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

# CAHI MONTHLY NEWS

November 2015 Volume 8, Issue 10

## Presidents Corner

Every once in a while a situation involving ethics can arise. Ethics, or moral philosophy, is the branch of philosophy that involves systematizing, defending, and recommending concepts of right and wrong conduct. As professionals we have a code of ethics built in our state standards of practice and as an organization CAHI has a code of ethics as well. In both cases, these codes must be adhered to in order to practice our profession ethically and remain in the good graces of these governing bodies.

Sometimes ethics can be blurred, mis-understood or confusing, but they must be followed none the less. They may not only affect us but can affect the people we work for and with. Sometimes when someone challenges ones ethics the reason for the challenge may not be clear or fully understood.

I encourage you all to read both codes of ethics so you have as good an understanding as you can of what they entail. They are usually put together to prevent confusion over certain practices that may be viewed as being a conflict of interest. If a situation arises where the ethics of the matter may be questionable it is always best to step away, as any concern regarding someone or something to be unethical can have a tarnishing affect, and of course we all want copper to shine.

We have begun a monthly advertising campaign in the Connecticut Home Navigator. The first ad hit the stands with the October issue. It is introductory in nature. A copy has been included in this newsletter. The next few will be educational in subject matter. Please take a look. If you have any ideas for future ads please contact me.

Thanksgiving is around the corner. Lets us all give thanks for the things in life that make us happy and drive us as human beings. Let's make it more than just a meal and some football. Show your thankfulness by helping someone who may have difficultly giving thanks this holiday season!

On behalf of the board of directors, I wish you and your families a very Happy Thanksgiving

Stan

### MONTHLY MEETINGS – Details & Info

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

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

## INSIDE THIS ISSUE



### Meeting Dates!

**November 18th Meeting**

***Dwight Uffer -***

***Long time CAHI member and a past President will be making a presentation on the foundation failures coming to light in northeast CT***

**December - *No Meeting***

**Merry Christmas and Happy New Year**

**January 27th TBD**

# Home Navigator Ad

ad as it appeared in the October issue in the Connecticut Home Navigator magazine.


# Home grown!

# No 1 in CT

**The largest Home Inspection Organization in the Northeast!**

**Education is our mission...better home inspectors is the result!**

**Find quality home inspectors at**

**https://www.ctinspectors.com**

# That is Not Insulation

As stated last month, the picture below was taken while inspecting the attic of an old three family house in Seymour. My photographer missed the opening in the screen over the gable vent. There was also an open gap in the ridge vent material that was above this picture.

**What self-invited critter(s) caused this mess?**

**Bats.**

**How many critters were observed during the inspection?**

**Four of them roosting at ridge.**

**What should be reported?**

**There are live bats in the attic and stay out until removed.**

**Who should fix the situation?**

**Licensed Pest Control Contractor.**

# Water Hammer

by Z. Michael Lahlou, Ph.D.,
Technical Assistance Consultant
Submitted by Tom Hauswirth

**Summary**
Water hammer refers to fluctuations caused by a sudden increase or decrease in flow velocity. These pressure fluctuations can be severe enough to rupture a water main. Potential water hammer problems should be considered when pipeline design is evaluated, and a thorough surge analysis should be undertaken, in many instances, to avoid costly malfunctions in a distribution system. Every major system design change or operation change—such as the demand for higher flow rates— should include consideration of potential water hammer problems. This phenomenon and its significance to both the design and operation of water systems is not widely understood, as evidenced by the number and frequency of failures caused by water hammer.

**What is water hammer?**
Water hammer (or hydraulic shock) is the momentary increase in pressure, which occurs in a water system when there is a sudden change of direction or velocity of the water. When a rapidly closed valve suddenly stops water flowing in a pipeline, pressure energy is transferred to the valve and pipe wall. Shock waves are set up within the system. Pressure waves travel backward until encountering the next solid obstacle, then forward, then back again. The pressure wave's velocity is equal to the speed of the sound; therefore it "bangs" as it travels back and forth, until dissipated by friction losses. Anyone who has lived in an older house is familiar with the "bang" that resounds through the pipes when a faucet is suddenly closed. This is an effect of water hammer.
A less severe form of hammer is called surge, a slow motion mass oscillation of water caused by internal pressure fluctuations in the system. This can be pictured as a slower "wave" of pressure building within the system. Both water hammer and surge are referred to as transient pressures. If not controlled, they both yield thesame results: damage to pipes, fittings, and valves, causing leaks and shortening the life of the system. Neither the pipe nor the water will compress to absorb the shock.

**Investigating the Causes of Water Hammer**
A water transport system's operating conditions are almost never at a steady state. Pressures and flows change continually as pumps start and stop, demand fluctuates, and tank levels change. In addition to these normal events, unforeseen events, such as power outages and equipment malfunctions, can sharply change the operating conditions of a system. Any change in liquid flow rate, regardless of the rate or magnitude of change, requires that the liquid be accelerated or decelerated from its initial flow velocity. Rapid changes in flow rate require large forces that are seen as large pressures, which cause water hammer.

Entrained air or temperature changes of the water also can cause excess pressure in the water lines. Air trapped in the line will compress and will exert extra pressure on the water. Temperature changes will actually cause the water to expand or contract, also affecting pressure. The maximum pressures experienced in a piping system are frequently the result of vapor column separation, which is caused by the formation of void packets of vapor when pressure drops so low that the liquid boils or vaporizes. Damaging pressures can occur when these cavities collapse.

The causes of water hammer are varied. There are, however, four common events that typically induce large changes in pressure:

1. Pump startup can induce the rapid collapse of a void space that exists downstream from a starting pump. This generates high pressures.
2. Pump power failure can create a rapid change in flow, which causes a pressure upsurge on the suction side and a pressure downsurge on the discharge side. The downsurge is usually the major problem. The pressure on the discharge side reaches vapor pressure, resulting in vapor column separation.
3. Valve opening and closing is fundamental to safe pipeline operation. Closing a valve at the downstream end of a pipeline creates a pressure wave that moves toward the reservoir. Closing a valve in less time than it takes for the pressure surge to travel to the end of the pipeline and back is called "sudden valve closure." Sudden valve closure will change velocity quickly and can result in a pressure surge. The pressure surge resulting from a sudden valve opening is usually not as excessive.
4. Improper operation or incorporation of surge protection devices can do more harm than good. An example is oversizing the surge relief valve or improperly selecting the vacuum breaker-air relief valve. Another example is to try to incorporate some means of preventing water hammer when it may not be a problem.

## Finding Practical Solutions

The surge pressure must be incorporated with the operating pressure in the design of the pipe. The recommendations and requirements regarding allowances for surge pressure are given in the American Water Works (AWWA) standards and manuals for water supply practice, and vary depending on the type of pipe used.

The following are some tools to reduce the effects of water hammer:

### Valves

Water hammer often damages centrifugal pumps when electrical power fails. In this situation, the best form of prevention is to have automatically-controlled valves, which close slowly. (These valves do the job without electricity or batteries. The direction of the flow controls them.) Closing the valve slowly can moderate the rise in the pressure when the downsurge wave—resulting from the valve closing—returns from the reservoir. Entrained air or temperature changes of the water can be controlled by pressure relief valves, which are set to open with excess pressure in the line and then closed when pressure drops. Relief valves are commonly used in pump stations to control pressure surges and to protect the pump station. These valves can be an effective method of controlling transients. However, they must be properly sized and selected to perform the task for which they are intended without producing side effects. If pressure may drop at high points, an air and vacuum relief valve should be used. All downhill runs where pressure may fall very low should be protected with vacuum relief valves. Vacuum breaker-air release valves, if properly sized and selected, can be the least expensive means of protecting a piping system. A vacuum breaker valve should be large enough to admit sufficient quantities of air during a downsurge so that the pressure in the pipeline does not drop too low. However, it should not be so large that it contains an unnecessarily large volume of air, because this air will have to be vented slowly, increasing the downtime of the system. The sizing of air release valves is, as mentioned, critical.

### Pump

Pump startup problems can usually be avoided by increasing the flow slowly to collapse or flush out the voids gently. Also, a simple means of reducing hydraulic surge pressure is to keep pipeline velocities low. This not only results in lower surge pressures, but results in lower drive horsepower and, thus, maximum operating economy.

**Surge Tank**

In long pipelines, surge can be relieved with a tank of water directly connected to the pipeline called a "surge tank." When surge is encountered, the tank will act to relieve the pressure, and can store excess liquid, giving the flow alternative storage better than that provided by expansion of the pipe wall and compression of the fluid. Surge tanks can serve for both positive and negative pressure fluctuations. These surge tanks can also be designed to supply fluid to the system during a downsurge, thereby preventing or minimizing vapor column separation. However, surge tanks may be an expensive surge control device.

**Air Chamber**

Air chambers are installed in areas where water hammer is encountered frequently, and are typically seen behind sink and tub fixtures. Shaped like thin, upside-down bottles with a small orifice connection to the pipe, they are air-filled. The air compresses to absorb the shock, protecting the fixture and piping.

## Conclusion

Water hammer will continue to challenge engineers, operators, and managers of water systems because it is associated with systems that cannot be exactly defined due to the size and length of the water distribution system with undulating profile or the lack of definition of the system components such as valves or pumps. There is a need for a more practical approach while research continues to provide better descriptions of the physics of water hammer and for useful computational solutions including those basics.

## Where can I find more information?


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- Weis, F. 1996. "Dispelling Common Misconceptions about Water Hammer." Water Engineering and Management. 143: 24–30.
- Wood, D. J. 2002. SURGE2000 Software. (Modeling water hammer in pipes and a wide range of hydraulic and surge protection devices are addressed). Civil Engineering Software Center, University of Kentucky Lexington, KY. CAHI Monthly November 2007

# Install a Laundry Sink

Dan Cary
08/27/2015

They're not as flashy as the latest washers and dryers, but laundry sinks are far from outmoded. Besides providing a convenient place to soak stained clothes, a laundry sink is handy for messy cleanup projects that you'd rather not perform in your kitchen sink.

Laundry sinks originated as stationary replacements for old portable galvanized-steel washtubs. Typically made from soapstone or concrete, early models were designed for washing clothes and featured one ribbed surface on the inside face to serve as the washboard. The washboard feature has since gone the way of the ringer, but the deep, steep-sided bowl design remains the key to a laundry sink's utility.

***The MTI Jentle Jet Laundry Sink is perfect for washing delicates. It features a jet system that recirculates the water, similar to a jetted bathtub.***

As laundry rooms moved out of the basement and into finished spaces that featured counter tops, manufacturers expanded their lines, and now they differentiate between sinks and tubs. Laundry sinks are typically 10- to 12-in. deep and designed to mount on or under a counter top – like a kitchen sink. Laundry tubs are typically 12- to 16-in. deep and are mounted on a set of legs or a base.

Even a small laundry sink is larger than most kitchen and lavatory sinks. Sizes range from 17-in.-wide single bowls to 36-in.-wide double-bowl and even 48-in. wide triple-bowl models. It's typically best to install the largest model for which you have room. Multiple bowls provide the most versatility, permitting you to use one bowl to pre-soak laundry and still have at least one bowl free for the washing machine to drain into and where you can wash out paintbrushes, etc.

***Tough jobs call for a sink and faucet with industrial utility and durability. The Elkay Pursuit Sink is made from 14-gauge stainless steel, and the Elkay Commercial Faucet has a flexible hose that extends 30 in.***

Laundry sinks are available in a variety of materials. One-piece molded-acrylic tubs are common, affordable and relatively durable. Solid-surface materials such as Veritek by Swanstone offer better durability and a variety of solid-surface color options. Stainless steel sinks are probably the most durable and most resistant to chemicals and staining. Cast iron is less commonly used for laundry sinks, but it is a time-tested material that provides traditional style and a solid feel. Finally, soapstone is showing resurgence in popularity among homeowners looking for natural material that is as beautiful as it is functional.

***Most utility sinks are defined by their deep basins, but in some cases a wide, shallow basin is more suitable. The Kohler Oceanview is 48 in. wide and only 6-3/8 in. deep. This sink would also work well installed on the floor.***

A deep, large bowl may be all you need in a laundry sink, but a few other features are worth considering. First, several models feature built-in shelves and ledges for keeping soap, brushes and other tools close at hand but out of the water. Second, two faucet holes are standard, but some models feature three holes, which gives you more faucet options. Finally, MTI Whirlpools makes a sink with built-in jets that circulate the water around the bowl. It's like a mini whirlpool tub for washing individual items and "delicates."

***Just because it's functional doesn't mean a utility sink can't have style. An undermount model, such as this Kohler Glen Falls Utility Sink, paired with a kitchen faucet can give your utility or laundry room a more refined appearance.***

If your laundry sink has seen better days, consider making an upgrade. If you have enough space, move up to a larger size or install a base cabinet to add storage and improve the look of your laundry room. It may not be the most exciting upgrade you'll ever make in your home, but it might be one of the most useful.

### *$150 Laundry-Room Makeover*

*Fully finished main-level laundry rooms are common in newly constructed homes, but in many homes (mine, for example) the laundry room is located in a remote unfinished area of the basement or garage. Even though the laundry room is one of the most frequently used rooms in a home, it is often the most overlooked and neglected. A room that gets that much use deserves some attention. You can revitalize just about any laundry room in a weekend with three projects that cost only about $50 each. I did all three and got a better reaction from my family than just about any other home-improvement project I've completed. Doing the laundry is still a chore, but it's a lot more pleasant since I enhanced the room.*

*Try these tips for successful makeovers:*

1. *Paint the walls and ceiling a bright color. Use moisture-resistant paint on exterior masonry walls.*
2. *Replace single ceiling bulbs with 4-ft.-long double-bulb fluorescent light fixtures.*
3. *Add storage shelves or a couple of wall cabinets over the washer and dryer. Cabinets with doors are the best way to eliminate clutter.*

## Sink Installation

**Installing a new laundry sink or upgrading to a larger tub is not difficult if you have some basic plumbing skills. Here's how we upgraded from a single-bowl to a double-bowl model.**

1. Disconnect the old drain and supply lines and remove the existing sink. If necessary, rotate the waste stub-out to realign with the new drain location. In this case the stub-out was rotated and the galvanized extension was removed. Note: Use caution when rotating an old fitting — you run the risk of breaking the old pipe. Thread a new PVC trap adapter onto the waste stub-out *(photos below)*

2. Assemble the faucet and attach it to the sink. We installed a brass utility faucet. This tried-and-true design isn't fancy, but it's reliable and easy to service. The faucet mounts on riser posts that are secured with washers and nuts in the faucet-mounting holes. Follow the manufacturer's instructions to assemble the new sink's double-outlet drain *(photos below)*.

3. If necessary, reroute the supply lines to align with the new faucet location. We also installed new threaded tees for washing-machine shut-off valves.

4. Connect the supply pipes to the faucet; then install the new washing machine shut-off valves and braided stainless steel lines.

5. Finally, connect the new drain-trap assembly to the sink and stub-out. Then anchor the sink legs to the floor with masonry screws.

Off the CT DPH web site; influenza threat appears to be less than some past years.
Flu vaccine is still recommended.

# Influenza Update

**Connecticut Department of Public Health – Posted 11/4/2015**

Influenza Season, Update for Week 43* *(Week ending Saturday, 10/31/2015)*

**Key Points**

- This is the fourth weekly report of the influenza season.
- Influenza activity has been increasing in Connecticut since the end of August.
- Activity is currently classified geographically as sporadic**.
- Predominant circulating influenza virus is Type A.
- It is time to obtain your flu vaccine and take other steps to prevent influenza-related illness and hospitalization: http://www.ct.gov/dph/cwp/view.asp?a=3115&q=500340

The Department of Public Health (DPH) uses multiple surveillance systems to monitor circulating flu viruses throughout the year. All data are considered preliminary and updated with available information each week starting in October and ending in May.

Statewide emergency department visits attributed to the "fever/flu syndrome" have remained at a level between 4.0-4.7%, which is below the level of 5% statewide; generally considered the minimum threshold when there are elevated influenza-associated ED visits.

The percentage of outpatient visits with influenza-like illness (ILI) have been gradually increasing for several weeks, but remain below a level of 1% statewide; generally considered the baseline when there are increased influenza-associated visits in the outpatient setting.

The percentage of unscheduled hospital admissions due to pneumonia are continuing to increase but remain below a level of 4% statewide; generally considered the baseline when there may be increased pneumonia hospitalizations due to influenza.

A total of 22 hospitalized patients with laboratory-confirmed influenza have been reported. Of these 22 reports, 15 were Type A (subtype unspecified), 1 was Type A (H3N2), 1 was Type A (2009 H1N1), and 5 were influenza B virus. No influenza-associated deaths have been reported to date, this season.

A total of 43 positive influenza reports have been reported for the current season. Influenza was reported in seven of eight Connecticut counties: Fairfield (17 reports), New Haven (11), Hartford (9), Middlesex (2), New London (2), Litchfield (1), and Windham (1). Of the 43 positive influenza reports: 31 were Type A (subtype unspecified), 3 were Type A (H3N2), 2 were Type A (2009 H1N1), and 7 were influenza B virus.

* *Week numbers refer to the Morbidity and Mortality Weekly Report calendar used by the federal Centers for Disease Control and Prevention for national disease surveillance.*

** *Definitions for the estimated levels of geographic spread of influenza activity available at: http://www.cdc.gov/flu/weekly/overview.htm*

To view entire report go to http://www.ct.gov/dph/lib/dph/infectious_diseases/flu/stats/thisweeksfluupdate.pdf

# Common Siding Failures

**Avoid errors that will cause a fiber-cement job to fail**

By Mark Parlee

***Link to COMMON SIDING FAILURES***

I see a lot of failed siding jobs. The one shown in the photos in this article is typical of the fiber-cement siding jobs I am asked to look at – I could go out right now to hundreds of homes that are in a similar condition. Each one usually looks fine from a distance, but when I examine the house up close, I see the same installation errors again and again. For some of the jobs, I am called out to investigate because they have gone to litigation. For others, it's a homeowner complaint. But almost all of them are very expensive to repair.

On this house, the siding had been so haphazardly nailed on and the fiber-cement boards so poorly attached that wind caused the siding to vibrate. This vibration transferred through the framing, creating a loud hum when the wind blew that kept the homeowners awake at night. As it turned out, there were problems beyond the inadequate nailing—none of the detailing designed to protect the walls from water had been done correctly. If the siding didn't fall off first, leaks would eventually wreak havoc on the interior.

Many fiber-cement siding jobs that look fine from a distance actually have serious installation defects.

I didn't think the work could be salvaged, and I recommended tearing off all the siding and starting over. However, because the initial complaint was about the vibration of the loose boards, the builder thought he could fix the job by face-nailing the siding. But his "fix," along with his attempts to correct the water detailing, still didn't conform to the specifications of the manufacturer's instructions or those codified in the product's Evaluation Service Report (ESR).

An ESR is required by the building code as acceptance criteria for any fiber-cement siding product. It's an easy document to obtain (search online for "ESR" and the product name). It spells out in plain terms the basic installation requirements for the particular product. This document the code for that specific material, as stated in the "Conditions of Use " section of every ESR: "The products must be manufactured, identified and installed in accordance with this report, the manufacturer's published installation instructions and the applicable code. In the event of conflict between the manufacturer's published installation instructions and this report, this report governs."

I always download copies of the ESR and the installation instructions and make sure my installers have copies too. The basic requirements for all fiber-cement products are similar, but you can't assume they are the same. There are small differences in the dimensions that define where nails can be placed and what clearances are needed above adjacent surfaces.

## Nailing issues

The material used here was MaxTile's MaxiPlank; and according to its ESR, exposed fasteners (face nails) must be placed at least 3/4 inch up from the bottom edge. Mostly, this job had been blind-nailed to begin with, but the installers had occasionally placed face nails to hold boards down, and these were only about 3/8 inch from the bottom edge. At least the nail shown here had been set more or less flush to the surface, whereas all the face nails the builder had retrofit not only were too close to the bottom edge, but also had been overdriven—and the divots had been filled with spackle.

In my initial report, I documented a number of other nailing problems. For starters, the ESR is clear about

An attempt to repair poorly attached fiber-cement siding by face-nailing it still didn't conform to manufacturer specifications.

Not only were the face nails too close to the edge, but they were also overdriven.

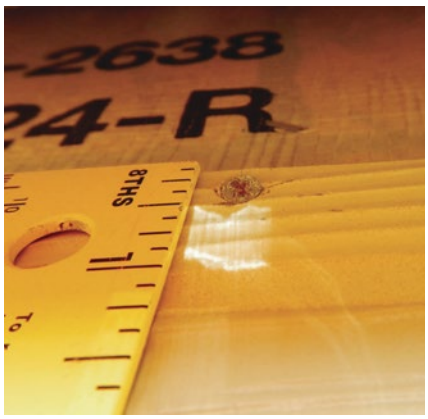
Butt joints should land over studs, but these were offset 24 inches over 16-inch on-center framing, so many of the ends were inadequately supported.

placement for exposed fasteners at butt joints: Butt joints must be located over studs (or a metal plate must be used for butt joints between studs, but none were in evidence on this job), and the nails placed 3/4 inch up from the bottom edge and 3/8 inch from the ends.

On this job, however, the butt joints were not located over the studs. The house was framed on 16-inch centers, while many of the butt joints were offset by 24 inches. At the butt joints, the builder had initially made an attempt to hold the ends down with a single nail strategically placed to hold both ends—an incorrect detail that I see all the time. I have also seen installers try to pin the ends down. Neither solution will provide enough holding power to secure the siding.

single nail placed in a butt joint is not enough to secure the siding.

Pinning down butt ends does not provide enough holding power to secure fiber-cement siding.



For this siding product, blind nails must be at least 1 inch from the top edge. This one was not even close.

For blind nailing, the ESR specifies that fasteners must be placed a minimum of 1 inch down from the top edge of the board, and a minimum of 3/8 inch from the ends. My inspection showed that a majority of the nails were much closer to the top edge and many were overdriven. The reason for requiring a minimum distance from board edges and ends is clear: When a fastener is placed too close to an edge, the material tends to break around the fastener when boards expand and contract with changes in temperature, or when wind forces push and pull on the material. The vibration caused by loose boards fluttering in the wind no doubt accelerated this failure and is why so many of the fasteners on this job had completely failed.

Many of the blind nails, like the ones in the photo, were overdriven.

When a fastener is placed too close to an edge, the material tends to break around the fastener

The nailing pattern was random, clearly not lined up with the studs.

Like a lot of the homes in this part of the country, the house had been sheathed with a fiber-board sheathing, which has no nail holding strength. With this material, it is especially important to drive the siding nails into the studs. But that clearly didn't happen. An analysis of the fastener spacing showed that the nailing was fairly random—likely a symptom of a zealous installer firing rapidly across each board with a pneumatic nailer.

## Water Management Details

There were a number of egregious water-detailing problems too. One of the worst was a siding break made directly above a dryer vent. Water leaking through this joint hit the vent pipe and followed it to the interior, where, not surprisingly, we found water marks. At all the other penetrations—at the gas line near the meter and the hose bib—the siding had simply been slotted around the pipe or vent, which not only looks bad, but also leaves the wall open to serious water and air leaks.

Siding breaks above penetrations like this dryer vent invite water right into the penetration hole and could allow water to leak inside the house.

This detail looks bad and makes the wall vulnerable to air and water leaks

Again, the siding is simply slotted around the hose bib, inviting water and air leaks.

The correct way to detail an existing pipe or vent penetration is to use a split mounting block. When one of these is used, a hole saw is centered along the split, and half the block is slid over, and the other half under, the pipe or vent. The split, which is beveled so it drains downward, is tightly sealed with caulk.

The correct way to deal with penetrations is to use a split mounting block. Beveled to drain downward, the split is also sealed with caulk.

**Butt joints.** Fiber cement won't rot, but it is not completely impervious to water. It can absorb water at ends and edges, and swell. This not only looks bad initially, but the movement of swelling and drying and freezing and thawing will gradually cause the material to deteriorate at vulnerable edges.

It's critical that board ends butting against window and door openings, or against corner boards, be cut at least 1/8 inch short to accommodate expansion. On this job, the boards were frequently butted hard against the trim. This left no room for the material to expand, and it also created an inferior caulk fillet that failed quickly and allowed water to seep into the joint when the siding boards contracted.

Fiber-cement boards shouldn't be butted up against the trim, but should be left 1/8 inch short to allow for expansion. The gap will allow for a caulk joint that will expand and contract with dimensional changes in the siding boards. Without the gap, you get a flat strip of caulk that is prone to peeling off.

Whoever installed this siding neglected to prime the cut ends - a requirement of the manufacturer's installation instructions, which building codes mandate must be followed.

**Cut edges.** The installers on this job also failed to prime the cut ends of siding and trim boards, as specified in the manufacturer's instructions to protect the material from water. This is particularly important for exposed edges at the base of the wall. Water running down the face of the wall can turn under that lower edge, and splash-back will further wet this area.

Exposed edges near the base of a wall particularly need to be primed to protect them from water that runs down the face or that splashes up.

Per the manufacturer's installation instructions and the Evaluation Services Report *(which take precedence over prescriptive buildin codes)*, there should be at least 1 inch to 2 inches of clearance between the siding boards and the porch surface.

Again, MaxiPlank calls for 1 inch to 2 inches of clearance between siding and a sidewalk.

**Clearances.** All fiber-cement manufacturers specify minimum clearances where siding hits a horizontal surface. This can include horizontal trim, such as above the head trim on an opening, above the mounting block for exterior penetrations, or where the siding lands on the top edge of water table. At least 1/4 inch is required, and this gap should remain uncaulked. However, the installers on this job left only about 1/8 inch above the window heads.

The clearance between the siding and a deck, porch, or hardscape surface, or along the rake of a roof, is much greater. For MaxiPlank, this clearance is supposed to be at least 1 inch to 2 inches. (But Hardie, for example, requires at least 2 inches in our climate zone. Don't assume all fiber-cement details are the same.) On this job, the installers brought the siding right down to the porch floor and to the sidewalks.

The installers brought the siding down onto the roof surface, though there should be 1 inch to 2 inches of clearance for this brand of siding.

Note the absence of kick-out flashing.

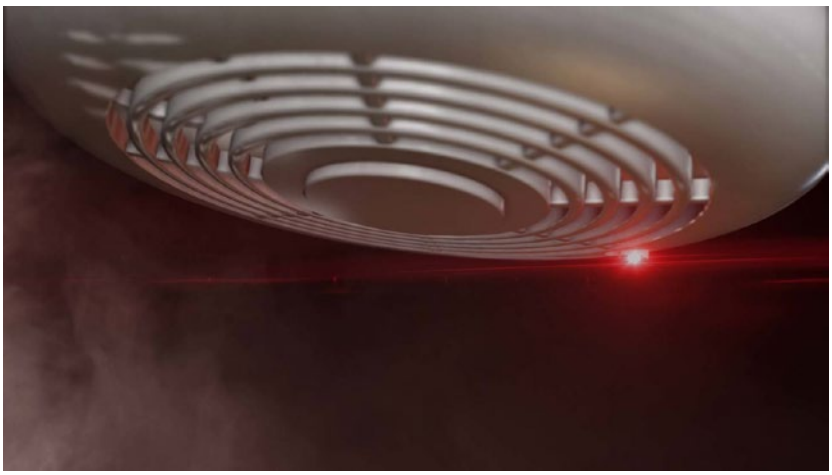
Caulking is not a good substitute for flashing.

**Sidewalls.** The installers also brought the siding down onto the roof surface where sidewalls intersected a roof. And they left out any kind of kick-out flashing where the bottom edge intersected with the wall. When this was called out on my initial report, they cut back the siding and smeared a lot of caulk into the corner in lieu of a kick-out flashing.

A true kick-out flashing, as shown in this photo of one of my siding jobs, is a large flashing that gathers water and directs it into the gutter. Note, too, how I detail the rake: I run a trim board along the rake, keeping this the required distance above the roof surface, and bring my siding board down to the trim, maintaining a 1/4-inch gap that gets caulked. Details like this let me stay profitable and allow me to sleep at night.

A true kick-out flashing, like this one, gathers water and directs it into the gutter. Note also the wide gap above the tim board follwing the rake. This allows any water flowing down the roof to be directed by the step flashing to the gutter, instead of wicking into the sidewall siding boards.

*Mark Parlee, a building-envelope consultant (thebuildingconsultant.com) and builder (parleebuilders.com) in Urbandale, Iowa, specializes in exterior renovations and building envelope solutions.*



# Don't Overlook the Smoke Alarms and CO Alarms

By Rick Bunzel, ACI

We all deal with managing liability in our business lives. Home inspectors and appraisers call out health and safety issues all the time. In Washington state appraisers are now supposed to call out missing carbon monoxide (CO) detectors. One way to manage our liability is to ensure that homes have working safety equipment. While I understand that our role is not to enforce building codes, I do see it as ensuring that the safety equipment is present and in reasonable order.

One area I see frequently overlooked is not calling out old, missing or disconnected smoke detectors. In 2014, the US had 3,275 civilian fire deaths (NFPA Report). Many of these deaths could have been prevented by having working smoke detectors. If a fire death occurs in a home recently inspected by one of us, do you think it is possible that we would get drawn into a wrongful death suit?

In many older homes there will only be a single smoke detector installed in a hallway. The National Fire Protection Association (NFPA) recommends that there should be at least one smoke detector on each level of a home, including the basement and walk-in attic. There should be a smoke detector in every bedroom and outside each sleeping area. Smoke detectors are not to be installed in kitchens and adjacent to bathrooms. Those locations will cause false alarms and in my experience the occupants will usually disable the alarm.

The life expectancy of smoke alarms is generally 10 years, after which their sensors can begin to lose sensitivity. The test button only confirms that the battery, electronics, and alert system are working; it doesn't mean that the smoke sensor is working. The only way to test that is with "canned smoke." In my experience the easiest and quickest way to gauge the age is by looking at the detector color. The detector shell is no longer white and turned golden beige, most likely it's older than 10. If the detector is white but the home is in the 10 to 15 year range,

then most likely the detectors are original and should be changed. Many units will have a date on the unit label. This requires removing the unit to take a look. Almost all smoke alarms can be removed with a half turn.

The most common smoke alarm type, ionization alarms, are generally more responsive to a flaming fire, for instance, when a lit candle tips over and ignites a drape- according to Underwriters Laboratories (UL). These alarms use electrically charged particles, to detect smoke in the air. UL says that, because they are inexpensive, ionization detectors are the most commonly found smoke alarms in homes in the US.

The second type of detector is the photoelectric smoke alarm, which uses a light beam to detect the presence of smoke. According to UL, these alarm types are more effective at sounding when a fire originates from a smoldering source, like a smoldering couch cushion. Smoldering fires can fill a home with dangerous gases before a fire ever erupts.

In recent years there has been controversy over which type of smoke alarm is superior but tests have proven both types have their strengths and it's impossible to predict what type of fire a home will have. Recently, the following organizations recommend having both ionization and photoelectric detectors in a home to maximize protection: National Fire Protection Association (NFPA), U.S. Fire Administration (USFA), National Institute of Standards and Technology (NIST), Consumer Products Safety Commission (CPSC), National Association of State Fire Marshals (NASFM) and Underwriters Laboratories (UL). Fortunately the costs of dual sensor alarms have dropped to where they are only slightly more expensive than single sensor alarms.

In the U.S. there is an average of 430 Carbon Monoxide deaths annually according to the Centers for Disease Control and Prevention (CDC). Many more people are sickened but survive. All homes should also have one or more carbon monoxide (CO) alarms in them. In Washington and other states, the law requires that a home should have a CO detector on each habitable level. The CO detector can be installed high or low on a wall or combined with a smoke alarm. Most CO alarm sensors wear out in five-seven years and should be replaced. CO alarms manufactured after 2009 have technology that will alert you to when the sensor wears out, however many of the units I see were manufactured prior to that and owners are still using them. All CO alarms are dated so it's easy to establish its age.

Working smoke and CO alarms save lives. By taking a few steps in our appraisal or home inspection we can ensure that this important safety equipment will be ready in an emergency.

***About the Author***

Rick Bunzel is the principal inspector with Pacific Crest Inspections and an ASHI Certified Inspector #249557. He holds a BA in Business Marketing. He is past Chair of the Marketing and Public Relations Committees for a national home inspection organization. Locally, he Chairs the North Puget Sound Board of Realtor's Communications Committee and is a firefighter/ EMT with the Mt. Erie Fire Department in Anacortes, WA.

# Bathroom Ventilation Ducts and Fans

Bathroom ventilation systems are designed to exhaust odors and moist air to the home's exterior. Typical systems consist of a ceiling fan unit connected to a duct that terminates at the roof.

## Fan Function

The fan may be controlled in one of several ways:

- Most are controlled by a conventional wall switch.
- A timer switch may be mounted on the wall.
- A wall-mounted humidistat can be pre-set to turn the fan on and off based on different levels of relative humidity.

Newer fans may be very quiet but work just fine. Older fans may be very noisy or very quiet. If an older fan is quiet, it may not be working well. Inspectors can test for adequate fan airflow with a chemical smoke pencil or a powder puff bottle, but such tests exceed most standards of practice and are awkward.

Bathroom ventilation fans should be inspected for dust buildup that can impede air flow. Particles of moisture-laden animal dander and lint are attracted to the fan because of its static charge. Inspectors should comment on dirty fan covers.

Ventilation systems should be installed in all bathrooms. This includes bathrooms with windows, since windows will not be opened during the winter in cold climates.

## Defects

The following conditions indicate insufficient bathroom ventilation:

- Moisture stains on walls or ceilings
- Corrosion of metal
- Visible mold on walls or ceilings
- Peeling paint or wallpaper
- Frost on windows
- High levels of humidity

The most common defect related to bathroom ventilation systems is improper termination of the duct. Vents must terminate at the home exterior.

The most common improper terminations locations are:

- Mid-level in the attic, these are easy to spot.
- Beneath the insulation. You need to remember to look. The duct may terminate beneath the insulation or there may be no duct installed.
- Under attic vents. The duct must terminate at the home exterior, not just under it.

Improperly terminated ventilation systems may appear to work fine from inside the bathroom, so the inspector may have to look in the attic or on the roof. Sometimes, poorly installed ducts will loosen or become disconnected at joints or connections.

Ducts that leak or terminate in attics can cause problems from condensation. Warm, moist air will condense on cold attic framing, insulation and other materials. This condition has the potential to cause health and/or decay problems from mold, or damage to building materials, such as drywall. Moisture also reduces the effectiveness of thermal insulation.

## Mold

Perhaps the most serious consequence of an improper ventilation setup is the potential accumulation of mold in attics or crawlspaces. Mold may appear as a fuzzy, thread-like, cobwebby fungus, although it can never be identified with certainty without being lab-tested. Health problems caused by mold are related to high concentrations of spores in indoor air. Spores are like microscopic seeds, released by mold fungi when they reproduce. Every home has mold. Moisture levels of about 20% in materials will cause mold colonies to grow. Inhaling mold spores can cause health problems in those with asthma or allergies, and can cause serious or fatal fungal infections in those with lung disease or compromised immune systems.

Mold is impossible to identify visually and must be tested by a lab in order to be confidently labeled. Inspectors should refrain from calling anything “mold” but should refer to anything that appears as mold as a material that “appears to be microbial growth.” Inspectors should include in their report, and in the inspection agreement signed by the client, a disclaimer clearly stating that the General Home Inspection is an inspection for safety and system defects, not a mold inspection.

Decay, which is rot, is also caused by fungi. Incipient or early decay cannot be seen. By the time decay becomes visible, affected wood may have lost up to 50% of its strength.

In order to grow, mold fungi require the following conditions to be present:

- Oxygen
- Temperatures between approximately 45° F and 85° F.
- Food, this includes a wider variety of materials found in homes.
- Moisture

If insufficient levels of any of these requirements exist, all mold growth will stop and fungi will go dormant. Most are difficult to actually kill.

Even though mold growth may take place in the attic, mold spores can be sucked into the living areas of a residence by low air pressure. Low air pressure is usually created by the expulsion of household air from exhaust fans in bathrooms, dryers, kitchens and heating equipment.

## Improper Ventilation

Ventilation ducts must be made from appropriate materials and oriented effectively in order to ensure that stale air is properly exhausted.

Ventilation ducts must:

- Terminate outdoors. Ducts should never terminate within the building envelope.
- Contain a screen or louvered (angled) slats at its termination to prevent bird, rodent and insect entry.
- Be as short and straight as possible and avoid turns, longer ducts allow more time for vapor to condense and also force the exhaust fan to work harder.
- Be insulated, especially in cooler climates. Cold ducts encourage condensation.
- Protrude at least several inches from the roof.
- Be equipped with a roof termination cap that protects the duct from the elements.
- Be installed according to the manufacturer's recommendations.

The following tips are helpful, although not required. Ventilation ducts should:

- Be made from inflexible metal, PVC, or other rigid material. Unlike dryer exhaust vents, they should not droop.
- Have smooth interiors. Ridges will encourage vapor to condense, allowing water to back-flow into the exhaust fan or leak through joints onto vulnerable surfaces.

Above all else, a bathroom ventilation fan should be connected to a duct capable of venting water vapor and odors into the outdoors. Mold growth within the bathroom or attic is a clear indication of improper ventilation that must be corrected in order to avoid structural decay and respiratory health issues.

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**The public is always welcome.**

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