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

CAHI MONTHLY NEWS

January 2019 Volume 12, Issue 01

Presidents Corner

Out with the old and in with the new.

As we as an organization, transition into the new year, the new year arrives with a change in leadership. Our organization's past president Bill Kievit and I are in the process of exchanging roles.

Bill has been and continues to be an extremely valuable leader within our organization. Bill has been instrumental in the streamlining and managing many of the day to day organizational requirements including but not limited to the continuing educational documentation and associated filing requirements.

The new year also begins with the departure of our treasurer Rob Gutman. Rob will be moving his family out of state. I think I can speak for the board and organization in thanking Rob for all of his past efforts and wish his family well moving forward.

Scott Monforte continues his tireless efforts and is vital in the acquisition and scheduling of monthly C.E. speakers. Scott recently gave a very effective impromptu radon seminar to those lucky enough to attend when the scheduled speaker did not.

Woody Dawson ....vice president....continues to remain in contact with the powers that be at the state level and continues to be the organizations liaison in the political arena.

Al Dingfelder continues as a board member and as the organizations liaison to the newsletter publisher. It is through Al's efforts that our newsletter has expanded and continues to provide our membership with educational relevance.

2019 welcomes back former board member Jim Enowitch, his energy and his computer savvy.

continued on pg 2

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

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Meeting Dates!

January 16th

Law Seminar

Presented by

Kent Mawhinney

January 23rd Meeting

Appliance Venting

Presented by

Kristopher Pereira

We as a board also welcome the addition of Mike Drouin as a committee member. As many before, Mike comes from the residential remodeling and construction arena. I have had the pleasure of mentoring Mike as an inspection intern over the last 9 months and can sincerely predict that he will evolve into one of the better inspectors and one of our organizations leaders.

As the year starts, steal small moments to reflect on having one of the best jobs in the world. Take time to regroup and refocus when time allows and buckle up for what we all hope will be a happy and prosperous new year.

Best
Dan Kristiansen
President

JANUARY MEETING DETAILS

Legal Seminar January 16th

Attorney Kent Mawhinney of Markowitz & Mawhinney, LLC of Bloomfield, CT.

This is the 3-hour CT Law Seminar required once every license renewal cycle. Join us for dinner and an informative seminar.

Sign up online: **CLICK HERE**

or Mail a check payable to CAHI to:
CAHI LAW c/o Bill Kievit, 27 Cope Farms Rd, Farmington CT, 06032
(include your Full Name, HOI License Number & Email Address)

Appliance Venting January 23rd

Presented by Kristopher Pereria
of Advanced Chimney Soulutions.

Kris will discuss chimney & vent types and proper venting of modern appliances such as pellet stoves, water heaters, and clothes dryers.

What You Need to Know About Chimney Inspections

The Chimney Safety Institute of America (CSIA) is proud of its long association with the home inspector community. CSIA has regularly attended and presented at many national home inspector conferences, including InspectionWorld 19 in San Diego.

One of the main questions chimney sweeps get is "***when do I need to call a chimney sweep?***" We worked with the American Society of Home Inspectors to give some guidance on the issue.

We also routinely answer this question and more with in-person education to home inspectors at their regional and state chapter events. Recently, we hosted classes as part of the Great Lakes Chapter of ASHI convention this past fall. Many home inspectors are expressing interest in earning a Certified Chimney Sweep® or Certified Dryer Exhaust Technician® credential, not necessarily to perform sweeping and maintenance, but to become a one-stop shop for home inspections. Home inspectors are welcome to learn more about the process for both credentials here: https://www.csia.org/certification.html.

You'll find that technicians certified by CSIA in your area are willing partners in home safety. You are encouraged to build relationships with them or make referrals via our zip code finder at www.csia.org.

Ways to Learn More:

Visit our booth or attend CSIA's course at InspectionWorld 19. Visit us at Booth 526 in the Exhibit Hal or attend CSIA Education Director Russ Dimmitt's course, "**Chimney and Fireplace Appliance Inspections**" on Wed, 1/23 at 2:00 pm.

Schedule a class for your local/regional group. CSIA can work with you to provide education about chimney and venting systems at your local events, or even host you at the CSIA Technology Center (minutes from the Indianapolis International Airport). Contact Zach Zagar.

Learn online. CSIA has several great courses online that may be of interest to you. Courses on draft, inspections, and more can be found on our website.

Homeowner (and realtor) resources. CSIA provides resources for the general public on our website. Feel free to use and share where appropriate: https://www.csia.org/homeowners.html.

UMassAmherst

BCT UMass Amherst

BUILDING AND CONSTRUCTION TECHNOLOGY

UMass Amherst | Department of Environmental Conservation

PREVENTING ICE DAMS

by Paul Fisette – © 2011

Please note: This older article by our former faculty member remains available on our site for archival purposes. Some information contained in it may be outdated. BCT Extension Professor Ben Weil was also recently featured in a Boston.com article on Ice Dams as well. You can read it at this link.

I have investigated countless ice-dam problems as a builder, researcher and consultant. Although individual cases look different, and often result in different types of damage, all ice-dam situations have two things in common: They happen because melting snow pools behind dams of ice at the roof's edge and leaks into the house; also, ice dams and the damage that results from them is avoidable.

Proper insulation and roof ventilation can stop ice dams from forming, prevent damage and lower energy bills.

Cause

Ice dams form when melted snow refreezes at roof edges. Anyone who has lived in cold climates has seen ice dams. We've enjoyed the sparkling beauty of ice formations built along roof eaves (of other people's homes). However, most of us don't stop to understand why these ice bands form until they damage our homes.

Three things are required for an ice dam to form: snow, heat to melt the snow and cold to refreeze the melted snow into solid ice. Ice dams can form when as little as 1 or 2 inches of snow accumulates on a roof – if the roof is poorly insulated and air sealed, and the snowfall is followed by several days of sub-freezing temperatures. Ice dams develop as snow on the upper part of the roof melts. Water runs down the roof slope under the blanket of snow and refreezes into a band of ice at the roof's edge creating a "dam". Additional snow-melt pools against the dam and eventually leaks into the building through the roof or roof trim.

The reason ice-dams form along the roof's lower edge, usually above the overhang, is straight-forward. The upper roof surface (toward the ridgeline) is at a temperature that is above freezing. And the lower part of the roof surface (along the eaves) is below freezing. The upper roof surface is located directly above the living space. Heat lost from the house warms this section of the roof, melting snow in this area. During periods of sub-freezing temperature the lower regions of the roof deck remain at sub-freezing ambient temperatures. Roof overhangs are not warmed by indoor heat-loss.

Deeper snow and cold temperatures increase the likelihood and size of ice dams. Every inch of snow that accumulates on the roof's surface insulates the roof deck a little more, trapping more indoor heat beneath the roof deck and warming the roof sheathing. Each inch of snow has an R-value of approximately 0.5 – 1. The worst ice dams occur when deep snow accompanies cold weather. Here is an example to provide a sense of scale: A poorly insulated and unvented R-20 cathedral roof with 10 inches of snow can result with serious ice damming. In this example, 10 inches of snow adds ~between R-5 and R-10 to the roof system resulting in a total roof R of 25 – 30. The layer of snow holds indoor heat below the sheathing and could warm the roof sheathing above freezing in the area over the living space (credit julio). If the inside temperature is 70 degrees and the outside 20 degrees (50 degree differential), the temperature of the roof sheathing would be between 5/25 and 10/30 of the way from 20 degrees toward 70 degrees. In other words, the roof should temperature should be between 30 and 37 degrees over the living space. Snow will probably melt under these conditions. Yet, the temperature of the roof over the unheated overhangs is 20 degrees, the same as the outdoor temperature. The melt water will freeze when it reaches that part of the roof. Deeper snow makes things worse. More insulation makes the situation better. You can do the math for a variety of snow depths and various indoor/outdoor temperature conditions to get a sense of how the variables are related. The trick is to keep the entire roof below freezing if possible. Roof venting helps and is discussed below.

Damage

It's easy to understand that allowing water to leak into your house is a bad idea. Ice dams cause millions of dollars of damage every year. Much of the damage is apparent. Water-stained ceilings, dislodged roof shingles, sagging ice-filled gutters, peeling paint, and damaged plaster are all easily recognized and usually repaired when weather or budgets permit. But other damage is not as obvious and often goes unchecked.

Ice dams usually develop along roof eaves, above the plate line of exterior walls. Heat lost from homes at this point aggravates snow melting and ice-dam development. There are two reasons for increased heat loss at this point: Rafters on most homes sit directly on top of exterior walls leaving a shallow space for insulation between the top of the wall and underside of the roof sheathing: Low R-value = heat loss! And secondly, builders are not particularly fussy when it comes to air-sealing this point to prevent the movement of warm indoor air up to the underside of the roof surface. Air can leak through wire and plumbing penetrations here. Also warm indoor air can leak from the wall cavities rising upward and passing between the small cracks that exist between the wall top-plate and drywall. Ice dams also form below skylights because they are typically low-R assemblies that melt water that subsequently runs down to a cold section of roof below the skylight.

Roof leaks wet attic insulation. In the short term, wet insulation doesn't work well. Over the long term, water-soaked insulation is compressed so that even after it dries, the insulation in the ceiling is not as thick. Thinner insulation means lower R-values. It is a vicious cycle. The more heat lost – the more ice dams form – the more it leaks – the more the insulation gets damaged – and so on. As a result you pay more to heat (and cool) your house. Cellulose insulation is hygroscopic and particularly vulnerable to the hazards of wetting.

Water often leaks down within the wall frame where it wets wall insulation and causes it to sag leaving uninsulated voids at the top of the wall . Energy dollars are again robbed, but more importantly, moisture gets trapped within the wall cavity between the exterior plywood sheathing and interior vapor barrier. The result: smelly, rotting wall cavities. Structural framing members can decay. Metal fasteners may corrode. Mold and mildew can form on wall surfaces as a result of elevated humidity levels. Exterior and interior paint blisters and peels. And the well-being of allergy-sensitive individuals is compromised.

Peeling of wall paint deserves special attention here because its cause may be difficult to recognize. It is unlikely that wall paint (interior or exterior) will blister or peel when ice dams are visible. Paint peels long after the ice and all signs of a roof leak have evaporated.

Water from ice dams infiltrate wall cavities. It dampens building materials and raises the relative humidity within wall frames. The moisture within the wall cavity eventually wets interior wall coverings and exterior claddings as it tries to escape (as either liquid or vapor). As a result, interior and exterior walls shed its skin of paint.

So the message here is to check your home carefully when ice dams form. Investigate even when there doesn't appear to be a leak. Look at the underside of the roof sheathing and roof trim to make sure they haven't gotten wet. Check the insulation for dampness. And when leaks inside your home develop, be prepared. Water penetration often follows pathways difficult follow. Don't just patch the roof leak. Make sure that the roof sheathing hasn't rotted or that other less obvious problems in your ceiling or walls haven't developed. And then detail a comprehensive plan to fix the damage. But more importantly, solve the problem.

Solutions

The damage caused by ice dams can be controlled in 2 ways: Maintain the entire roof surface at ambient outdoor temperatures or build a roof so that it can't leak into sensitive building materials if an ice dam forms.

Cold roofs make a lot of sense. Here you let the cold outdoor air work for you. Keep the entire roof as cold as the outdoor air and you solve the ice-dam riddle. Look at the roof of an unheated shed or garage, a pile of lumber or an abandoned home. Ice dams don't form on these structures because there is no uneven melting and freezing!

For new construction it's easy. Design the house to include plenty of ceiling insulation, a continuous air barrier separating the living space from the underside of the roof, and an effective roof ventilation system. Insulation retards the conductive flow of heat from the house to the roof surface. An air barrier retards the flow of heated air to the underside of the roof. And a good roof-ventilation system helps keep the roof sheathing cold. In an existing house this approach may be more difficult to follow. Often you are stuck with less than desirable conditions. But let's look more closely at all the issues that will guide your strategy.

Insulation: Houses in the northern United States should be equipped with ceiling insulation of at least R-38 (about 12 inches of fiberglass or cellulose). The insulation should be continuous and consistently deep. The most notable problem area is located above the exterior wall. Raised-heel trusses or roof-framing details that allow for R-38 above the exterior wall should be used in new construction. In existing structures, where the space between the wall's top plate and underside of the roof sheathing is restricted, install high R/inch insulating foam (R-6/inch). Be sure to seal the insulation at this point to prevent warm-air leakage from the living space.

Ventilation: A soffit-to-ridge ventilation system is the most effective ventilation scheme you can use to cool roof sheathing. Power vents, turbines, roof vents and gable louvers just aren't as good. Soffit and ridge vents should run continuously along the length of the house. A baffled ridge vent (like the one sold by Air Vent) is best because it will exhaust attic air regardless of wind direction. The exhaust pressure created by the ridge vent sucks cold make-up air into the attic through the soffit vents. A 2-inch space

or “air-chute” should be provided between the top of the insulation and the underside of the roof sheathing in all applications. The in-coming “soffit” air washes the underside of the roof sheathing with a continuous flow of cold air. CAUTION: Be sure to install insulation baffles above the exterior wall to protect the insulation from the air that blows in through the soffit vents.

Air Leakage: Insulation retards conductive heat loss, but a special effort must be made to block the flow of warm indoor air (convection) into the attic or roof area. Small holes allow significant volumes of warm indoor air to pass into attic spaces. In new construction avoid making penetrations through the ceiling whenever possible. But when you can’t avoid making penetrations or when you need to air-tighten existing homes use urethane spray-foam (in a can), caulking, packed cellulose, or weatherstripping to seal all ceiling leaks like:

- wire penetrations
- plumbing penetrations
- ceiling light fixtures
- attic hatches
- chimneys
- bathroom exhaust fans
- intersection of interior partitions and ceiling

The Also-Rans…

The list of attempted solutions is long. The problem I have with many of these efforts to prevent ice dams is that they don’t deal with the root cause which is heat loss. They merely treat the symptom.

Metal roofs are common in snow country so they must work! Right? Steeply pitched metal roofs in a sense thumb their nose at ice dams. They are slippery enough to shed snow before it causes an ice problem. However, metal roofs are expensive and do not substitute for adequate levels of insulation.

Many people install self-sticking rubberized sheets under roof shingles wherever ponding of water against an ice dam is possible: above the eaves, around chimneys, in valleys, around skylights and around vent stacks. The theory is that if any water leaks through the roof covering, the waterproof underlayment will provide a second line of defense. The material is sold in 3-foot x 75-foot rolls for about $80/roll. These products adhere directly to clean roof decking. Roof shingles are nailed to the deck through the membrane. The membrane is self-healing and seals nail penetrations automatically. W.R.Grace (Ice and Water Shield), Domtar (Eaveshield) and Bird all make competitive products. This band-aid solution is reasonable alternative for many existing structures where real cures are not possible or cost effective. These products also serve as a redundant layer of protection. Sometimes even well-constructed and designed roofs can have ice dams. Deep snow will act to insulate the roof deck making it warm enough to melt snow over the living area. A redundant layer of protection is helpful here.

You might consider using sheet-metal ice belts if you don’t mind the look of a shiny 2-foot-wide metal strip strung along the edge of your roof. I think, ice/snow belts are reasonable choices for some patch and fix jobs on existing houses. This eaves flashing system tries to do what metal roofing does: shed snow & ice before it causes a problem. It works —- sometimes. The problem with ice belts is they don’t work well. Often, a secondary ice dam develops on the roof just above the top edge of the metal strip.

Ice/snow belts are sold as 32-inch x 36-inch pieces (with additional fastening hardware) for about $12 per panel.

Contrary to popular belief, gutters do not cause ice dams. However, gutters do help concentrate ice and water at a very vulnerable roof-eaves area. As gutters fill with ice, they often bend and rip away from the house bringing fascia, fasteners and downspouts in tow.

And what about those heat tapes? In my entire life, I have never seen a zig-zag arrangement of electrically-heated cable work to fix an ice dam problem. The cable is heated by electric power, so you throw good energy after bad energy (keep in mind that ice dams are a heat-loss problem!). Over time heat tape embrittles shingles, creates a fire risk, are expensive to install and use, and leak water through loose fasteners. In fact take a good look at roofs that are equipped with heat tape. The electric cable creates an ice dam just above it. My advice is don't waste your time or money here.

Different styles of shoveling snow and chipping ice from the edge of a roof is my favorite of all solutions! People attack mounds of snow and roof ice with hammers, shovels, ice picks, home made snow rakes, crow bars and CHAIN SAWS! Can you believe it? The theory is obvious: no snow or ice, no leaking water. BUT, and it is a big but, more damage is done to life, limb and roof in the process. Having said that, carefully removing snow from roofs with roof snow rakes does help. You can scrape some of the protective mineral surface from asphalt shingles as you remove snow, but removing the insulating snow and potential meltwater does help reduce ice dam potential – just be careful.

Whatever plan you decide to follow, focus on the cause. Ice dams are created by the heat lost from the house. Develop a strategy that is centered around this fact whenever possible. Ventilate, insulate well and block as many air leaks as practical. There are no excuses for new construction. However, cures for existing structures are often elusive and expensive. In some cases you have to treat the symptom. The payback is damage prevented.

This is a picture of a house with no overhang. It has working cables (see cable sticking out of snow above first window on left-hand side of house). The ice dam is on north side of house. The gutter is being destroyed.

This is a picture of a house with no overhang. It has no cables, but shows a huge ice dam on the north side of the house.

United States
CONSUMER PRODUCT SAFETY COMMISSION

Navien Recalls Tankless Water Heaters and Boilers Due to Risk of Carbon Monoxide Poisoning

Name of product:
Navien condensing tankless water heaters and combination boilers

Hazard:
A kit installed on the tankless water heaters and boilers to convert them from natural gas to propane can cause the unit to produce excessive amounts of carbon monoxide, posing a risk of carbon monoxide poisoning to consumers.

Remedy:
Replace

Recall date:
December 20, 2018

Units:
About 3,400

Navien Condensing Tankless Water Heater

Navien Condensing Combination Boiler

Consumer Contact:

Navien at 800-244-8202 from 8 a.m. to 5 p.m. PT or e-mail recall@navien.com or online at https://www.navieninc.com/news for more information.

Recall Details

Description:
This recall involves only Navien condensing tankless water heaters and combination boilers with model numbers NPE-180A, NPE-180S and NCB-180E that have been or will be converted from using natural gas to propane gas. The recalled water heaters and combination boilers were manufactured between July 9, 2018 through October 14, 2018. The manufacturing date is identified within the serial number. The serial number is printed on a label which is affixed to the side of the unit and on the product packaging. The first two digits identify the year, the next single digit identifies the month, and the last two digits identify the day. For example, 18709 stands for July 9, 2018. X stands for October.

Product	Model	UPC Code	Serial Numbers with date of Manufacture
Navien Condensing Tankless Water Heater	NPE-180A	884954974101	7410x18709xxxx 7410x188xxxxxx 7410x189xxxxxx 7410x18X14xxxx
Navien Condensing Tankless Water Heater	NPE-180S	884954974194	7419x18709xxxx 7419x188xxxxxx 7419x189xxxxxx 7419x18X14xxxx
Navien Condensing Combination Boiler	NCB-180E	884954966083	6608x18709xxxx 6608x188xxxxxx 6608x189xxxxxx 6608x18X14xxxx

Remedy:
Consumers should immediately stop using the recalled water heaters and boilers that are using propane gas and contact Navien for a free replacement conversion kit. Consumers who continue use of the water heaters and boilers while awaiting repair, should have a working carbon monoxide alarm installed outside of sleeping areas in the home.

Incidents/Injuries:
None

Sold At:
Wholesale distributors to installers nationwide from August 2018 through October 2018 for about $1,400 to $1,700 for water heaters and $3,800 for combination boilers.

Manufacturer(s):
Kyung Dong Navien Co. Ltd, South Korea

Importer(s):
Navien Inc., of Irvine, Calif.

Manufactured In:
South Korea

Recall number:
19-057

Report an Incident Involving this Product

The U.S. Consumer Product Safety Commission is charged with protecting the public from unreasonable risks of injury or death associated with the use of thousands of types of consumer products under the agency's jurisdiction. Deaths, injuries, and property damage from consumer product incidents cost the nation more than $1 trillion annually. CPSC is committed to protecting consumers and families from products that pose a fire, electrical, chemical or mechanical hazard. CPSC's work to help ensure the safety of consumer products - such as toys, cribs, power tools, cigarette lighters and household chemicals -– contributed to a decline in the rate of deaths and injuries associated with consumer products over the past 40 years.

Federal law bars any person from selling products subject to a publicly-announced voluntary recall by a manufacturer or a mandatory recall ordered by the Commission.

To report a dangerous product or a product-related injury go online to www.SaferProducts.gov or call CPSC's Hotline at 800-638-2772 or teletypewriter at 301-595-7054 for the hearing impaired. Consumers can obtain news release and recall information at www.cpsc.gov, on Twitter @USCPSC or by subscribing to CPSC's free e-mail newsletters.

Connecticut Department of Public Health Safe Drinking Water Fee

There is a new line item on your water bill for the Connecticut Department of Public Health (DPH) Safe Drinking Water Fee.

This new charge is a result of a law passed by the Connecticut legislature in 2017 that established a Safe Drinking Water Assessment fee for all public water systems in the state. This was established to help fund the DPH so they can maintain their Safe Drinking Water Program and meet their obligations under the Federal Safe Drinking Water Act, as other state and federal funding has been reduced.

All public water systems are required to pay the state the assessment. As this is a pass through charge, the water company may bill the fee as a line item on customers' bills without requiring a separate rate approval process.

The charge for Connecticut Water customers for the DPH Safe Drinking Water Fee is less than 1 penny a day or about 30 cents per month.

Click Here to learn more about the Connecticut Department of Public Health Safe Drinking Water Fee.

Just got my quarterly water bill from Wallingford for water and sewer. New charge to me was 56 cents.

Organizing the Mechanicals

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

BY DOUG HORGAN

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

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

ELECTRICAL

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

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

Photos by Doug Horgan

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

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

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

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

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

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

PLUMBING

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

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

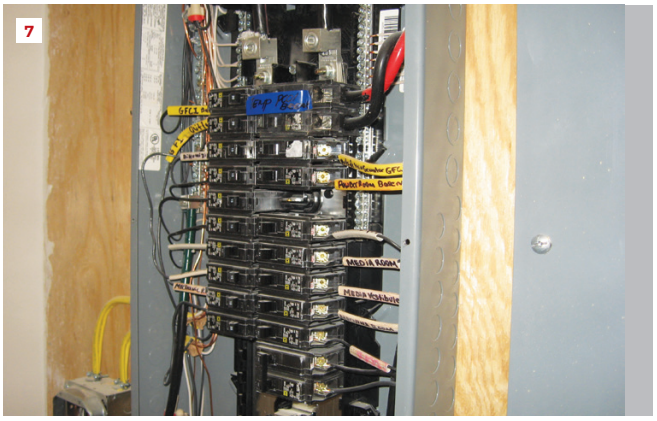
A house with six or 12 hose faucets can be a challenge to drain down for winter. We've remodeled large houses where plumbers scattered shut-offs and drains all around the house, and clients can't remember where some of them are. A few winters later, they change maintenance people, and we get a call about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

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

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

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

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



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

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

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

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

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

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

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

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

Pipe calculations. Some luxury baths have amazing amenities,

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

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

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

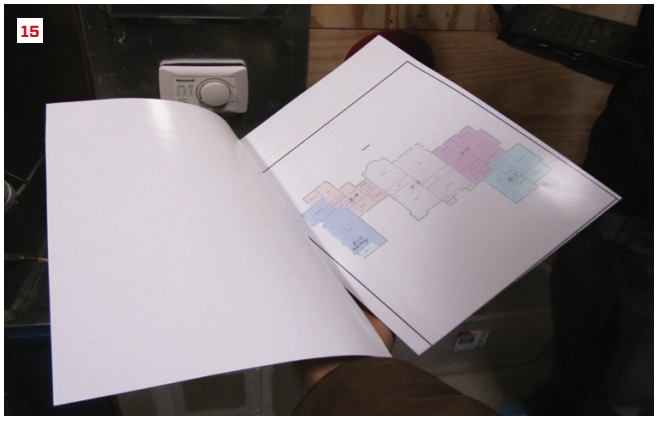
Many of our largest homes are on well service. If a shower has multiple heads or if a large family may simultaneously run water, the draw could be 15, 20, or even more gallons per minute, much more than most wells can put out. We install a storage tank in the basement for this situation. Two hundred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

HEATING, VENTILATION, AND AIR CONDITIONING

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

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

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



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

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

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

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

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

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

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

Doug Horgan is vice president of best practices at BOWA.

Press Releases
12/27/2018

DPH Warns Residents of Carbon Monoxide Danger

Improper use of portable generators, charcoal grills lead to hospitalizations and deaths each year

With cold weather approaching, the Connecticut Department of Public Health (DPH) reminds residents of the dangers of carbon monoxide (CO) and encourages residents to have their heating systems serviced and carbon monoxide detectors installed in their homes. DPH also warns against the improper use of portable generators during power outages.

“Every winter in Connecticut, hundreds of residents are taken to the emergency department and some are hospitalized and even die due to CO poisoning resulting from malfunctioning furnaces, improperly placed portable generators and indoor use of charcoal grills,” stated DPH Epidemiologist Brian Toal. “Taking preventive measures such as having your furnace serviced annually, installing a CO detector near all sleeping areas, replacing the batteries annually, and placing portable generators well away from the house, will prevent CO poisonings.”

CO is an invisible odorless gas that can be fatal and forms when fuels do not burn completely. Breathing CO can deprive the body of oxygen, and may lead to illness, unconsciousness and death. Often times, CO detectors are the only way to know that the deadly gas is present. DPH recommends that residents install CO detectors near all sleeping areas in their home to alert them of the presence of CO.

To prevent CO poisoning, portable generators should be placed at least 20 feet from the home and should never be used in enclosed spaces such as porches, carports, garages and basements, even with open windows and doors. Opening windows and doors, and using fans, is not sufficient to prevent the build-up of deadly levels of carbon monoxide.

The symptoms of CO poisoning mimic those of the flu, including headache, fatigue, dizziness, nausea, vomiting, or loss of consciousness. If several members of a household experience these symptoms when they are home, but feel better when they are away from the home, there may be a CO problem.

DPH offers the following safety tips to prevent CO poisoning:

- Install a carbon monoxide detector on each floor of your home and outside of each bedroom. Install new batteries at least once a year and replace detectors every five years as the sensors degrade.

- Have your heating systems, chimney flues, gas appliances and generators checked every year, and cleaned and serviced as needed by qualified heating/appliance contractors.
- Never use portable generators, pressure washer engines, or other gasoline-powered equipment (including tools) inside your home, garage, carport, basement or other enclosed spaces. Be sure to place portable generators at least 20 feet from your home.
- Use gasoline-powered equipment outside and away from doors, windows or air intake vents.
- Use grilling apparatus such as charcoal or gas grills outdoors only.
- Opening windows and doors, and operating fans is not sufficient to prevent buildup of CO in a home.
- Check that gas dryer vents and automobile tail pipes are not plugged up with snow.
- Make sure the exhaust pipe on your standby generator is pointing away from the house.
- Get out of the house and seek medical help immediately if you or a family member has unexplained/sudden onset of symptoms of CO poisoning. Symptoms include headache, fatigue, dizziness, nausea or vomiting, and loss of consciousness.
- Call 911 from a cell phone or neighbor's home and the Connecticut Poison Control Center at 1-800-222-1222.

For more information on carbon monoxide poisoning and prevention:

CT DPH Environmental & Occupational Health Assessment Program
www.ct.gov/dph/co
860-509-7740

Connecticut Poison Control Center
http://poisoncontrol.uchc.edu
800-222-1222

Consumer Product Safety Commission
http://www.cpsc.gov

Press Releases
01/02/2019

Celebrate a Healthy New Year with a Radon Test During National Radon Action Month

To kick off National Radon Action Month, the Connecticut State Department of Public Health (DPH) is urging Connecticut residents to test their homes for radon gas, the leading national environmental cause of cancer mortality. Health officials estimate that radon is responsible for more than 21,100 lung cancer deaths each year in the United States.

A naturally occurring, radioactive gas formed from the natural decay of uranium, radon is found in rock, soil and water. While radon in outdoor air poses a relatively low risk to human health, it can enter homes from the surrounding soil and become a health hazard inside buildings.

“Because you can’t see, taste, or smell radon, people are often unaware that this silent killer could be in their homes,” said Allison Sullivan with DPH’s Lead, Radon and Healthy Homes Program. “That is why testing for radon and reducing elevated levels is so important, and could save your life or the lives of your loved ones.”

The DPH Radon Program recommends that all Connecticut homes be tested for radon. Testing is recommended in the winter months. Testing homes for radon is simple and inexpensive. Thirty-three local health department/district partners were provided a total of 2,200 free test kits for distribution in their local communities to support radon awareness. Visit the DPH Radon Program website at ct.gov/radon to view a map of the local health partners and contact them directly to determine eligibility. Test kits can also be purchased from the American Lung Association by calling 1-800-LUNG-USA or at your local hardware store.

The U.S. Environmental Protection Agency recommends that homes with radon levels at or above 4.0 pCi/L be fixed. Homeowners should consider reducing their potential lung cancer risk by fixing homes with radon levels between 2 pCi/L and 4 pCi/L. Smokers exposed to radon have a much higher risk for developing lung cancer.

Radon problems can be corrected by qualified radon contractors, with costs typically ranging between $1,200 and $1,500. A homeowner should hire a qualified radon mitigation (reduction) contractor to decrease airborne radon levels.

To learn more about radon and to obtain a list of qualified radon mitigation contractors, please visit the DPH Radon Program website at ct.gov/radon.

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		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.**	

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