

# CAHI MONTHLY NEWS



## Presidents Corner

One year ago this month, On March 16th the state of CT called for a two week shut down of the state in response to the surging Carona virus pandemic. The Governor’s office stated they would put out a list of essential services who could continue to work, the rest must stay home and work from home when possible. I do recall that time as if it were yesterday. My town was like a ghost town. The highways were empty. The fear of God was in everybody’s eyes. We waited with bated breath to see who was allowed to work. Alas the list came out and the Real Estate professionals were on the list as essential. Great, but who was going to be buying and selling homes during a pandemic? Those in our profession who were concerned elected not to work. The Real Estate profession set guidelines for showings and inspections and those of us who were ready to venture out moved ahead cautiously. As we all know 2020 became a very busy year despite the raging pandemic.

Here we are one year later. Honestly, while some changes have taken place we are still in “pandemic Mode”. We had our shut down and never completely re-opened. We flattened the curve to where there were only 60 people in the hospital with COVID 19 at one point. But the second wave that was predicted very early on to happen in the fall did. Most people have been working. The bar, food and restaurant industries are hanging on by a thread, although many businesses have shuttered.

I guess our profession has been very lucky and will proceed with caution as we move deeper into 2021. The vaccine roll out may ease the minds of many people as Connecticut and the US and the world attempts to get back to some semblance of normality. While I do not like the term new norm, I do believe it will be a different norm for a while. For now, we are moving forward towards the light that’s beginning to flicker at the end of the tunnel.

*Continued on pg 2*

March 2021 Volume 14, Issue 03

### INSIDE THIS ISSUE

- Presidents Corner .....1
- Home Inspectors: Should you offer mold sampling?.....3
- Treasure Map or Fool’s Gold.....7
- Spray Foam Under the Slab.....8
- Inspection assets: How to store inspection contracts, reports, photos, and videos..... 11
- Increasing Demand for Ultraviolet Market & Pandemic Challenges ..... 17
- Raising the Roof .....18
- Indoor Air Quality Testing Should Not Be The First Move .....23

### Meeting Dates!

**March 24th**

**Trinity Solar**

Presenter - Jay Celozzi



**April 28th**

**CT Pest Solutions, LLC**

Presenter - King James



**May 26th**

**Ultra Clean Air, LLC**

Presenter - Gary Smith



Quarterly Board Meeting  
March 24 - 6 pm

### 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 also broadcast via Zoom.

Meetings are still free to members but RESERVATIONS are a MUST.

Reservations can be made at our CAHI website.

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.

**Presidents Message Continued:**

The March board meeting will have taken place before the March membership meeting. There are items of new business that will be discussed that will shape the future of CAHI as we move through and eventually out of the pandemic era. I would like to take this opportunity to reach out to our membership and ask if anyone is interested in helping shape the future of CAHI and ultimately the home inspection landscape in Connecticut by joining the board. If you earn a living performing home inspections, why wouldn't you want to have your finger on the pulse of the profession. No organization can be at the top of its game without input from its membership. If any on you have any concerns, recommendations, or questions please feel free to contact me.

Stay well,

Stan

*Act as if what you do makes a difference. It does*

— William James



**CONNECTICUT DEPARTMENT OF CONSUMER PROTECTION**

MICHELLE H. SEAGULL | COMMISSIONER

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Hartford, CT 06103

**NOTICE / ADVISORY**

As we continue to navigate the Covid-19 pandemic, the Department of Consumer Protection and the DCP Home Inspector Licensing Board ("Board") encourage licensees to utilize CDC guidelines to help with health / safety during inspections. Please visit:

<https://www.cdc.gov/coronavirus/2019-ncov/index.html>

Renewal notices for licensees will be sent out shortly for the upcoming June 2021 license term. In advance of renewal, all continuing education credits must be completed for this license year. The home inspector shall take courses consisting of at least twenty continuing education hours in each two-year continuing education period. For each two-year continuing education period, it shall be mandatory to take one course consisting of at least three classroom hours in current home inspection legislation, licensing laws and regulations.

For a list of online course providers, please visit:

<https://portal.ct.gov/DCCP/Occupational-and-Professional-Division/Occupational--Profess/Continuing-Education-for-Occupational-and-Professional-Licenses>

# Home Inspectors: Should you offer mold sampling?



By Stephanie Jaynes  
March 1, 2021

A possible health risk and a costly issue to fix, mold deters many potential home buyers away from otherwise great finds. Others who buy only to find mold later frequently look for someone to blame, leaving you, the inspector, with a sizable target on your back.

How can you diminish that target and make some additional cash? Offering mold testing may be your answer. In this article, we explore why home inspectors choose to offer mold sampling and recommendations for home inspectors considering offering the additional service.

## **Why inspectors perform mold inspections.**

When asked why they offer mold sampling, the home inspectors we interviewed said that they began offering the service for the following reasons:

### **1. To protect clients from potential mold-related risks.**

According to a brochure by the Federal Emergency Management Agency (FEMA), mold is a type of fungus that, when outdoors, helps dead plants decompose and regenerate soil. Mold is everywhere and naturally occurring.

“There’s never been a mold test that we’ve done that didn’t have any mold,” said Rob Hopkin of ProTec Inspection Services in an article for The Washington Post. “Every house, every environment has mold spores.”

While there isn’t a practical way to eradicate all mold, the U.S. Environmental Protection Agency (EPA) encourages homeowners to avoid letting mold grow indoors, thereby preserving indoor air quality. Mold reproduces by creating tiny spores that are invisible to the naked eye and float in the air both in and outdoors. Mold growth begins when a spore lands, absorbs moisture in the air, and swells in size. As it continues to absorb the air’s moisture, it quickly spreads across its chosen surface.

How mold affects people is largely up for debate. There’s sufficient evidence that mold can lead to allergic reactions and respiratory symptoms, like coughing and wheezing. However, lawyers, physicians, and people who claim to have a mold-related illness say that mold exposure can cause a wide variety of ailments, including headaches, poor memory, abdominal issues, static shocks, and depression. While correlation doesn’t prove causation, and extreme health claims often lack scientific support, mold’s potential side effects spook many home buyers.

## 2. To meet demand.

With many clients fearing mold's side effects, some inspectors try to steer clear of mold as much as possible. Others see mold's prevalence and clients' interest as investment opportunities.

Brian Thomas, President of A-Z Tech Home Inspections, Inc. in Pennsylvania, began to offer mold inspections in direct response to client demand.

"We were being told, 'My kids are allergic, I'm allergic, so we need to know if there's mold in this house,'" Thomas said. "Visuals are one thing, but if you don't do an air test, you're not really doing anything with mold."

By adding mold to its list of services, A-Z Tech acts as a one-stop shop for its clients so that, as its slogan promises, "one call does it all," Thomas explained.

In addition to providing a valuable service, mold inspections can expand a home inspector's business. mold inspections

"A lot of times, a mold inspection isn't related to the sale of the home," explained Robb Graham, President of the Professional Mold Inspection Institute (PMII) in South Dakota, which provides mold training and certification for inspectors and remediators. "If someone gets water damage or has moisture issues, they're not necessarily selling their home. [Offering mold inspections] allows you to do a similar type of service [but for] a different revenue stream."



## Mold inspection investments.

### Education & licensing

Inspectors and claims specialists alike recommend that home inspectors take a class that focuses on mold. Even if your state doesn't require coursework or certifications, the knowledge you obtain by taking a class about mold can differentiate your business, better your sampling and reporting skills, and manage your risk.

Periodically, The ASHI School offers a class about mold that covers the latest in sampling techniques and how to analyze microbial growth. The course is approved for 24 ASHI Continuing Education Credits. Check The ASHI School website for availability.

Other third-party training schools, like PMII and American Home Inspectors Training (AHIT), offer mold courses, too. Choose the best one for you based on your state requirements, interests, and budget.

Most states do not require mold assessors to have a license. But some—like Florida and New York—do. Be sure to check your state laws to see if your area requires licensure and what you need to do to obtain licensure.

## Equipment

There are two main ways in which home inspectors can sample for mold: surface sampling and air sampling. Most home inspectors take surface samples with swabs by gently rolling a swab on a surface they suspect may have mold. After taking the sample, home inspectors place the swab in a tube and send it to an accredited lab for analysis.

Many labs sell both mold testing kits and analysis to home inspectors. However, you can also purchase kits from third-party vendors and then select a lab of your choice. According to Home Advisor, for an estimated \$150 in equipment and lab costs per screening, inspectors made a national average of \$648 per mold inspection in 2020.

## Endorsements

An endorsement is a form that either modifies or adds coverage to your insurance policy. Most home inspection insurance policies exclude additional services like mold sampling. Thus, the insurance company will not offer coverage for those additional services without an endorsement. So, if you perform mold testing or want defense and indemnity for claims involving mold testing, you may wish to change an existing policy exclusion with an endorsement.

Typically, insurers charge a flat, annual fee around \$100 for a mold endorsement. However, some insurance policies offered by other providers may give you mold coverage outright with a sublimit.

Sublimits cap certain risks, usually additional services, defined in your insurance policy, which gives you less coverage per individual service. For example, say a home inspector that purchases \$1,000,000 / \$1,000,000 in coverage with a \$100,000 sublimit. That inspector receives only \$100,000 per claim and per policy period for mold-related issues. So, when choosing your coverage, be sure to take sublimits into account.



## Limiting liability against mold-related claims.

Mold claims are common and costly, inspiring the adage “mold is gold” to become commonplace in the insurance industry. According to the International Risk Management Institute (IRMI), the number of mold claims in general, including those against home inspectors, increased by more than 1,000 percent in some areas in 2004. Mold claims continue to be one of the most frequent claims we receive, and that doesn’t look to be changing.

Carrying a mold endorsement is one of the most important things you can do to protect against mold-related claims. However, there are additional risk management techniques you can employ to safeguard your business. Here are some suggestions.

## Set expectations

It’s important that your clients understand both mold and home inspections. In most states, home inspectors don’t have to do more than report when they do or do not observe mold. Mold

inspectors, however, should be able to provide more information.

“Giving your clients a report from the mold lab isn’t going to mean anything to the client because they don’t know anything about the types of mold and what [they] mean,” Graham said. “You have to understand what the lab is doing, how to analyze its results, and how to give that information to the client in a meaningful manner.”

Making sure clients receive and understand the inspection’s limitations will help them look at its results realistically.

## Have an advisement

What about inspectors who aren’t performing mold inspections, either because their clients opted out of the service or because they’d prefer not to sample for mold? How do they prevent meritless mold claims?

Our claims team recommends prominently including a mold advisement in your pre-inspection agreement. An advisement, which is often included with a limitation of liability clause, states what is and what isn’t covered in your inspection.

It’s important to make this advisement prominent to decrease the chance that your client could overlook it. Our claims team estimates that few inspection clients read the entire pre-inspection agreement. That’s why it’s essential you make any advisement stand out.

For example, our claims team suggests using boldface type or another color or font type to highlight the advisements related to mold in both your pre-inspection agreement and your report. Some inspectors our team has defended have included advisements in the footer of every page of their reports. It’s also smart to have the client initial any advisement to illustrate that the client acknowledges and understands the terms.

## Mold testing and your home inspections.

Is there a lot of public interest in mold in your area? Do you feel that you have a duty to your clients to protect them from mold-related illnesses? Are you looking for additional revenue sources and job security for your inspection business?

If you answered “yes” to any of these questions, perhaps it’s time for your company to offer mold testing.

**This article appears on the blog of the InspectorPro Insurance website. For more information or to view the original article with additional links click [HERE](#).**

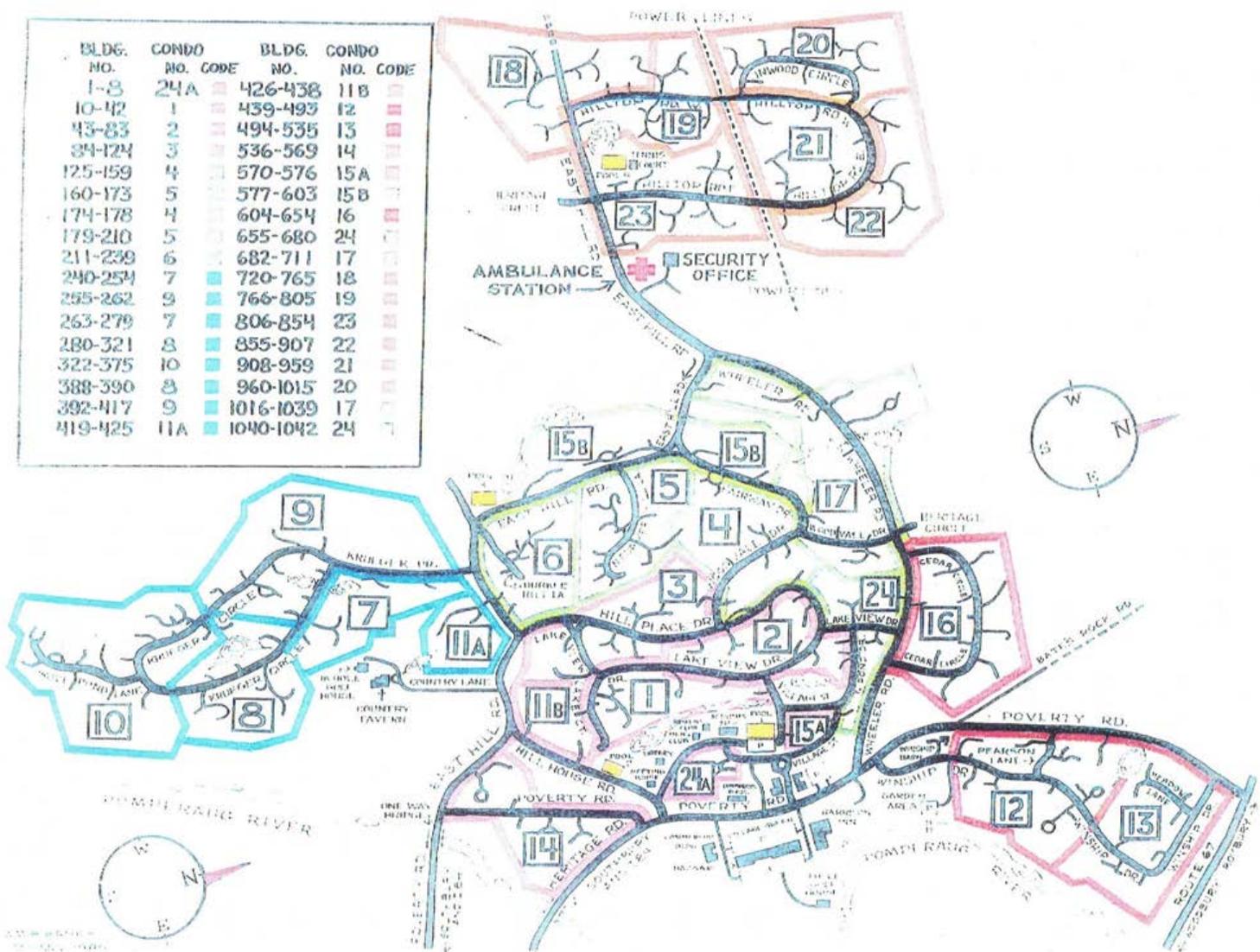
# Treasure Map or Fool's Gold

Al Dingfelder

Most of us who have inspected homes at Heritage Village in Southbury have encountered an intricate lack of organization in the numbering of the units there. 400s and 500s followed by 1100s while the 600s are a couple of miles in the other direction. Then 140 is in with the 300s. Ask a dog walker or exercise enthusiast for directions and they never know. They just agree there is no true organization. Maybe this is for security and privacy?

Last month I found the included map while inspecting a property north of this community. I have used it twice since then and the map delivered me easily and accurately while my GPS was garbled and stupid.

Hope this is useful to us all. If you have something better we can put it on our web site.





## Spray Foam Under the Slab

BY WADE PAQUIN

**For the past eight years** or so, we have been using closed-cell spray foam insulation (CCSPF) underneath our basement slabs to provide both insulation and air sealing. We don't do this on every project, but on most of the homes we build or renovate extensively, we will spray a minimum of 2 inches of spray foam (yielding at least R-14) directly on top of a crushed stone base, and then we place our concrete slab on top of it.

I like this method because it is a quick and easy way to insulate under a slab. On a recent job, for example, we insulated a 2,200-square-foot slab in just a couple of hours. If we had done this with 2-inch-thick rigid board—properly cut and properly taped, especially around all the concrete columns on this job—we would have spent nearly two days on just the installation.

That said, on this particular project, the cost of labor vs. the higher material cost of using CCSPF was a wash. On other projects that are not as complex, the higher material cost does make the job more expensive, but we save a lot of time and aggravation. More importantly, there are a number of performance benefits that I like: The foam locks into the subbase to create a monolithic base; there are no seams, or joints, so it's a continuous air barrier; and closed-cell foam is impervious to water and air, so it's a great moisture and vapor barrier. One added benefit that a lot of people don't think about, but is important in some locations, is that it is a great radon blocker, too.

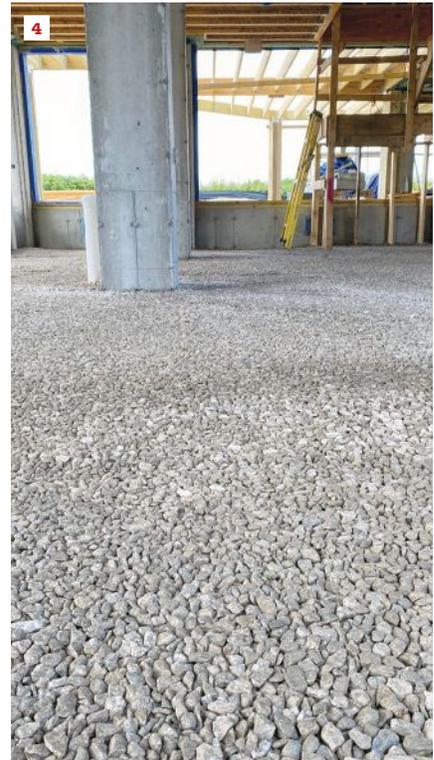
### BASE FOR THE FOAM

I've learned over the years to apply the spray foam directly to a crushed stone base, instead of to a gravel base. The reason for this is that the stone base has voids between the

Two inches of closed-cell spray foam provides not only good insulation but also a superior air and water barrier. The author has found that spray foam works best when applied over a compacted crushed-stone base.

Photos by Wade Paquin

On the Job / Spray Foam Under the Slab



Elevation lines on this foundation wall show the layers of the typical basement slab for the large custom homes built by the author (2). Over the compacted gravel subbase, crushed stone is spread and compacted smooth (3, 4) before the foam is applied (5). Note the foam is brought up the wall (6) a good 12 to 16 inches to get it well above the slab surface to tie in with the wall insulation and ensure a continuous seal.



While this slab on an older project uses wire mesh, the author has gravitated towards using fiber-mesh reinforcement to simplify the pour. Both will provide good reinforcement but must be coupled with saw-cut control joints (after finishing) to avoid cracking. With a solid base, reinforcement, and proper curing, the author avoids any visible cracks in the slab surface.

aggregate pieces that allow the foam to penetrate. This accomplishes two things:

1. As the foam expands, it fills the voids in the stone base, keeping the insulation layer anchored down and creating a monolithic substrate.
2. The combination of the stone and its voids helps the SPF installer maintain a relatively flat, even 2-inch installation.

If we were to apply the foam to sand or dirt that has a top layer of particles, the tensile strength of the foam curing will lift and curl on the edges. Applying to crushed stone helps keep the foam flat, which in turn helps the installer maintain a fairly flat surface of foam.

#### CONTROL JOINTS

One practice we do, which is needed on all slabs regardless of whether or not, or how, they are insulated, is to cut control joints in the slab to relieve any stress cracking or hairline cracks in the slab surface. Spacing of the control joints varies by the shape of the slab, but in general, for a 4-inch slab, joints should be 8 to 12 feet apart. The National Ready Mix Concrete Association recommends that spacing should never exceed 15 feet.

We typically also use expansion joints around the perimeter along the wall (to isolate the walls from the slab) and wrap expansion joint material around any interior concrete columns.

#### CONCRETE

We like to use a 3,500-psi, or even a 4,000-psi, mix with fiber-mesh reinforcement. We have been moving to fiber mesh for a number of years, getting away from using wire-mesh reinforcement. The wire mesh works well, and we've used it often in our slabs, but we like the fiber mesh better. Without needing to install the wire mesh and all the extra chairs required, we significantly simplify the pour. (Depending on the slab, we may also install rebar, as required by engineering.) Fiber-mesh reinforcing is a lot easier and cleaner than wire, yet provides a strong concrete mix. Coupled with the base, the foam, and those control joints, you end up with a successful slab pour and good long-term performance.

I am often asked, "Can the foam support the weight of the concrete?" The answer is absolutely, yes. The CCSPF has a PSI of 28.5, which is more than sufficient. In fact, when the entire process is done correctly, it can be used under a garage slab. We have used this overall application in several garages—and with two vehicles on a slab, there hasn't been even so much as a hairline crack.

*Wade Paquin runs WKP Construction, a custom home building and renovation firm based in Newport, R.I. Follow him on Instagram at @whp\_construction and on the BuildShowNetwork.com.*

# Inspection assets: How to store inspection contracts, reports, photos, and videos

By Stephanie Jaynes  
December 15, 2018



In Massachusetts, claimants alleged that a home inspector missed over \$30,000 in property damages. According to the claimants, the inspector failed to identify a bow in the exterior wall along with resulting water, structural, and pest damage.

The crawlspace that exhibited most of the issues was inaccessible at the time of the inspection, and the inspector noted the lack of access in his report. However, the claimants stated that the inspector still should have been able to identify the bow from outside the property. With their allegations, the claimants included several pictures of the exterior wall of the home where the bow was clearly visible.

The claimants' photographs were nearly identical to the ones the home inspector had in his files. Nevertheless, there was a striking difference: The inspection photos revealed that there was a large bush covering the bow on the day of the inspection.



## Why store home inspection assets

As illustrated in the claim above, it's important to store your home inspection assets, or the documents and graphics you create for and at each inspection. Inspection assets—such as photos, videos, signed contracts, and reports—serve a purpose long after your clients complete their real estate transactions. That's why our claims team recommends that home inspectors keep inspection assets for a minimum of five years, regardless of the statute of limitations in the inspector's area.

In our survey of 260 home inspectors, we asked the open-ended question, "Why's is storing inspection assets important?" See their responses in the graph below:

Overwhelmingly, survey participants cited four key reasons:

1. Claims, meaning claims prevention and resolution
2. Customer service, like the ability to answer questions about the property post inspection
3. Future reference
4. Requirement, such as a state requirement that inspectors keep copies of inspection contracts for a certain number of years

We go over the key reasons below.



## Claims

Liability does not end when you deliver your inspection report. Therefore, you must be prepared to defend your inspection findings with your inspection assets for at least five years after the original inspection date.

But why are inspection assets so crucial to defense?

“If it’s not documented then it didn’t happen,” said Daniel Cullen of Domicile Consulting, LLC in Illinois.

As Cullen suggests, inspection assets are key tools in a home inspector’s defense. Assets testify of the property’s condition on the day of the inspection. They provide factual evidence that’s difficult for claimants to dispute.

According to Blaine DeVoy of DBI Building Inspections in Washington, home inspectors are responsible for storing inspection assets to assist their insurers with claims prevention and handling.

“As an inspector, you have to be able to retrieve and look at what you said in a report, what photos or videos you chose to include or not include,” DeVoy said. “[You have to be able to] recall your impressions and bring up the signed agreement to help you and your insurer challenge or prevent a claim.”

Donn Anderson of Anderson Home Inspection in Wisconsin has had firsthand experience with inspection assets stifling claims.

“I’ve had several clients call back 6 months to three years after the inspection with complaints,” Anderson said. “Each time, I was able to either show a photo of the condition or their signature on the contract. That immediately defused the situations.”

Inspection assets can assist home inspectors in managing risk in a multitude of ways: by deterring claims, by resolving claims, and even by decreasing claims’ severity.

“Saving assets can mean the difference between a quick claim resolution and having to go to court,” explained Taylor Willson of Willson Home Inspection, Inc. in Florida.



## Customer Service

Many home inspectors use inspection assets to continue to assist their inspection clients long after they performed the inspection.

Darrell Clegg of Left Coast Inspections in California observed that inspection assets can serve as helpful reminders of what the property was like on inspection day.

“Most of us do at least two inspections a day five to six days a week. After a while the houses all run together in your head,” Clegg said. “It’s great to have that information to refresh your memory.”

According to James Brady of Inspector Express in Florida, inspection assets can help inspectors answer client questions.

“I always want to show clients that I did my due diligence,” Brady said. “While not all photos or videos may make the final inspection report, I keep them saved so, if a question ever arises, I have a record of my findings a home condition at the time of inspection.”

Saving inspection assets makes it more likely that you’ll be able to comment on and assist with client inquiries after your memory of the inspection fades.

## Future Reference

When asked why preserving home inspection assets is important, many survey participants answered simply: future reference.

We can’t say for sure what home inspectors meant when they left it at that. However, those that chose to expand mentioned using past assets as educational material. Others mentioned assets being great frames of reference for re-inspections.

## Requirement

Some home inspectors live in states that require them to keep inspection assets for a certain amount of time. However, it’s important to note that, while statutes of limitations can deter and defend

claims, they cannot prevent them. Clients can still make claims against your business long after your statute of limitations expires. (Within the last two years, we received a claim 18 years after the allegedly negligent home inspection occurred. Yes, years.)

“In Wisconsin, the law requires [inspectors to store inspection assets for] two years. But I have seen inspectors get sued five years later,” said Michael Schwitzer of 1st Choice Inspection in Wisconsin.

Further, statutes of limitations can change. While your state may say that inspection clients have two years to make a claim today, your state could change the law to allow clients five years to make a claim tomorrow.

“If a problem arises, you can’t really count on a statute of limitations protecting you [from receiving a complaint, even if] it’s written into your inspection agreement or even the Standards of Practice for your state. You need your inspection assets,” DeVoy said.

## The Five-Year Minimum

Thus, claims professionals urge home inspectors to keep inspection assets for a minimum of five years. We were pleased to see that about 63 percent of the home inspectors we surveyed are already keeping their inspection assets for five years or more. In fact, many respondents far exceeded the five year minimum proposed by our claims team, arguing that inspection assets should be kept for 10 years, as long as the property stands, or until their death.



One anonymous survey participant recommended storing inspection assets for at least five years after you are no longer in business, much like many inspectors carry an extended reporting period endorsement (“tail” coverage) after their insurance policy expires. (Read more about tail coverage here.)

John Paul de Oliveira of Home Sight Inspections, LLC in New Mexico took our anonymous survey participant’s suggestion one step further.

“Why not forever with the [low] cost of digital storage?” de Oliveira said.

While we applaud the efforts of de Oliveira and others to keep their inspection assets as long as possible, we realize that the space and cost associated with storage may make it difficult for many inspectors to keep inspection assets through the decades. Thus, we encourage inspectors to start

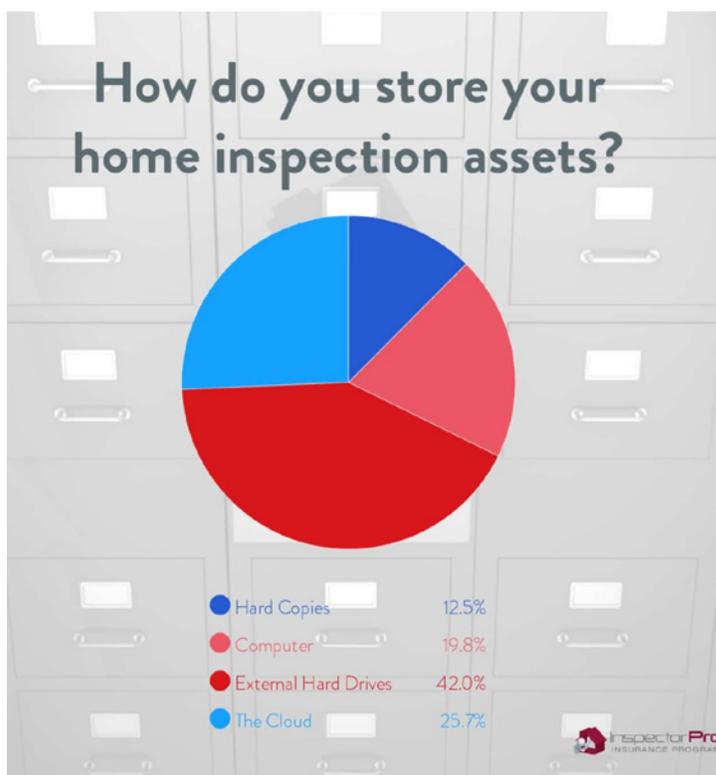
with the five-year minimum endorsed by claims specialists and to go beyond that minimum when it's desirable and achievable.

## How to store home inspection assets

There are many ways to store your home inspection assets. The primary methods are in hard copies, on the computer, in external hard drives, and in the cloud.

Not sure of the difference between each solution? Read our quick explainer graphic below

Now that you understand the common inspection asset storage options, you're ready to choose the best method(s) for you. See what the home inspectors we surveyed prefer below:



While the graph above depicts some preferences for some storage strategies over others, there is no mandatory method. In fact, many home inspectors store their inspection assets across storage methods.

“My reports are stored up in the cloud, but my pictures are stored on my computer,” said Richard Stockton of A Better Home Inspection Service, LLC in Virginia.

However, many industry experts suggest that home inspectors store their inspection assets in multiple locations to prevent loss.

“Always have them saved to at least two locations,” advised Mike Sanderson of Emerald Coast Inspection Services in Oregon. “I save all of my reports and photos in two different locations in the cloud: 1) on my report software company’s cloud and 2) on a [separate] cloud server service.”

## A quick recap



Your inspection photos, videos, pre-inspection agreements, and inspection reports aren't just for the property sale. These assets serve as key reference documents for both your clients and you. Securely storing inspection assets helps you to answer client questions and respond to allegations. Inspection assets are customer service and risk management tools that better your business.

Take a moment today to consider how you store your home inspection assets. What might you change to better protect you and your clients? Remember, our claims team urges home inspectors to keep inspection assets for a minimum of five years. We strongly encourage that you

follow their counsel. After all, you never know when you'll need that photo of the bush in front of the property's exterior wall.

Want to do more to keep your home inspection business safe? Apply for a no-obligation insurance quote today.

**This article appears on the blog of the InspectorPro Insurance website. For more information or to view the original article with additional links click [HERE](#).**

# Increasing Demand for Ultraviolet Market & Pandemic Challenges | WWD Weekly Digest



EPISODE 48



**OLIVER LAWAL**  
AQUISENSE CEO & IUVA IMMEDIATE PAST PRESIDENT

**BOB CROSSEN**  
WWD SENIOR MANAGING EDITOR

The coronavirus pandemic in 2020 had a profound impact on everything. For the ultraviolet market, this resulted in intense interest. Health officials wanted the technology for hospitals and doctor's offices to disinfect surfaces, meanwhile consumer businesses wanted to sell them to the public. All the while, water and wastewater facilities with the technology in place was competing for replacement lamps.

Oliver Lawa, CEO of Aquisense and immediate past president of the International Ultraviolet Association, discusses the challenges of competing market forces for ultraviolet equipment. He also touches on the growing value and demand for the latest UV technology — UV-C LEDs and excimer-based gas-exchange lamps — and how regulations for the water and wastewater industry could benefit those of other markets and verticals.

- Intro: (0:00)
- How the pandemic impacted and affected the ultraviolet market: (0:44)
- The challenge of multiple verticals competing for ultraviolet resources: (2:56)
- The balancing act of prioritizing resources across vertical: (5:10)
- Increased value in UV-C LED and excimer-based gas-exchange UV lamps: (6:42)
- Getting technology advancements into the hands of utilities: (11:05)
- Ultraviolet disinfection regulations and how they apply across verticals: (13:10)
- Outro: (16:25)

Click [HERE](#) to visit the WWD website and view the interview with Oliver Lawa.



After stripping the old roofing, workers covered the roof deck with peel-and-stick membrane to keep the structure dry during the project (1). Workers reinforced 2x12 framing that had been sistered to the old rafters with rafter ties so the roof could safely be lifted with a crane (2). To provide a “foundation” for the new roof, they set up a braced and leveled LVL frame on the ground representing the tops of the structure’s walls (3).

## Raising the Roof

BY ALAN SCHMIDT

**Recently, we added** a new master bedroom and bath to the upper level of the west wing of a vintage 150-year-old Vermont home, which had just been purchased by our clients. While the 22'-9" x 30' ell's foundation and first-floor framing were in fine condition, thanks to an extensive kitchen renovation project in 2009 (see “Replacing a Stone Foundation,” Mar/09), our clients had been instructed by their insurance agent to fix its slate roof when they had closed on the house. They also wanted to add shed dormers and move the knee walls out, thus increasing the footprint on the second floor and creating wall space for new windows for the master bedroom suite. All of the work would have to take place without disrupting the kitchen below.

**Prepping the roof.** The roof had been severely compromised due to the weight of slate sitting on roof framing that had been designed for cedar shakes. The slate had been installed directly over cedar shakes, in fact, so we started by removing both layers. Then we covered the roof sheathing with synthetic roofing underlayment to keep the space dry until we were ready to cut in the new shed dormers (1).

On the interior, we removed drywall and the dense-packed cellulose that had been used to insulate the walls and ceiling. This revealed hand-hewn 5x7 timber rafters, which had been reinforced at some point with sistered 2x12s. The rafters were pegged at the peak and nailed to the wall top plate on a roughly 3-foot-on-center layout (2). In order to cut in our clients' proposed 21-foot-wide dormer on the south-facing side of the roof and 12-foot-wide dormer on the opposite, north-facing side, we would need to install a structural ridge to prevent the walls from bowing out even more than they already were.

With no interior walls available to post up midspan support for a structural ridge, it would be next to impossible to “cut” the large dormer on the south side and the shorter dormer on the north side into the roof without exposing the structure to weather. Leaving the sheathing intact and installing a dropped ridge underneath the rafters wasn't an option either, because it would sacrifice much-needed headroom. And even if we could figure out these details without risking water damage to the kitchen below, we would still be left with the challenge of flattening, straightening, and resheathing what was left of the main pitch roof to accept standing seam roofing.

After sharing these discoveries with the client, I proposed the safest bet was to rebuild the entire roof system

Photos by Alan and David Schmidt



Workers tacked 2x6 plates to the LVLs and installed a double 1<sup>3</sup>/<sub>4</sub>-inch-by-14-inch LVL structural ridge, then framed the new roof with 2x12 rafters (4). The dormer walls were framed with 2x6s (5). Zip panels were used to sheathe the walls and roof (6), while temporary T-shaped rafter ties were added to the framing to reinforce the roof system during the lift (7).

on the ground, then use a crane to remove the old roof and set the new one in place. Catamount Crane Co., run by Cole Goyette, a good friend of mine, would be my go-to for “the big move.”

**Framing the new roof on the ground.** I started by mapping the overall size of the exterior walls and shot the elevations of the existing top plates with a laser. Each eaves wall had roughly a 1<sup>1</sup>/<sub>2</sub>-inch bow, caused by the weight of the slate, with the plates dropping around 3 inches from east to west (away from the house) along their 30-foot span. With only 2 feet of balloon-framed stem wall extending above floor height, we knew we couldn’t do anything to fix the bow in the walls without disturbing the ceiling and kitchen below. The elevations, however, needed to be trued back up in order for the new roof to sit level.

With the bowed walls and the odd size of the old, rough-sawn lumber framing, it was difficult to determine if the structure was square, and—if not—just how far out-of-square it was. My solution

was to use a laser to plumb down from the “peak” of the rafters to the old subfloor at either end of the building and use those marks to snap a centerline representing the center of what would become the ridge. Verifying that back to the corners that mated up to the main house, we were within 1/4 inch of square over 20 feet. That was within the tolerances needed to build our new structure truly square and make adjustments later.

Next, we built a 22'-9" x 30' frame out of LVLs in the parking area to represent the structure’s footprint (3), propping it up so that it was level. After squaring it up, we checked all four sides with a string line to make sure they were straight. Then we plated the two eaves walls of the LVL frame with 2x6s, which would eventually become the upper plate of the double top plate that we would install to cap the balloon-framed walls (4).

On the existing roof, the old rafters terminated at the very outer edge of the single top plate, with the soffit and roof overhang simply

## On the Job / Raising the Roof



On the day of the lift, workers cut the old roof into three sections, which they had reinforced with truss-like framing prior to removal (8). The lifting straps were threaded through small openings cut into the roof sheathing at the ridge (9). With the roof removed and the balloon-framed gable end walls exposed, the structure was ready for its new roof (10).

applied from outside. Initially, I thought that the soffit, fascia, and roof crown were still worth saving, if possible. However, I also wanted the eaves to be structurally sound, with the new rafters overhanging the wall plates and birdsmouth seat cuts in the rafters.

The position of the ridge was dictated by where it mated up to the main house, while the new roof framing was restricted by the needed clearance for the height of an interior door, which could not change. We didn't want to disturb the siding on the main house, and we wanted to keep the already-sided gable wall on the addition largely intact. That meant that the ridge height and roof pitch of the old and new roofs had to match exactly.

We ended up with a 7.5/12 pitch, with a 6<sup>1</sup>/<sub>2</sub>-inch HAP cut in the birdsmouth. Because we planned on double top plates, we had to remove 9<sup>1</sup>/<sub>2</sub> inches from the top of the existing walls in a level plane for the new roof structure to mate up to the old building.

For the structural ridge, we specified double 1<sup>3</sup>/<sub>4</sub>-inch-by-14-inch

LVLs, with 2x12 rafters and roughly 7-foot-long collar ties to form the ceiling. We dropped the ceiling in the lower level to make room for a recessed cassette heat-pump head. The dormer walls were framed with 2x6s, with LVL headers in the window openings (5).

We sheathed the walls with 7/16-inch Zip System sheathing and used 5/8-inch Zip T&G panels to sheathe the roof (6). At the peak, we cut the final course of sheathing to size and Zip-taped the joints, but we fastened the panels to the framing with only a few screws in each panel. That allowed us to remove the screws and fold the panels back so that we could rig crane straps to the ridge.

We had decided—with Cole's (the crane operator) input—that the roof system could be picked up from four points along the ridge. Since neither end of the structure would have a gable wall for support, we framed a series of 16-foot-long temporary strongback T-shaped 2x6 rafter ties, screwing them to the rafter pairs at the gable ends and to the rafter pairs flanking the short shed dormer. To reinforce the

assemblies, we posted each rafter tie up to the ridge and installed pairs of diagonals. Finally, to help resist the force of the walls and eaves wanting to fold inward during hoisting, we installed a full-width LVL fastened on each side to doubled window king studs, plating the LVL with 2x6s (7).

**Lifting day.** To reinforce the old roof system, we had fastened rafter ties to roughly every other rafter pair with structural screws. These reinforced rafters become our lifting points, as the wooden pegs at the peaks offered minimal shear strength. With Cole's 70-ton crane on site, we divided the roof into three sections, cutting down the rafter bays from the peak all the way through the top plate with a reciprocating saw. Knowing that we would eventually have to remove 9½ inches of studs below the top plate, we also cut horizontally through the studs at the upper board sheathing break (8).

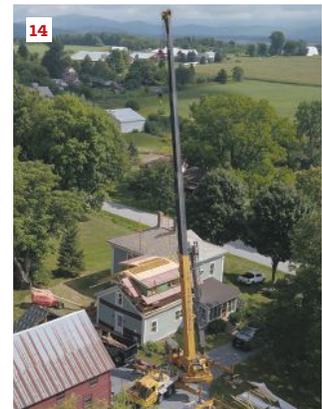
Next, we cut a small opening in the peak at the center of each section for the lifting strap to go through. Before lifting away each section, we installed a triple 2x6 beam underneath the section's supporting rafter ties. We also posted up from either end of the beam to the peak with 2x6s, effectively creating a pair of trusses that would support each roof section. Then we hooked the lifting strap to the beam and hoisted the roof away, section by section, relying on the small "windows" in the sheathing to guide the straps and keep the roof sections from rolling over (9).

With the roof out of the way and the wall framing exposed, we shot a laser line around the building and snapped out the new height needed for the existing studs to set the new roof system level. Then we cut the studs to the line with a 10¼-inch circular saw, creating our new level plane. Finally, we snapped a line on the board sheathing that was slightly below the height of the studs and cut to the line with a reciprocating saw. When making the seat cuts on the new roof rafters, we had cut secondary notches 3 inches below the seat cut to accommodate the sheathing.

The west-facing gable wall was now free-standing, but because it was balloon-framed, we felt comfortable leaving it loose for the time being while we nailed off the lower of the two top plates to the tops of the studs in preparation for the new roof (10).

**Flying in the new roof.** While the crew and I reinforced the new roof structure for hoisting, Cole unscrewed and folded back the finish course of Zip sheathing to expose the ridge and begin rigging his lifting straps. He hung a spreader bar off the crane's main hook with two 20-foot steel cables, then choked 40-foot-long straps to the ridge. The longer the strap (and therefore the shallower the angle between the lifting points on the ridge and the hooks on the steel cables), the less likely the straps would slide inward towards each other under the weight (11).

Because we had two different-sized dormers, the weight of the roof wasn't evenly distributed from side to side. So



Hung from a spreader bar, lifting straps were choked to the ridge at four reinforced locations (11). During the lift, a worker used a tag line to help position the suspended roof (12). A strap fastened to the large dormer and tensioned with a come-along kept the unbalanced structure level (13). Tucking the new roof's structural ridge under the main house eaves while fitting it into a beam pocket in the existing framing was tricky (14).

## On the Job / Raising the Roof



To match the new roof trim to the out-of-level ell, workers had to remove the existing soffit and fascia (15) and install a secondary frieze board molding detail, complete with new fascia, soffits, and crown molding (16, 17). The dormers were clad with gapped shiplap siding, and a new standing seam metal roof was installed (18). On the interior, new partitions were framed for closets and a master bathroom, and the wall cavities and rafter bays were sprayed with closed cell foam insulation (19).

a test pick was performed, during which we used another strap hooked to the long dormer and a come-along to balance out the heavy side (12, 13). At the same time, we adjusted the lifting straps so that the east side—the side mating up to the existing house—would be slightly lower than the west side, providing the geometry needed to tuck the ridge under the eaves of the main house while clearing the free-standing gable wall at the other end (14).

On the east side, we had framed the LVL ridge 4 inches long to allow us to post up to the ridge inside the interior wall of the main house. Unfortunately, the extended ridge became a bit of a headache, as we didn't have enough clearance between the east strap near the end of the LVL and the eaves above to join up to the main house without the strap hitting the eaves. Because the east side was lower, we were able to set it down temporarily, taking just enough weight off the strap to be able to slide it over to the other side of the rafter bay that it was rigged to. Then we picked the structure back

up and slid it over into its final position on top of the new plates. Once we nailed the plates together, we unhooked the straps, cut the sheathing to length against the main house, folded the roof sheathing back into place, nailed everything off, and taped all the joints with Zip tape. It was a long day, but now we were watertight (15).

**Stitching the pieces back together.** Due to the ell's out-of-level condition, we had to remove the existing soffit and fascia. To match the new trim with the old and hide the problem, we installed a secondary frieze board molding detail, complete with new fascia, soffits, and crown molding, finished off with a new standing seam metal roof (16, 17, 18).

On the interior, after framing new interior partitions for closets and a master bath, we roughed-in new plumbing and electrical. Then we air-sealed and insulated the space with spray foam (19).

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Rev. 2018

## Indoor Air Quality Testing Should Not Be The First Move

Many times, office workers, homeowners, renters, teachers, parents, administrators and other school stakeholders want to have their building "tested" to assure themselves of "good indoor air quality". This is usually not the first move that responsible parties should make. Why do health professionals recommend caution and a great deal of thought before testing the air? There are a number of reasons.

### ◆ There Are No Standards

- There are no appropriate standards for indoor air quality (IAQ) in environments such as schools, office buildings, and residences [not including asbestos, lead, and radon].
- There are some industrial standards for permissible exposure limits for certain chemicals used in manufacturing and other work place settings, but these standards should not be used for children, sensitive populations such as pregnant women, the elderly, or people with certain illnesses. They should never be used in residential settings.
- There are no health-based standards for indoor levels of molds because there is great variability in both people's reaction to mold and in mold species themselves. There is no scientific support for designating a particular mold measurement as "safe" or "unhealthy."
- The most current ventilation guidelines for acceptable indoor air quality are just that - *guidelines*. They are not enforceable unless they are part of the building code. Newer buildings are generally designed according to newer ventilation guidelines, but older ones built to a building code in existence at the time of construction (especially pre-1989) may be outdated.

### ◆ The Lack Of Enforceable Standards Makes Interpretation A Tricky Business

*It is difficult to interpret the results of air testing. This can add to the confusion and create an air of mistrust between the stakeholders and the administration that ordered the testing.*

- ⇒ Testing as a first response does not usually lead to an answer or solution. Very often air testing is conducted as a knee-jerk reaction to a reported IAQ problem. Such testing done in the absence of a hypothesis or as part of a well-planned investigation usually produces data that raises more questions that it answers. It can raise expectations that a solution will follow, and subsequently raises suspicions if no answer is found.

- ⇒ Background Exposures – Most indoor pollutants (mold, particles, volatile chemicals) are present in all buildings at “background” levels. These contaminants are present in most buildings without causing adverse health effects. Testing indoor air will therefore always find something, usually background levels that have no significance with respect to reported health complaints.

**Therefore, DO NOT TEST IF:**

- the results cannot be interpreted**
- results will add no meaningful information**
- just because someone wants it done**

**◆ What Is The First Step In Creating A Space With Good Indoor Environmental Quality? What Should You Do Before or Instead of Air Testing?**

- ⇒ Walk through the building using your eyes, nose, and common sense to identify potential problems.
- ⇒ Look at general cleanliness (or lack thereof) in each of the areas you inspect.
- ⇒ See if building services can substitute cleaning agents that have less of an odor (low VOCs – volatile organic compounds) than the stronger, odor-producing ones that may be in use.
- ⇒ In addition to bedrooms, bathrooms, classrooms, offices, gymnasiums, locker rooms, auditoriums, music rooms, industrial and fine arts rooms, etc, also look at maintenance areas such as janitor closets, mechanical rooms that house ventilation equipment, chemical storage closets in labs and in custodial areas, etc. Do not store chemicals near ventilation equipment.
- ⇒ Take note of where carpeting is used. How is it cleaned, and how often? Does it ever get wet from flooding, roof leaks, etc, and if so, how quickly is it dried out?
- ⇒ Walk around the outside of the building and look for potential pollution sources.
- ⇒ Look for locations of fresh air intakes and exhaust vents. Are they too close together, allowing exhaust air to be sucked back into the building via the intakes? Are the intakes located near dumpsters or where busses, trucks or cars idle?
- ⇒ Look at how the building is set on the land. Does the land slope downward towards the building, allowing rainwater to pool along the foundation? Is the building located on former swampland or landfill? Is there a high water table or underground stream under the building? Is landscaping too close to the building?

All of these things can have an impact on indoor environmental quality. Here are some additional things that should be done early on, before resorting to actually testing the air.

2

For schools, [EPA's Tools for Schools](#) program should be instituted as a preventative framework for identifying and addressing problems early before they become unmanageable. The [National Center for Healthy Housing Principles of Healthy Homes](#) provide a similar framework for residential properties.

- **Examine Building Usage**

Compare the hours that the building is actually used with any automatic timers that may be set to turn the mechanical ventilation systems on and off, and make adjustments as necessary. Those who schedule building usage for activities must be sure to communicate this to facilities management. Mechanical systems should be turned on early enough in the morning to let these systems attain full capacity by the time school or work begins.

- **Ask About Maintenance Service Contracts**

Schools and offices often have service contractors to take care of certain parts or all of the physical plant. This is especially true for the ventilation equipment. You can ask questions about how often filters are scheduled to be changed, and about what other components are included in an annual service contract (be sure to ask to see the maintenance log for proof of when this work was completed).

If your facility subcontracts out janitorial services, find out what is included in the contract. Ask about the cleaning agents they use and request them to use products with low VOCs.

- **Plan Minor Renovations During Off-Hours**

- Schedule minor jobs such as painting, floor re-surfacing, carpet installation, etc. during hours when school is not in use.
- Use low VOC paint, glues, polyurethane, and other building materials whenever possible. Limit the use of particleboard, pressed wood and plywood containing formaldehyde. If you do use these woods, make sure that they are “CARB II compliant” (low formaldehyde emissions).

- **Build Communication Into Large Renovation Projects**

- Before major renovation projects are scheduled, meet with office workers, principal, teacher representative, school nurse, facilities director and local health director in your town or district. Set up a plan for communicating relevant information to everyone who may be affected. This includes workers, parents and students.
- Plan to do as much work as possible during non-school or non-business hours.
- Isolate construction areas from non-construction areas using barrier techniques to minimize contamination in areas that will be used for normal school or office activities.

Much of the time, a building assessment should be performed to identify basic problem areas. Once these areas have been identified, you then may decide to call in the professionals. However, as a first cut, here are some things you can do yourself.

## • What You Can Do Yourself

- Implement [EPA's Tools for Schools Program](#) or the National Center for Healthy Housing's [Principles of Healthy Homes](#) .
- Develop proactive risk communication
- Do routine scheduled maintenance on building mechanical and plumbing systems, *especially on HVAC* (heating, ventilation and air conditioning) *equipment*
- Remove pollution sources
- Substitute odorous products with those containing low VOCs whenever possible
- Fix all leaks *promptly!*
- Remove and discard all porous materials damaged by water. This includes ceiling tiles, carpets, furnishings, cardboard, and even wallboard.
- Schedule repairs/renovations during off hours

## • When *Is* Indoor Environmental Testing Useful?

Once a problem has been identified, the solution may be thought of as a puzzle. There are many pieces, and air sampling for certain things may be one of them. There is no single magic box to sample all indoor contaminants. Part of the puzzle is in figuring out which (if any) contaminants may be contributing to the problem. This requires more information, which may be obtained by conducting a building walk through, taking a history of the physical plant and any past and present maintenance problems, history of building usage and land usage on the property and surrounding neighborhoods, review of architectural and mechanical blueprints, interviewing maintenance staff, and anything else that would add information about the physical structure of the building and activities that go on in and around the building.

It may also be useful to interview the building occupants. Ask for their help in identifying problem areas. Set up good lines of communication between management, staff, and parents. This is crucial and cannot be over emphasized! Ask the school or company nurse if she/he has observed or documented an increased incidence of health complaints. Are the complaints specific or more generalized in nature? It may be desirable to do a symptom survey if lots of people are affected. Your local health director can help coordinate these activities.

When all of the practical steps and investigations described above have been conducted, there *may* be a place for air testing for specific contaminants. Air testing may be used to confirm or refute a hypothesis or highly suspected source , such as one uncovered during the walk-through inspection.

Air testing is most useful when a specific contaminant or contamination source has already been identified as a likely culprit, and quantitative data are needed to:

- Document the degree or extent of the hazard, or
- Document different locations in a building where elevated levels or severe conditions exist.

Air testing may also be useful in a qualitative manner when trying to differentiate between several suspect chemicals or sources. Although air testing is sometimes useful in tracking down chemical sources, air testing for mold is an entirely different story. The many different mold species present in our everyday environment complicate matters when interpreting air test results for mold. Most of the time, you will find that molds normally found outdoors are also present indoors. This is because they are carried in on our clothing and shoes, and also enter building interiors via open windows, doors, and fresh air intakes.

**So, to review, indoor air testing may be useful when:**

- ❑ **It is part of an overall evaluation**
- ❑ **When the data is interpretable**
- ❑ **When the data has a descriptive component that helps to illustrate its place in the overall evaluation**
- ❑ ***NEVER alone***

After undertaking the steps described above, you may find it necessary to hire one or more professionals. Remember that varied problems may require more than one type of specialist. For example, you may need a ventilation engineer, or a moisture specialist, or an architect, or an industrial hygienist, or an environmental/ geology consultant. Here are some tips to follow when hiring a consultant.

- **When You Have To Call In A Consultant**

- Discuss the problem with your local health director, and enlist their help with risk communication to all of the stakeholders. He/she may also be able to help you select the right kind of consultant for the job at hand.
- Review the American Industrial Hygiene Association (AIHA) consumer brochure: [Guidelines for Selecting An Indoor Air Quality Consultant](#).
- Have a clear understanding of the problem, so that you can direct the consultant properly.
- Make sure the consultant explains the scope of the project up front - what they can and cannot do. Communicate this to all of the stakeholders so people will have a realistic expectation about the process.

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