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

CAHI MONTHLY NEWS

June 2018 Volume 11, Issue 6

Presidents Corner

Sales, Inventory and Prices are all up in Hartford County. The Real Estate market is certainly keeping me busy. Staying busy is a good thing. Becoming fatigued is bad.

Fatigue causes standards to slip, makes for mental errors and worse of all can lead to accidents.

Stay safe and maximize your profits by following these simple rules:

1) Show up properly prepared for the job, having done everything possible to get a good sleep and rest.
2) Recognize the signs and symptoms of fatigue.
   They include: feeling (constantly) tired, having little energy, feeling 'sluggish', excessive yawning, bad moods, forgetfulness, inability to concentrate, poor communication, poor decision-making, reduced hand-eye coordination and slower reaction times.
   Other symptoms not so obvious to others include: feeling drowsy, headaches, dizziness, blurred vision or impaired visual perception and a need for extended sleep during days off work.

Overcoming fatigue involves;

Sleep: Adequate, good quality sleep is essential to maintain and restore full physical and mental functioning. It is the only way to recover from fatigue.

Take breaks: Use rest and recovery time appropriately to restore energy and alertness.

Eat well: Eat a balanced diet

Hydrate: Drink sufficient amounts of water. Don't allow yourself to get dehydrated.

Stay well, Stay safe, Stay profitable!

Bill

MONTHLY MEETINGS – Details & Info

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

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

INSIDE THIS ISSUE

Presidents Corner 1

How to Drive Traffic to your Site.....2

Bracketed Deck Stairs.....5

Mid Year Planning; Tax Changes....16

Avoiding Wet Roofs.....18

Cancer and Men.....24

Pouring Level Floors for Tile.....25

Meeting Dates!

June 27th

"Water Sampling"

Presented by:
Randy Boncek
from Aquatek Labs

Randy will talk about water sampling for the Basic Profile, Lead, Arsenic, Uranium, Pesticides and VOCs.

July Meeting

TBD

Editor's Note: This story appears in Working RE Home Inspector's Summer 2018 Print Edition. OREP insureds enjoy it free along with many other business and risk management benefits! WRE reaches 20,000+ Home Inspectors in Print and Online!

How to Drive Traffic to Your Site Organically

By Kate Ivey, HomeGauge

Having a functional and attractive website is the first step to creating a great online presence. Already have one? Way to go! The next challenge is making sure your investment in a website pays off.

"Paying off" means doing everything you can to bring people to your site. Because, after all, what good is a great website if no one visits it? There are many different strategies for SEO (Search Engine Optimization) and very different approaches. You may have already been contacted by people or agencies claiming to increase your traffic and ranking and to get you to the top of Google. My advice? Tread lightly and do your research before signing contracts or spending your hard-earned money. Just like the home inspection industry, Google's algorithms are ever-changing. After six years in this industry, here are what I believe to be the three easiest ways to drive traffic to your website in 2018.

1. Publish Fresh Content Regularly

Having a great website with well-written content is fantastic. But it's not enough. If you really want to drive traffic to your site and increase your ranking with search engines, you need to publish fresh content on your site. What does that mean? Blogging. Or, in other words, writing original articles with quality content, keywords and links. I know it sounds daunting and cumbersome but it really will pay off in the long run. SEO is a marathon, not a sprint, so you'll need to stay on top of maintaining your website's content and making sure it's useful and relevant to both search engines and customers. If the sound of all this makes you want to run in the other direction, consider hiring a professional to handle it for you.

2. Get Social with Your Business

Now that you have some great content, you need to share it with the world. First stop? Facebook. Why? For one thing, it's the social media platform used by most businesses. Today, there are 70 million small businesses on Facebook. And if that many businesses are going there, you can be sure people who need those businesses are going there too. Facebook is also flexible. You don't have to be as brief as you do on Twitter or as visually focused as you do on Instagram.

So what should you do for your business on Facebook? Start by setting up a Facebook business page—if you don't already have one. Make sure your branding for that page is consistent with your company and with what you're saying and showing on your website. If branding and marketing skills aren't necessarily in your wheelhouse, hire someone who knows what they're doing. After all, you wouldn't expect a graphic designer to inspect their own home and they wouldn't want you to create your own logo (trust me!).

For many inspectors, setting up a Facebook business page is the easy part. The hard part is figuring out what to post on it. The only real rules are to make it interesting and mix it up a little. You don't want every post to be another straightforward advertisement for your business. Mix in some education, some practical information and even some fun. Share tips and tricks for home repair, maintenance or improvement. Link to blog articles you wrote for your website (with a little teaser or introduction to get them to click over), and post photos from your inspections. Are you or your company involved in charitable events, sports or other activities? Post photos from those too and let potential customers know that you're dedicated to the community. Or why not simply thank a client or agent for choosing you for the inspection? That small gesture says a lot about you as businessperson. Bonus points if you ask the people you thank to follow you on Facebook and you "tag" them in your post. Keep in mind that whatever you post, the main goal is to get followers to go from Facebook to your website. So don't forget that link!

3. Deliver Your Inspection Reports Online

You may not think of your inspection software as a tool you can use to drive traffic to your site but it absolutely is. Many inspectors today create their reports using software applications but deliver them by PDF. When they do that they're missing a great opportunity to build website traffic. Quality home inspection software allows you to create reports in HTML instead of delivering them in printed form or as emailed PDFs. I know what you're thinking—EVERYBODY uses PDFs. But it's time for PDFs to die—or at least go away. If that sounds a little harsh, consider this: the quickest, surest way to increase your traffic is to stop sending PDFs. With the right software you can easily generate reports that are more visually impressive and functional and that have some nifty time-saving features built right in. Both clients and agents will be happy. (And yes, they can convert those HTML reports to PDFs if they really want to.) But the real payoff, traffic-wise, is that HTML reports mean clients and agents have to come to your website, where you have a chance to impress them with your knowledge and professionalism.

My grievance with PDFs aside, think about how many times your website would get visited each month if you have a full featured software solution that allows parties to come to the website to complete the business agreement, access their report, and not only access an invoice but pay it as well. Or if agents could go to your site to retrieve an older report for reference. More visits lead to a greater sense of familiarity and comfort with you. And that means more referrals and repeat business. And guess what? Those multiple visits help you in another way as well. Internet search engines keep track of visits to your site. More visits tell them your website is relevant and useful, and that helps boost you in search results. It's a win-win!

Don't Forget to Track It!

While each one of these tools can help increase your organic traffic, you need to be tracking and monitoring it too. Because our industry changes from month to month and especially season to season, it's crucial to be able to compare traffic data year over year. That way, when you're focusing on planning your summer marketing for 2018, you can compare what you did in those months in 2017 to those same months in 2016. Did your traffic increase or decrease? What did you do differently this year to affect that change? Be sure to install Google Analytics on your site as soon as possible so that you can begin tracking your website data.

Facebook Page Insights help you improve your social media presence by telling you what types of content (videos vs. still photos, etc.) are engaging your audience, which topics visitors like most, and if there are optimal days and times to post. Most quality software packages give you ways to view all activity on a report, including report views and views by third parties, so you know exactly what is going on with your uploaded report.

Remember, a quality website is essential for inspectors. But you can't just have a beautiful website built and then hope for the best. By driving traffic to the site, you're taking a big step in driving more clients to your business.

About the Author

Kate Ivey has been in the home inspection industry for more than 5 years and currently manages the web services team at HomeGauge. Kate and her team create custom websites and offer a variety of affordable hosting and SEO packages geared towards home inspectors. You can check out examples of their work at www.HomeGauge.com.

Bracketed Deck Stairs

Mike Guertin

Build wider, stronger deck stairs using just a pair of solid stringers and metal brackets

I don't see many deck stairways built with bracketed stringers, but they're a good alternative to notched stairs in certain situations. The design is similar to housed stringers.where dadoes are routed into the framing to provide shoulders for the treads and riser boards to rest in.but is simpler to build. And bracketed stairs are stronger than stairs with notched stringers because the 2x12 stringers aren't weakened by notches that effectively leave only 2x6s to support the loads on the stairs.

I like to use solid stringers and brackets whenever a design calls for wide stairs or long spans. Notched stair stringers have a limited unsupported run of 6 feet, according to the AWC's DCA6 (*Prescriptive Residential Wood Deck Construction Guide*). Compare that with solid stringers, which can span more than twice that distance. 13 feet 3 inches.without intermediate supports.

DCA6 also limits the width of 2-by treads between solid stringers to 36 inches, but that can be increased substantially by installing structural risers. Incidentally, this also satisfies the building code requirement to block openings that are greater than 4 inches.including underneath the treads.when the stair is more than 30 inches above grade.

Metal Brackets

On this project, the stairs access a landing for a storage building. I built them using ordinary pressure-treated lumber rated for ground contact (AWPA UC4A). For a more finished look, the stringers, treads, and risers could be made from any finish-grade, naturally decay-resistant lumber, such as cedar or a suitable tropical hardwood.

The treads are 2x12s that I ripped down to 11 1⁄4 - inches. Because the risers are structural to help support the 4-foot span of the treads, I used 2x10s for them.

DCA6 provides a tread-support detail that features 2x4 PT cleats fastened to the solid stringers, but on this project, I used metal stair angles. While stair angles look like ordinary angle brackets, they are made of thicker-gauge steel and are stronger. Stair angles are made by both Simpson Strong-Tie (TA9Z and TA10Z) and MiTek/USP (SCA9-TZ and SCA10-TZ) and are weight-rated depending on how many structural screws or lag screws are used to mount them to the stringers.

Another option is to use EZ Stairs (ez-stairs.com) metal support brackets, which have a right-angle design that supports both the treads and the risers. According to the manufacturer, this system can be used with a single pair of stringers to build exterior deck stairs that are as wide as 7 feet.

Stringer Layout

To avoid overloading an end joist or a rim joist, I prefer to support the head of the stair independently of the deck frame. On this project, I began by fastening a 2x6 dropped header to the 4x4 posts with structural screws. The 2x6 is also supported by a pair of 2x4 jack studs that are screwed to the posts and bear on the footings supporting the posts. The 2x6 is in plane with and provides additional support to the end joist of the deck (**Figure 1**).

Stair layout starts as it does for cut stringers. First, I determine the rise— the height from the top of the finish deck to the point on the landing where the bottom step will fall. Then I find the run— the distance from that point back to the deck. Of course, these two measurements are necessary for calculating the width of the treads and the height of the risers.

When laying out the treads and risers, I mark the tops of the finish treads, rather than the bottom, or cut line. Screwing a 1-by strip of wood to my framing square instead of using stair gauges or lining up the framing square by eye allows me to mark the tread and riser heights with more accuracy (**Figure 2**).

I draw heavy pencil lines for the treads and light lines for the risers. This is because the marks aren't cut out, as they would be for notched stringers, and the actual position of the risers will be 3⁄4 inch behind the stringer nose. This makes it easier to erase the light riser lines later.

After the primary stringer layout, I make a second pass to scribe the bottom lines for the treads using the 1 1⁄2 inch tongue of the framing square. This lower line is where the top of the tread brackets will be aligned.

To transfer the layout onto the mating stringer, I square a line where each of the riser and tread marks meet along the top edge of the pattern stringer. Then I align the pattern stringer with its mate f lush across the top edge and transfer the edge marks to the mate.

With the two stringers positioned so that they mirror one another, I use the framing square to mark the mate with the light riser line and the top.of.tread and bottom.of.tread lines. This ensures that the same face isn't marked on both stringers.

The top stringer cut is one straight line with the top ear clipped for the decking to pass over. At the bottom, I cut both the heel line and the riser line, but the riser.line cut is optional. The stringer can be left to run out onto the landing, but it looks better when it terminates with the nose of the tread.

Installing the Brackets

It's easier and faster to install the hardware when the stringers are resting across a pair of sawhorses, but hardware can also be screwed in place when the stringers are in position. In either case, orienting the bracket along the line at the bottom of the tread is important, and don't place it too far forward or the bracket will interfere with the riser installation (**Figure 3**).

On these stairs, I wanted the tip of the tread nosing to line up with the top of the stringer. I positioned a section of 2x12 at the tread line and measured back 2 1⁄4inches along the bottom from the face of the tread: 3⁄4 inch for the tread nose overhang (code requires a minimum projection of 3⁄4 inch and a maximum projection of 1 1⁄4 inches) and 1 1⁄2 inches for the 2x10 riser thickness.

After screwing the brackets to the stringers, I drilled pilot holes for structural screws to be driven through the outside of the stringers and into the end of the treads. Then I installed the treads, driving 1 1⁄4 -inch-long structural screws up through the metal brackets into the treads.

The risers perform a structural function, turning the treads into small beams. So I used structural screws driven about a foot apart through the back of the risers and into the back of the treads to beef up the assembly. I also drove structural screws down through the front of the treads into the structural risers at 12 inches on-center (**Figure 4**).

Even though the tread brackets are screwed to the inside face of the stringers, driving 5-inch long structural screws through the outside face of the stringers and into the treads and risers really tightens up the stair assembly. Here, the stairs run next to a wall, so I had assembled the staircase about a foot and a half or so away from its final position, far enough to be able to drive the screws through the outside face of the wall-side stringer. Then I slid the stairs over into place and fastened them to the header with metal hangers (**Figure 5**).

This technique leaves a lot of screw heads exposed, which was not a problem on a set of utility stairs like this. I used black HeadLok flat-head structural screws, which probably stand out more than would Simpson Strong-Tie's SDWS screws, which have tan heads. Another option might be to trim the stringers with separate skirtboards that conceal the fasteners (though this would present other trimming challenges).

Post Assembly

Bracketed stringers are taller and provide more attachment surface than cut stringers, so they tend to be more stable front to back. To keep the lower guard post from moving side to side, I used a FastenMaster-designed Thru- Lok block-and-screw system. For that detail, the 4x4 post and blocking (which is cut to the height of the riser board) are both ThruLok'd to the structural riser. Longer ThruLok screws are then driven through the stringer, the post, and the block.

Finally, after notching the bottom tread around the 4x4 post, I screwed it into place like the other treads, and finished up the railing.

Mike Guertin is a builder and remodeler in East Greenwich, R.I., and frequent presenter at JLC Live and DeckExpo. You can follow him on Instagram @mike_guertin.

Mid-Year Planning: Tax Changes to Factor In

The Tax Cuts and Jobs Act, passed in December of last year, fundamentally changes the federal tax landscape for both individuals and businesses. Many of the provisions in the legislation are permanent, others (including most of the tax cuts that apply to individuals) expire at the end of 2025. Here are some of the significant changes you should factor in to any mid-year tax planning. You should also consider reviewing your situation with a tax professional.

New lower marginal income tax rates

In 2018, there remain seven marginal income tax brackets, but most of the rates have dropped from last year. The new rates are 10%, 12%, 22%, 24%, 32%, 35%, and 37%. Most, but not all, will benefit to some degree from the lower rates. For example, all other things being equal, those filing as single with taxable incomes between approximately $157,000 and $400,000 may actually end up paying tax at a higher top marginal rate than they would have last year. Consider how the new rates will affect you based on your filing status and estimated taxable income.

Higher standard deduction amounts

Standard deduction amounts are nearly double what they were last year, but personal exemptions (the amount, $4,050 in 2017, that you could deduct for yourself, and potentially your spouse and your dependents) are no longer available. Additional standard deduction amounts allowed for the elderly and the blind remain available for those who qualify. If you're single or married without children, the increase in the standard deduction more than makes up for the loss of personal exemption deductions. If you're a family of four or more, though, the math doesn't work out in your favor.

Itemized deductions — good and bad

The overall limit on itemized deductions that applied to higher-income taxpayers is repealed, the income threshold for deducting medical expenses is reduced for 2018, and the income limitations on charitable deductions are eased. That's the good news. The bad news is that the deduction for personal casualty and theft losses is eliminated, except for casualty losses suffered in a federal disaster area, and miscellaneous itemized deductions that would be subject to the 2% AGI threshold, including tax-preparation expenses and unreimbursed employee business expenses, are no longer deductible. Other deductions affected include:

- **State and local taxes** — Individuals are only able to claim an itemized deduction of up to $10,000 ($5,000 if married filing a separate return) for state and local property taxes and state and local income taxes (or sales taxes in lieu of income).

- **Home mortgage interest deduction** — Individuals can deduct mortgage interest on no more than $750,000 ($375,000 for married individuals filing separately) of qualifying mortgage debt. For mortgage debt incurred prior to December 16, 2017, the prior $1 million

limit will continue to apply. No deduction is allowed for interest on home equity loans or lines of credit unless the debt is used to buy, build or substantially improve a principal residence or a second home.

Other important changes

- **Child tax credit** — The credit has been doubled to $2,000 per qualifying child, refundability has been expanded, and the credit will now be available to many who didn't qualify in the past based on income; there's also a new nonrefundable $500 credit for dependents who aren't qualified children for purposes of the credit.

- **Alternative minimum tax (AMT)** — The Tax Cuts and Jobs Act significantly narrowed the reach of the AMT by increasing AMT exemption amounts and dramatically increasing the income threshold at which the exemptions begin to phase out.

- **Roth conversion recharacterizations** — In a permanent change that starts this year, Roth conversions can't be "undone" by recharacterizing the conversion as a traditional IRA contribution by the return due date.

Photo: Mark Parlee

Avoiding Wet Roofs

A building-science guide to insulating attics and roofs

BY PETER YOST

The performance of attics and roofs covers a big subject area, so this is the first of two articles addressing this topic. In this first article, we get everyone on the same page, explaining the science and options available to builders and remodelers.

In the second article, we will look at the even thornier issues of the evolving building code, real-world roof performance, and exciting new research in residential roof performance.

Vented, unfinished attics usually work great as built-in moisture buffers. By the word "buffer," we mean the space allows indoor moisture to be whisked away on air currents or to condense on the underside of the roof sheathing where it harmlessly evaporates away ("dries") or is absorbed into the sheathing and framing before it eventually dissipates (again, "dries"). The unfinished attic makes it easy to inspect your roof from the interior.

But it's just so tempting to take back that attic space; you can use it for mechanicals, for storage, or even as a place to banish teenagers to. We routinely configure walls without such a buffer

space. So why do we run into roof moisture problems way more often than we run into wall moisture problems? To answer this first question, we need to work our way through a pretty long list of questions about attics and roofs.

WHAT ARE THE OPTIONS?

The wide variety of attic and roof configurations is one way that roofs differ markedly from walls. I number them here in order of preference from a moisture-control perspective. As Steven Baczek is fond of saying, "You vent until you can't."

1. Vented attic. The most moisture-forgiving attic-roof assembly is a vented attic. Properly built, a vented attic requires continuous air and thermal control layers at the top-floor ceiling with soffit-to-ridge or gable-to-gable venting.

In terms of driving forces, you gain a big advantage with soffit-to-ridge vents, or high-low venting (supported by stack effect).

2. Cavity-vented insulated pitched roof. If you can't give up the attic space to moisture management, then the least expensive way to vent and protect the roof sheathing is to vent within the roof framing space, but that takes up valuable real estate within the cavity that could otherwise be filled with insulation.

This configuration requires continuous air and thermal control layers at the roof line with soffit-to-ridge venting within the roof framing cavities.

3. Top-vented insulated pitched roof. If you can't give up either the attic space or the framing cavity spaces to venting, then you can add venting on top of your roof sheathing, but that comes at a significant added cost.

This configuration requires continuous air and thermal control layers at the roof line with soffit-to-ridge venting topside of the roof structural sheathing.

4. Unvented insulated roof. If you make your roof geometrically complex enough that you can't achieve soffit-to-ridge venting—or you make your roof a low enough pitch that there is no driving force from soffit-to-ridge—you will be forced to give up on venting and go unvented, as your last resort.

An unvented insulated roof still must have continuous air and thermal control layers at the roof line with no venting (for any roof pitch or slope).

Note: Our industry, particularly in cold regions, likes to call unvented roofs "hot" and vented roofs "cold." The logic is that vented roofs move cold, dry air up the vent chutes, while unvented roofs get hot without the vented air. Obviously, the terminology belies climate, weather, time of day, and the direction the roof slope faces. (Just venting here ...)

A vented attic with gable end vents is the most forgiving type of roof. This photo **(1)** shows part of the author's gabled-gambrel home with a vent in each gable. Note also the gapped roof-sheathing boards, which support a slate roof. There is quite a bit of drying potential for the entire space and assembly.

Vented cavity. An inexpensive option to vent a cathedralized space is to use continuous vent chutes **(2)**.

Photos: 1&4, Peter Yost; 2, J&R Products; 3, Steve Shirber

Top venting. This roof assembly **(3)** has an "over-roof"—the 2x4 furring supports nailbase sheathing for the roof cladding and creates soffit-to-ridge venting on top of the unvented roof assembly below.
Unvented roof assembly. This is a SIPs roof on the kitchen addition of the author's home **(4)**. The insulated roof panels have no venting, and the standing-seam-metal roof will be attached directly to the panels.

WHY CONTINUOUS CONTROL LAYERS?

In every description of the typical roof options I listed on the previous page, I used the terms "continuous" and "control layers." The goal is to create an unbroken line of defense against water penetration, thermal losses, air leaks, and vapor transmission—with an emphasis on unbroken, or "continuous."

The essential "control layers" include (prioritized in this order):

1. A continuous bulk-water control layer. The roof cladding or underlayment must be properly weather-lapped and connected to flashings at all penetrations.

2. A continuous air control layer. An air-impermeable insulation or sheet good must be properly sealed or connected to all air-sealing at penetrations and connections to the exterior-wall air control layer.

3. Dedicated, directional drying potential (vapor profile). All layers of the roof assembly are selected based on vapor permeance such that drying in one or both directions is possible, encouraged, and achieved.

4. A continuous thermal control layer. Continuous insulation eliminates or significantly reduces thermal bridging. (Thermal bridges in roof assemblies include structural through-members, such as rafters that extend from the inside ceiling plane to the exterior sheathing plane. But they also include timber-frame rafters that extend from inside the building to outside for eaves overhangs.)

The problems actually arise when we do not honor their prioritization.

A bulk-water leak spells major trouble no matter how airtight the roof assembly, how well it is designed to dry, or how continuous the insulation is.

Condensation caused by air leakage in a roof assembly cannot be overcome by drying by diffusion or—in many cases—even by roof ventilation. And elimination of thermal bridges must include thermal bypasses involving leaking air. Essentially, you can't vent your way out of an air-leakage problem, especially for north-facing roofs that see so much less solar energy than the other three cardinal directions (for examples of this, see photos on page 46).

Drying potential is more important to design in than a thermal control layer because a thermal bridge not involving air leakage may not involve condensation or, if it does, it can be managed or corrected from the interior. An assembly that lacks drying potential cannot be "redesigned;" the assembly is more likely to stay wet if it gets wet.

HOW MANY WAYS CAN THE ROOF DRY ONCE IT GETS WET?

1. Weather-lapped drainage is how we move bulk water—our biggest threat—off the roof. Drainage relief is immediate and complete; it's the best! Once water soaks

an assembly, we can't drain it to dry it, at least not as a performance strategy (although we might drain a flooded building cavity as an emergency measure).

2. Convective drying is what happens when dry (or drier) air moves past wet materials in a building assembly. Roof assemblies with air flowing from soffit to ridge are often said to be ventilated (not just vented) because there is actual air flow (rather than just diffusive air movement). Active air movement by convection is many times more powerful as a drying force than diffusion. Convective drying by ventilation is powerful and fast, but its speed and effectiveness is based on how much energy is driving the airflow.

3. Diffusive drying. If an assembly gets wet, our last line of defense is to rely upon diffusive drying. If building materials get wet, they can slowly dry by giving up their moisture content as vapor. Here we have two pathways:

- Vapor moving through materials that allow drying to the exterior, where the world at large takes away that moisture without notice
- Vapor moving through materials that allow drying to the interior, where space-conditioning systems work as the primary way to manage the moisture.

Building scientists call designing and selecting materials for drying "doing a vapor profile" (see sidebar, facing page). Diffusive drying is slow and may not be fast enough to keep a moisture problem from becoming a mold, mildew, or even a rot problem. Moving from a moisture problem to a mold problem is often determined by how wet an assembly gets and how long it stays wet.

Bottom line. Focus on the continuity of your bulk-water and air control layers so you don't have to rely on your last resort: directional drying by diffusion.

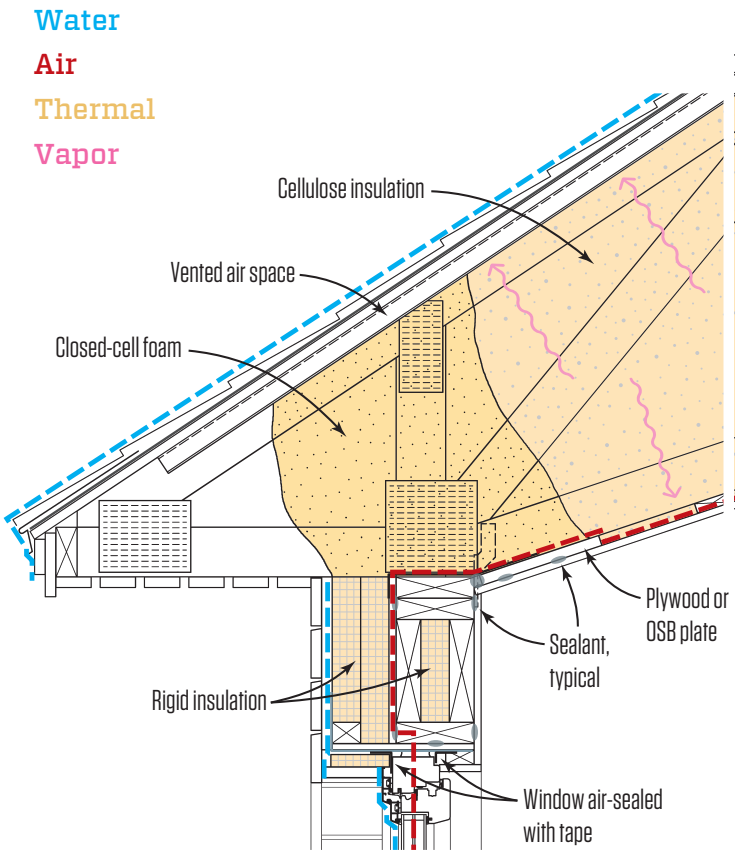
WHAT ABOUT LOW-SLOPE OR COMPACT FLAT ROOFS?

There really is no such thing as passive ventilation in low-slope or compact flat roofs, since there is no soffit-to-ridge configuration to drive any pressure difference that would support airflow. William Rose, in his book, *Moisture in Buildings* (Chapter 7 "Attics," page 189, Wiley, 2005), is unequivocal on this front: "Tobiasson (1986) showed that low-slope roof system[s] should not be constructed as vented cavity assemblies, as the difficulties in actually getting flow through a horizontal cavity by natural means are considerable."

IS POWER VENTING EFFECTIVE OR NEEDED?

Powered attic ventilators often create more moisture problems than they solve, particularly with air-perme-

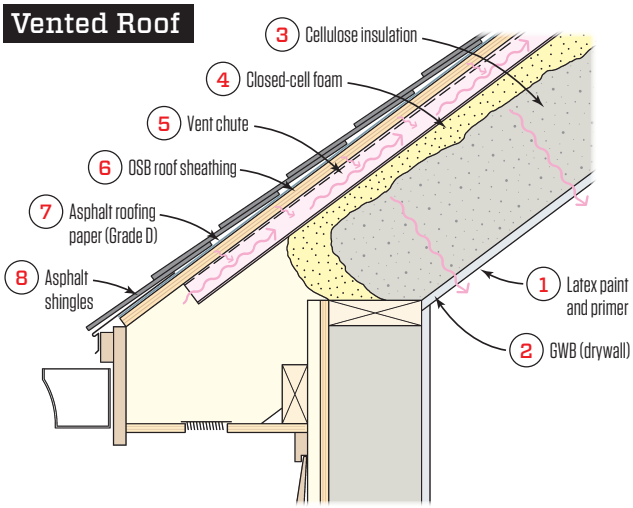
Essential Control "Layers"



Control "layers." Each colored line in the illustration above shows the continuous water, air, and thermal control layers, while the wavy arrows indicate directional drying of the vapor profile. This architectural detail is based on a design by Steven Baczek. In this design, the drywall serves as the air barrier for most of the ceiling. At the edges, it transitions to plates that are installed in plane with ceiling strapping. These plates provide a surface for wide peel-and-stick flashing that laps over the wall top plates and adheres to Zip System sheathing—the air barrier for the walls. For more on this air-sealing technique, see the article by Steve Baczek and Jake Bruton, "Air Sealing That Works," Apr/18.

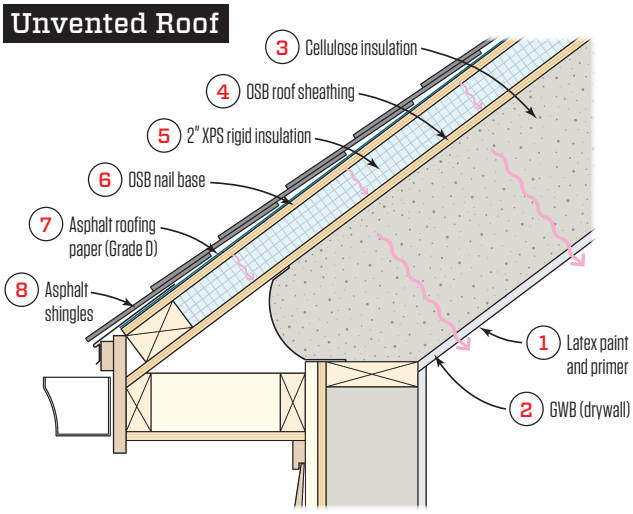
Illustrations: Tim Healey / Steven Baczek

Vented Roof



1	Latex paint and primer	5 perms	Class III retarder
2	GWB (drywall)	40 perms	Vapor open
3	Cellulose insulation	75 perms	Vapor open
4	Closed-cell spray foam	1 perm	Class II retarder
5	Vent chute	300 perms	Vapor open
6	OSB roof sheathing	2 perms	Class III retarder
7	Asphalt roofing paper	30 perms	Vapor open
8	Asphalt roofing shingles	.65 perm	Class II retarder

Unvented Roof



1	Latex paint and primer	5 perms	Class III retarder
2	GWB (drywall)	40 perms	Vapor open
3	Cellulose insulation	75 perms	Vapor open
4	OSB roof sheathing	2 perms	Class III retarder
5	2" XPS rigid insulation	.5 perm	Class II retarder
6	OSB nail base	2 perms	Class III retarder
7	Asphalt roofing paper	30 perms	Vapor open
8	Asphalt roofing shingles	.65 perm	Class II retarder

CONDUCTING A VAPOR PROFILE

A vapor profile is a qualitative method to determine what sort of drying potential a building assembly has, based on the vapor permeance of each layer of the assembly. There are four steps:

1. Determine the vapor permeance of each component or layer of the assembly. You can determine vapor permeance by using Building Science Corporation's Building Materials Property Table [https://buildingscience.com/documents/information-sheets/building-materials-property-table] or by obtaining the information from individual product manufacturers and standardized test results for ASTM E96.

2. Assign a class to each layer, based on this information.
a. > 10 perms – vapor open: little to no restriction to drying
b. 1 – 10 perms – Class III retarder: very limited restriction to drying
c. 0.1 – 1.0 perms – Class II retarder: substantial resistance to drying but still some drying potential
d. < 0.1 perms – Class I retarder: little to no drying

3. Assess the extent and direction of prevailing vapor drive. This means taking into account the vapor drive associated with the climate, and moisture levels associated with the type of building and number of occupants. A home for a retired couple living in Hawaii in a 5,000-square-foot masonry-based home experiences very little vapor drive or pressure while a 1,200-square-foot multifamily, wood-framed dwelling unit with six occupants in Ottawa, Canada, experiences extreme vapor drive or pressure.

4. Identify the least vapor-permeable component(s) and determine if that component or those components restrict drying of moisture-sensitive components. Concern should or will be high if the restricting component is a Class I retarder and still of some concern if the restricting component is Class II.

There are a lot of variables that heighten or reduce the need for drying potential of assemblies. The goal is to determine the directional drying potential based on a vapor profile. However, having limited drying potential does not translate to assembly failure should the assembly get wet. A lot depends on how much moisture the assembly sees, how much sun it sees, and how bombproof your water and air control layers are.

In Part 2 of this article, we will return to the two vapor profiles shown in these illustrations and examine how well each roof would dry in a given direction. In the meantime: How well do you think they would dry?

able roof cavity insulation or with the lack of a continuous air control layer at the top-floor ceiling or roof framing assembly.

DOES THE TYPE OF ROOF CLADDING MATTER?

You bet. Some roof claddings are made and installed in such a way that there is little to no air or vapor movement that encourages drying. Roof membranes certainly don't allow any air movement through them and many have very low vapor permeance (Class 1 retarder). You would think that the lapped installation of asphalt roofing shingles would permit at least some drying by way of either air or vapor movement, but they don't. Asphalt roofing shingles constitute a Class 1 vapor retarder. Standing-seam-metal roofs are made of Class 1 vapor-retarding metal, and when they're installed in direct contact with the roof assembly below, there is little to no air or vapor movement.

Roof claddings that are made or installed to allow air and vapor movement include barrel tiles, slate, corrugated metal roofing, and wood shakes and shingles. While there is no dedicated soffit-to-ridge channel in these materials and installations, there can be enough air moving through the installation and enough vapor permeance in the materials themselves to provide varying levels of drying potential to the exterior.

MORE TO COME

So far, we have laid the groundwork for understanding the basic building science that governs how roofs get wet. It's becoming clear from this Q&A that roofs aren't just walls turned sideways. The venting options, configurations, materials and even the forces at work differ markedly from walls, making roofs more complex assemblies to keep dry. It gets even more interesting when we start considering all the different ways you can insulate the assembly, something we will tackle in Part 2. Also in the next part, we will dive into the code requirements that address the issues we have laid out here, and look at some emerging practices that can further help you avoid problems.

Peter Yost is Vice President of Building Performance for BuildingGreen in Brattleboro, Vt. He and Steven Baczek present Home Building Crossroads *and other traveling building-science symposiums throughout the U.S. Look for them in a city near you to answer your building-science questions and clarify home performance issues related to the latest energy codes.*

5

6

7

Poor air control. Each of these show vent channels that are supposed to be directing outside cold, dry air from the soffit to the ridge, but because there is no continuous air control layer in the ceiling plane, the vents are directing leaking warm, moist air up against the cold underside of the roof sheathing.

Photos: 5, Rick Roberts; 6&7, Peter Yost

Cancer and Men

Your Wake-Up Call

"Both my father and grandfather died of colon cancer—that's what motivates me to get screened," says David.

"My father did not get screened. It actually wasn't until he had some symptoms that he went to the doctor and they found the cancer. Unfortunately, at that point it had already spread.

"I started getting screened right around when I turned 50, and I've had them regularly ever since," he says. "The preparation is unpleasant, but the procedure itself is nothing.

"If they can catch [cancer] early, before it becomes a problem, why not get screened?"

Tips for Lowering Your Cancer Risk

Every year, more than 300,000 men in the United States lose their lives to cancer. You can lower your cancer risk in several ways.

- Don't smoke, and avoid secondhand smoke.
- Stay up-to-date on screening tests for colorectal and lung cancer.
- Protect your skin from the sun when outdoors, and avoid indoor tanning.
- Make healthy choices like staying active, keeping a healthy weight, and limiting how much alcohol you drink.

Fast Facts About Cancer and Men

- The most common kinds of cancer among men in the U.S. are skin cancer, prostate cancer, lung cancer, and colorectal cancer.
- Most prostate cancers grow slowly, and don't cause any health problems in men who have them. Treatment can cause serious side effects. Talk to your doctor before you decide to get tested or treated for prostate cancer.
- A human papillomavirus (HPV) vaccine is recommended routinely for boys at 11 or 12 years of age to prevent anal cancer and genital warts. The vaccine also is recommended for all teenage boys and men through age 21, any man who has sex with men through age 26, and men with compromised immune systems (including HIV) through age 26, if they did not receive all doses of the vaccine when they were younger.

Click HERE to see this on-line article including links and video.

This floor was out of level by a full inch in one direction **(1)**, and by 3/4 inch in the other **(2)**. Before the leveler can be mixed and poured, the author applies liquid primer to the underlayment **(3)**.

Photos by Roe Osborn

Pouring a Level Floor for Tile

BY TOM MEEHAN

Severely out-of-level floors are a fact of life in the New England homes that I work in. For a tile setter, these floors can be a nightmare—especially when the project calls for large-format tile that requires the subfloor to be within 1/8 inch of flat and level in 10 feet ("Working With Large-Format Floor Tile," Nov/17).

Recently, clients asked me to install large-format tile on the floor of an L-shaped bathroom that they were remodeling and expanding with a new walk-in shower. When I arrived at the project, the carpenters had already installed the plywood underlayment, but I could tell at a glance that the outside corner of the L was very high. A long level confirmed that the floor dipped a whopping 1 inch in about 4 feet in the direction of the toilet and shower **(1)**, and more than 3/4 inch toward the entry door **(2)**.

New options. In the past, my options would have been limited. If the deviations were 1/4 inch or less, I could have built up low spots with layers of thinset. In an extreme case such as this project, I would have had to do a full mortar bed, which is messy and time consuming. Instead, I opted to use one of the self-leveling underlayment products now on the market.

Self-leveling concrete products have been around since the late 1970s. The product I used, Ardex Self-Leveling Backerboard, is a polymer-modified, Portland-cement-based product that mixes with water and is then poured onto the low areas of the floor. It has high compressive strength, making it ideal for installation under tile floors, and it can be feathered into the high areas, maintaining strength and adhesion as it approaches zero thickness.

Before I could mix and pour the self-leveling compound, the subfloor had to be primed with Ardex P51, a milky liquid that I applied to the subfloor with a coarse broom **(3)**. Ardex says that the primer should be allowed to dry a minimum of three hours and a maximum of 24 hours before you mix and apply the self-leveling compound.

Self-leveling underlayment products are not cheap. We used four 50-pound bags for this particular floor at just under $50 per bag. In addition, the primer cost about $70 per gallon jug. This price may seem a bit steep to some, but the time it saved me was invaluable. And in one pretty simple and quick operation (shown in the photos on the following two pages), I was able to form a strong, solid substrate for the tile floor that was level, flat, and perfectly smooth.

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

Liquid leveler will seep through any opening left uncovered. Here, expanding foam fills in around a plumbing stub, and tape forms a dam around the toilet flange **(4)**. The author drives a screw as a depth gauge for the liquid **(5)** and uses the screw to set the height of the gauge rake **(6)**. Because the existing threshold wasn't high enough to contain the leveler, the author screwed in a temporary dam between the door jambs **(7)**. A stone threshold will be added later to transition to the tiled bathroom floor.

The manufacturer requires that the inside of the mixing bucket be rinsed thoroughly to prevent the plastic from absorbing liquid from the mix **(8)**. A taller, narrower bucket is typically used for mixing the leveler, but this bucket was all that the author had on hand. Water for the mix must be measured accurately **(9)**. Instructions require that the leveler be mixed with a mixing paddle for no less than two minutes **(10)**. Then the mix must slake for five minutes and be quickly remixed before pouring.

Two crew members dump the initial bucket of mix in the corner where the compound will be the deepest **(11)**. The author wears protective boots as he spreads the first batch with the gauge rake **(12)**. The leveling liquid fills the lowest corner with the head of the depth screw (visible as a small white dot) flush with the surface of the leveler **(13)**. Smaller, subsequent batches fill the low area in front of the bathroom door **(14)**, and the author uses a squeegee to feather the liquid up to the high corner **(15)**. To leave the bathroom, the author had to take one step into the liquid, but it quickly filled back in around his footprint. The entire pour took only 15 minutes and the self-leveling liquid did the rest, providing a solid, flat, and level substrate for the tile floor. As a side note, the author covered the floor with an uncoupling membrane before installing the large-format floor tile.

Contact CAHI c/o

Bill Kievit
27 Cope Farms Rd.
Farmington, CT 06032

Email: info@ctinspectors.com

Web: www.ctinspectors.com

Articles published in CAHI Monthly are the sole opinion of the author. CAHI does not endorse or state a position for or against the content of said articles.

CAHI Executive Board		CAHI Presidents	CT Home Inspection Licensing Board	
President	William Kievit 860-919-4960	Stanley Bajerski	William Stanley, Chairman (Cheshire)	Inspector
Vice President	Woody Dawson 203-710-1795	Bernie Caliendo	Richard Kobylenski (Coventry)	Inspector
Treasurer	Rob Gutman	Robert Dattilo	Lawrence Willette (Tolland)	Inspector
Secretary	Open	Woody Dawson	Bruce Schaefer (Woodbridge)	Inspector
Director	Scott Monforte 203-877-4774	Michael DeLugan	***Vacant***	Inspector
Director	Dan Kristiansen 203-257-0912	David Hetzel	***Vacant***	Public Member
Director	Al Dingfelder 203-376-8452	Richard Kobylenski	***Vacant***	Public Member
Director	Open	Scott Monforte	***Vacant***	Public Member
		Joseph Pelliccio		
		Pete Petrino		
		Dwight Uffer		
		They have served as our primary leaders and in other capacities since 1992. Please thank them for their service when you have a chance.	***The Licensing Board meetings are held at 9:30 am Dept of Consumer Protection 165 Capitol Avenue. Hartford*** **The public is always welcome.**	

Published by: Larry Ruddy
Larryhp@cox.net