, the DeWalt clamps deliver 350 pounds rather than 450 pounds of clamping force, though I couldn't really tell the difference in my limited trials. The DeWalt's throat is about ¾ inch deeper for a better reach. Like the Stanley, the DeWalt uses a coiled steel spring to speed the closure.

In use, the DeWalt 6-incher worked as well as the old one, consistently springing the jaws shut when I pulled the release lever. But the 12-incher sometimes stalled and needed a manual assist. That might be because the new spring is about 1/16 inch narrower than the old one, though there also seems to be more friction in the new design. DeWalt says the sliding action should improve with use. I've seen the two sizes priced as low as $20 and $22 online. *—Bruce Greenlaw is a contributing editor to* JLC.

New & Noteworthy

The Stanley FatMax Powerclaw is a unique power strip that clamps to framing, ladders, or elsewhere to keep it off the ground or floor while conveniently positioning your power source. It has three grounded outlets and a 15-amp breaker, and costs about $25. Search "Stanley FatMax Powerclaw" at youtube.com to view a video. *—B.G.*

RUGGED, WASHABLE DROP CLOTH

Josh Dunlap, production manager of Consolidated Design & Construction Group, a residential design/build remodeling contractor in St. Louis, reports that his company has been using Trimaco's Old School Heavyweight Butyl drop cloths (trimaco.com) for years with excellent results.

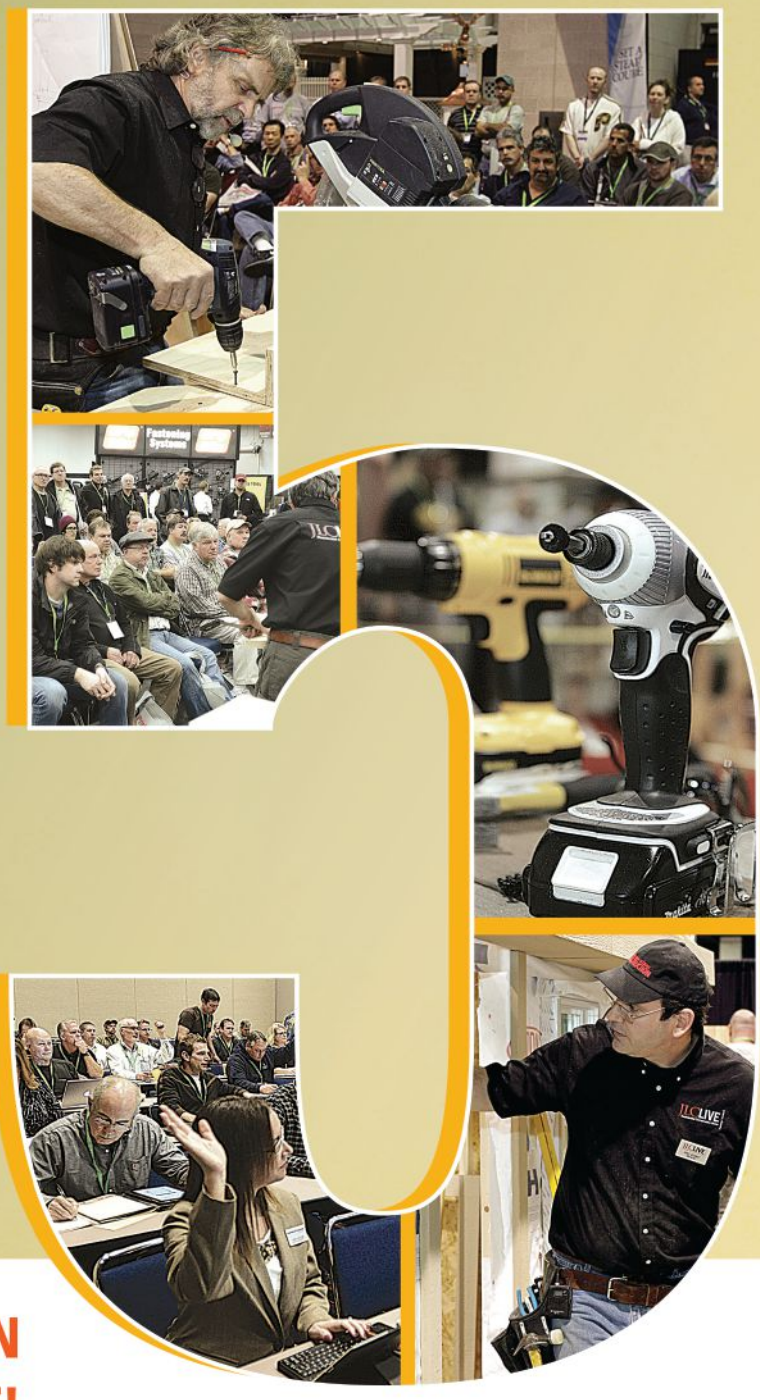
Made in the U.S., the washable drop cloths consist of a tightly-woven polyester/cotton fabric with a triple-coated butyl-rubber backing that helps prevent liquids from leaking through while also resisting slippage on hardwood and other solid surfaces. Dunlap says that his drops have endured countless machine-washings without delaminating, and that small tears can be repaired by patching both sides with Tyvek tape (which can also handle multiple washings).

The drops come in four sizes, but he finds the 4x15 and 9x12 versions to be the most useful because they're easy to wash and can collectively protect everything from hallways to large rooms. At homedepot.com, the 4x15 costs about $16, the 9x12 about $28. *—B.G.*

Photo: bottom, David Frane

JLCLIVE
Residential Construction Show

NORTHWEST2013



REGISTRATION IS NOW OPEN FOR JLC LIVE NORTHWEST!

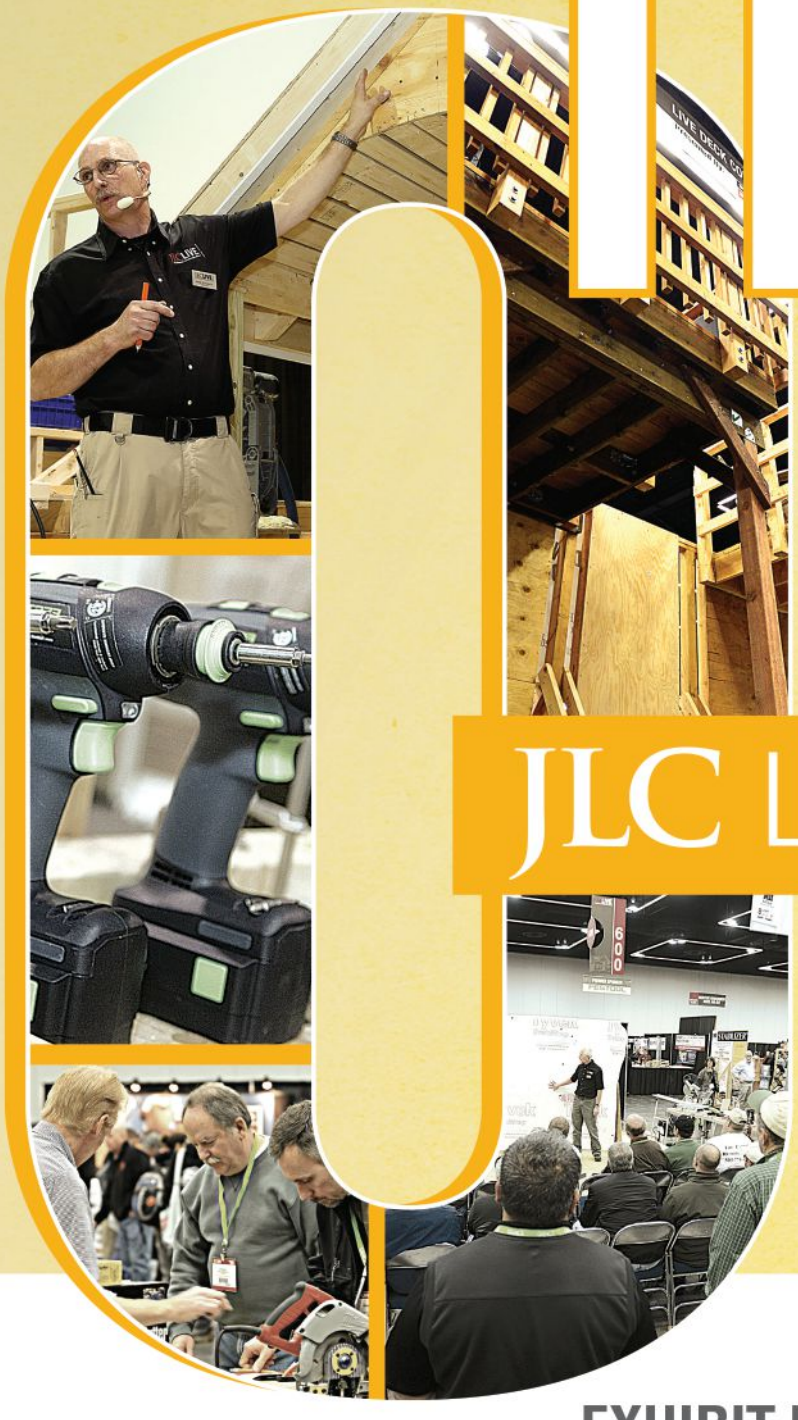
This is JLC LIVE's 50th LIVE event! Check out the all new JLCLIVE.com and register today. Use the code in this ad to receive free exhibit hall admission so you can experience the live clinics and demonstrations from industry experts for yourself! Elective and Core education credits are also available.

REGISTER NOW — **JLCLIVE.COM**

PROMO CODE: AD01

hw

TH



JLC LIVE EVENT

EXHIBIT HALL: DECEMBER 5-6, 2013
CONFERENCE: DECEMBER 4-6, 2013

OREGON CONVENTION CENTER | **PORTLAND, OREGON**

TOLL FREE: 866-261-7769

October Advertising Index

Advertiser	Page	Website
Ainsworth Engineered	4	betterboard.com
American Institute of Architects, The	12	aia.org/join_allied
Apex Tool Group, LLC	6	controlseries.lufkintool.com
Astro Plastics	95	astroplastics.com
BehrPro	2	behrpro.com/prtjlc
Benjamin Obdyke Incorporated	37	benjaminobdyke.com
Calculated Industries	71	calculated.com
Chrysler Group LLC/Ram Trucks	25	ramtrucks.com/commercial
ClimateMaster	28	cmbuildernet.com
Contractor's Solutions	95	Contractors-Solutions.net
Covercraft Industries	27	worktruckproducts.com
DEWALT	16	dewalt.com/multitool
DEWALT	20	dewalt.com/tablesaws
Diablo	5	DiabloTools.com/DareToCompare
Eco-Strip, LLC	95	eco-strip.com
Enduris	60	endeck.com
FastenMaster	IBC	FastenMaster.com
Feeney, Inc.	83&91	feeney5.com
FESTOOL USA	33	festooljigsaws.com
Grace Construction Products	IFC	graceresidential.com/35yearsIWS
Grainger / Professional Equipment	71	ProfessionalEquipment.com
GreenBuild	80	greenbuildexpo.org
Grip-Rite/PrimeSource	43	grip-rite.com
Home Depot, The	10	homedepot.com/RIDGID
Home Depot, The	57	homedepot.com/pro
Home For Life	70	homeforlife2013.com
Huber Engineered Wood, AdvanTech	45	AdvanTechPerforms.com/warranty/JLC5
Huber Engineered Wood, ZIP	85	ZIPsystem.com/JLC7
Husqvarna Construction Products	18	husqvarnacp.com
Inteplast Group LTD.	40	VernadaHP.com
Jamsill	91	jamsill.com
JLC LIVE	92&93	jlclive.com
JLC Online	58	jlconline.com
Kett Tool Company	91	kett-tool.com
Kleer Lumber, LLC	47	kleerlumber.com
Lenox Tools	16a-d	oneblade.com
Lumber Liquidators	71	lumberliquidators.com/prosales
Malco Products, Inc.	79	malcotools.com
Mark E Industries	91	markeindustries.com
Marvin Windows and Doors	31	pros.myMarvin.com/Gallery
Masterchem Industries, Inc.	9	kilzpro-x.com/betterhide
Maze Nails	86	mazenails.com
Milwaukee	14	milwaukeetool.com/m18fuel
MiTek Industries, Inc.	39	uspconnectors.com
National Nail Corporation	48	camofasteners.com/edge.html
Nissan North America, Inc.	7	nissancommercialvehicles.com
Noble Company	95	noblecompany.com
NyloBoard	22	nylodeck.com
Schluter Systems	89	schluter.com
Simpson Strong-Tie	69	strongtie.com/strongwall
PorterCable	1	PorterCable.com
Stanley	OBC	stanleytools.com
Structus Building Products	27	hydrotrimcorner.com
Surface Shields, Inc.	8	surfaceshields.com
Tapco Group, The	72	TapcoSolutions.com
Titebond	21	titebond.com/PROvantage
Tjernlund Products, Inc.	95	tjernlund.com
Trim-Tex Drywall Products	59	trim-tex.com
wedi Corporation	59	wedicorp.com
Western Red Cedar Lumber Association	13	realcedar.com
Wilsonart	19	wilsonarthd.com
Young Manufacturing Company, Inc.	34	youngmanufacturing.com

JLC

Content Licensing for Every Marketing Strategy

Marketing solutions fit for:

- Outdoor
- Direct Mail
- Print Advertising
- Tradeshow/ POP Displays
- Social Media
- Radio & Television

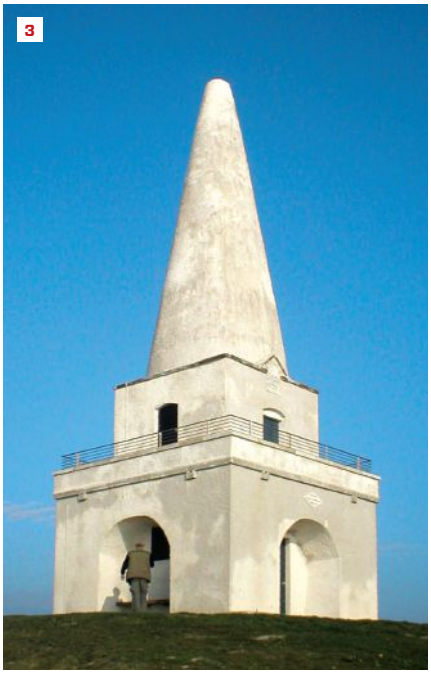
Logo Licensing | Reprints

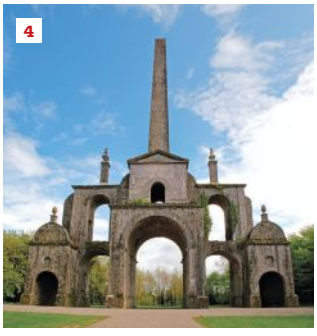
Eprints | Plaques

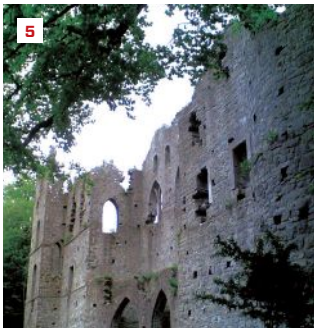
Leverage branded content from *The Journal of Light Construction* to create a more powerful and sophisticated statement about your product, service, or company in your next marketing campaign. Contact Wright's Media to find out more about how we can customize your acknowledgements and recognitions to enhance your marketing strategies.

For more information, call Wright's Media at 877.652.5295 or visit our website at www.wrightsmedia.com

BY JON VARA







1. The Temple of Philosophy in the Ermenonville Garden in France was deliberately left unfinished to symbolize the incomplete state of human knowledge. **2.** Carved from a sandstone boulder, The Hermitage folly is said to have standing room for 18 visitors. **3.** An inscription on The Killiney Hill Obelisk above Dublin Bay reads "Last year being hard with the poor, walks about these hills and this were erected by John Mapas, June 1742." **4.** Connolly's Folly, County Kildare, Ireland, reportedly provided work for hundreds of workers after a crop failure in 1740–41. **5.** Ireland's Jealous Wall was built for an irate landowner who wanted to block the view of his estranged brother's nearby home.

Well-Built Folly

In everyday language, the word "folly" usually refers to a foolish action or object. But to an architectural historian, it has a more precise meaning: a folly in that sense is any decorative building that has little or no practical use.

True architectural follies are relatively rare in North America. (Building follies in the more general sense, of course—as exemplified by oversized, haphazardly insulated, and poorly air-sealed residential structures—are not uncommon at all.) But in much of Europe—and especially Great Britain and Ireland—there's a long tradition of architectural follies. Wealthy estate owners in the 18th and 19th centuries were fond of stone follies that could be astonishingly large and elaborate. The Jealous Wall in County Westmeath, Ireland, for example, is a full three stories high and more than 150 feet long. At the other extreme, The Hermitage folly—near the English hamlet of Littlebeck—consists of just one stone.

In some instances, follies served as public works projects in a time before government relief programs for the poor. Ireland's so-called "famine follies" were designed by prosperous landowners as a way to pay unemployed laborers to turn their hands to something without taking productive work away from those lucky enough to have it.

Jon Vara is a JLC *contributing editor who lives in Cabot, Vt.*

MEET CODE.
LOWER COST.

View a TimberLOK installation video

TimberLOK is used by professional contractors nationwide to meet code and lower costs for rafter and truss to top plate connections.

Meet Code: Tested and proven to meet 2012 IRC requirements for rafter and truss to top plate connections. **Lower Cost:** Requires no predrilling, saving time and labor.

TimberLOK is part of the FastenMaster LOK Line family of structural wood fastening products. Visit our website to learn more, download technical documentation, watch an installation video or find a dealer near you.

RAFTER OR TRUSS TO TOP PLATE CONNECTION

Fastener	Hurricane Clip	6" TimberLOK
Code-Compliant	✓	✓
Additional components	10 nails	**NONE**
Installation Time	**1 min, 17 sec**	**10 sec**

Made in USA

www.FastenMaster.com **800·518·3569**

FastenMaster TimberLOK® Heavy Duty Wood Screw

STANLEY®
FATMAX®

SINGLE-HANDEDLY GET THE JOB DONE

STANLEY® FATMAX® TAPE RULE

It's innovation you can measure. The new STANLEY FatMax 25' Tape Rule is the first auto-locking tape with 11' blade standout. The auto-lock mechanism holds the blade secure until you are ready to release it, and a detachable framing hook is ready to grab studs when you need it. When it comes to increasing your productivity, let FatMax give you a hand.

SCAN FOR MORE NEW PRODUCTS

STANLEYTOOLS.COM