



Center for Innovative School Facilities of Oregon

A Project of Innovation Partnership

Indoor Health and Air Quality

The following was excerpted from the comments of two experts in the field of indoor health and air quality: Andy Frichtl, Interface Engineering and Neal McEachin, Vik Construction. Each individual offers their own unique point of view and information on the topic of indoor health and air quality. The following brief does not reflect any one perspective but instead offers a general overview of the different perspectives.

Introduction

According to the November 2002 study done by the National Clearinghouse for Educational Facilities, our schools have an average age of 50 years old. The study also found that on a given school day, 20% of Americans spend time in a school building. This percentage, coupled with the average age of schools, leads to low comfort, poor indoor air quality (IAQ) and noise which can all affect student and teacher's ability to perform.

HVAC Systems¹

Heating, Ventilation and Air Conditioning (HVAC) systems are the standard air circulation system in most schools nationwide. Much is known about HVAC and how it works and a lot of this is focused on problems that exist with HVAC systems. One such problem is poor ventilation effectiveness. This results in inadequate IAQ. Another problem with HVAC systems is the stratification of the air amongst a classroom. This results in uneven temperatures throughout the room creating a heating comfort problem, excessive energy use, and poor IAQ. HVAC systems also have a problem with being too noisy. This reduces the environmental quality of the room. HVAC systems also have poor filtration efficiencies that result in increased particulate concentrations. Cross contamination, specifically from occupant to occupant and classroom to classroom, is also a common problem that HVAC systems create.

A solution to these problems comes by way of displacement ventilation, which uses the natural buoyancy of warm air to provide improved ventilation and comfort. This process requires an integrated design process for proper implementation. All of the aforementioned problems with HVAC have possible solutions when implementing displacement ventilation. Poor ventilation effectiveness can be solved with ventilation being delivered to the occupied zone, where students sit, and not elsewhere in the room where its effect is not felt. Solving the stratification problem involves heating at the perimeter of the room and a significant energy use reduction. Lowering sound levels and keeping systems clean and functioning properly will reduce the noise from HVAC systems, resulting in better environmental quality. Installing MERV 13 filters, which have a medium efficiency and are most practical for commercial and institutional uses, will increase filtration efficiencies. Making sure all room air is exhausted through a heat recovery

¹ The following has been adapted from a presentation delivered by Andy Frichtl, Interface Engineering. The presentation was delivered at the Bonds & Ballots Conference; 1/24/08, Salem, OR.

unit is an effective way to lower levels of cross contamination. This will also displace contaminants.

Risk Management & Insurance²

It is important for an entity to know what their insurer can do for them. First and foremost, an insurer can review an entity's coverage to make sure the entity understands their options. An insurer can write the entity checks whenever the entity needs something. Two things an insurer can fund are extra expenses covered in a policy as well as covered repairs or replacements. An insurer can identify recovery damage while also assessing building damage. Something else an insurer can do is to identify specialty contractors for jobs like removing asbestos.

Insurance is a valuable policy to have in the case of structural damage caused by water damage. Insurance is defined as a promise of compensation for specific potential future losses in exchange for a periodic payment. Insurance is designed to protect the financial well being of an individual, company or other entity in the case of unexpected loss. State laws require some forms of insurance, while other forms are optional. There are several strategies in dealing with insurance that cater to an entity's need and personal preference. The first option is to transfer the risk, thus giving it to an insurance company that is well equipped to handle it. The next option is to simply insure the risk and cover all liabilities. A small business can choose to self-insure the risk and put away money and resources for their own insurance. Finally, an entity can choose to go bare on coverage and take no insurance at all. What is most important and what applies specifically to water damage is having the entity know what insurance coverage they have for mold losses.

Understanding an entity's insurance coverage is very important when assessing property damage. The entity first has to know what is covered and if the insurance amounts are for replacement or actual value. The entity must also know how much their deductible is. With this, they need to know what are considered covered contents and extra expenses. Knowing what is excluded is also crucial to properly claiming insurance. To help this, an entity should keep current on their schedules for their property/facilities, automobiles, equipment and special coverages. Finally, an entity must review their insurance annually. They must do this both by department and with a local insurance agent.

Weather-Related Damage

Inclement weather in Oregon provides homes and school buildings alike with various structural problems due to violent winds and rains that batter all areas of the Northwest. These problems clearly affect a building's indoor health and air quality, especially if ignored and left untreated. This weather provides buildings with various risks that need to be assessed in order to maintain a healthy indoor air quality. Risk management, the process of analyzing exposure to risk and

² The following has been adapted from a presentation delivered by Valerie Saiki, City County Insurance Services. The presentation was delivered at the Bonds & Ballots Conference; 1/24/08, Salem, OR.

determining how to best handle such exposures, is the safest and most efficient way to assess weather damage. Many counties in Oregon experience severe flooding like those coastal communities experienced in December of 2007. This can leave up to 500,000 residents powerless as well as creating irreversible damage for homes and school buildings. It is very common for water to seep through a crack in the foundation of a building and, if left untreated, cause thousands of dollars of damage. This water intrusion leads to mold, a very serious insurance risk. To help stop the risk of mold, Oregon entities should expect water intrusion from weather such as rain, floods, snow, ice/freezing and wind. Those entities that live on the Western part of Oregon and on the coast should expect intrusion from severe weather as well as the general wet climate that they experience.

Indoor Air Quality – Mold & Mildew³

Mold has become an increasing concern for occupants of publicly owned and leased buildings, but in reality, mold is just a part of overall air quality in Oregon. For molds to occur on a surface, the temperature must be between 40 and 100 degrees, there must be mold spores, there must be a nutrient base, and there must be moisture. There is no practical way to remove all mold and fungi from a building.

Most common molds are not hazardous to individuals, however people with allergies, asthma, and weakened immune systems may experience allergy-like symptoms. There are no Federal or State regulations for evaluating the potential health effects of mold and fungal contamination nor any mandated guidelines for remediation. Molds can become a problem in a building when there is excessive moisture. Removing the source of moisture through either repairs or dehumidification is critical. Identifying and repairing leaks is also critical. Wet materials should be dried and cleaned within 24-48 hours. Absorbent materials like ceiling tiles, drywall and carpet may have to be replaced.

When cleaning up mold, surfaces should be cleaned and dried completely. Mold can be washed off hard surfaces with detergent or bleach and water. The New York City Department of Health Fungal Remediation protocols are often used as a standard for remediation. That resource can be found [here](#). If outside contractors are hired to clean up mold, be sure to check their references and make sure they follow accepted guidelines.

When evaluating HVAC systems and mold is present, indoor humidity should be reduced to 30-60%. This can be achieved by venting moisture-generating sources to the outside, increasing ventilation, using exhaust fans or insulating to reduce the potential for condensation. The factors that determine relative humidity are often misunderstood. However, a knowledgeable HVAC specialist can be a building owner's best source of information on the subject.

³ The following has been adapted from a presentation delivered by Neil McEachin, Vik Construction Company. The presentation was delivered at the Bonds & Ballots Conference; 1/24/08, Salem, OR.

Mold Remediation Checklist

Investigate and evaluate moisture and mold problems

- Assess the size of the moldy area (square feet)
- Consider the possibility of hidden mold
- Clean up small mold problems and fix moisture problems before they become large problems
- Select remediation manager for medium or large size mold problem
- Investigate areas associated with occupant complaints
- Identify source(s) or cause of water or moisture problem(s)
- Note type of water-damaged material (wallboard, carpet, etc.)
- Check inside air ducts and air handling unit
- Consult a qualified professional if necessary or desired

Plan remediation

- Adapt or modify remediation guidelines to fit your situation; use professional judgment
- Plan to dry wet, non-moldy materials within 48 hours to prevent mold growth
- Select cleanup methods for moldy items
- Select Personal Protection Equipment – protect remediators
- Select containment equipment – protect building and occupants
- Select remediation personnel who have the experience and training needed to implement the remediation plan and use Personal Protective Equipment and containment as appropriate

Remediate moisture and mold problems

- Fix moisture problem, implement repair plan and/or maintenance plan
- Dry wet, non-moldy materials within 48 hours to prevent mold growth
- Clean and dry mold materials
- Discard moldy porous items that can't be cleaned

Questions to Consider before Remediating

- Are there existing moisture problems in the building?
- Have building materials been wet more than 48 hours?
- Are there hidden sources of water or is the humidity too high/high enough to cause condensation?
- Are building occupants reporting musty or moldy odors?
- Are building occupants reporting health problems?
- Are building materials or furnishings visibly damaged?
- Has maintenance been delayed recently or has the maintenance plan been altered?
- Has the building been recently remodeled or has building use changed?
- Is consultation with medical or health professionals indicated?

Finally, it is important to avoid exposure to and contact with mold and to always use Personal Protective Equipment.