Addressing and Detecting Hazards from Mold Transcript

Topic 2: Causes of Mold Growth

Slide 1: Title Slide – Causes of Mold Growth

Slide 2: Topic 2: Causes of Mold Growth

Welcome back. This is Topic 2 of the training on Detecting and Addressing Hazards from Mold. In this segment, we will discuss the causes of mold growth.

Slide 3: Topic 2 Objectives

Under this topic, we will provide examples to help identify the environments in which mold develops and grows. We will talk about the types of surfaces mold grows on and what it needs to grow. We'll describe the best weather conditions or temperatures for mold to grow, and we'll discuss factors affecting the growth of mold in buildings.

Please follow along in your handbook under Topic 2.

Slide 4: Conditions for mold growth: moisture, food, temperature, and time

Molds grow indoors if the right organic material is inside a building. However, four conditions must be just right in order for mold to grow. You need moisture, food, temperature, and time.

Let's talk first about moisture. Common sources of moisture include roof leaks, condensation from high humidity or cold spots, plumbing leaks, floods, humidification systems, and occupant behavior.

Mold does not need much moisture to grow. Evaporative cooling systems and window air conditioning units can be a source of mold, so it's important to regularly check the filters on

those systems. Some systems have humidifiers that throw moisture into the air. These should be monitored to prevent over humidification.

Also, consider the type of windows in the home. Wood frames are most susceptible to mold because they can crack and hold moisture. Double paned windows may retain moisture on the inside from condensation if the seal becomes weak or broken.

Here you have an image of mold growth inside the seal of a washing machine. The water seal of the washing machine provides a perfect environment for mold to grow. All four conditions are there: moisture, food, temperature, and time.

Slide 5: Conditions for mold growth (continued)

Buildings contain an abundant supply of food, making it impossible to eliminate all sources of mold growth.

Moisture influences mold growth the most. Some mold can germinate, grow, and produce spores in as little as 24 hours after water damage occurs.

Mold can grow on virtually any organic substance. Organic material in buildings include paper, cloth, wood, plant material, and soil.

Mold can also decompose surface dirt, dust, grease, and other deposits on concrete, glass, and metal. When you see mold growing on glass, it's not because the mold is able to break down glass, but because the mold can obtain nutrients from the dust or other organic material that clings to glass.

Mold grows well in temperatures between 40 and 100 degrees, and especially between 70 and 90 degrees.

Slide 6: Cold damp basements

Here are some photos taken in a basement. Cold damp basements provide great potential for mold growth. Basements get damp and cool in the summer, making carpeting a bad idea in the basement. It is difficult to keep the area dry without a de-humidifier. Dampness, coupled with the fluctuating room temperature, creates perfect conditions for mold.

A couple of slides ago we saw mold on the water seal of a washing machine. Where else might you see this type of mold growth? A really common place is the rubber seal (or gasket) on the refrigerator door. If the seal is weak, cold air comes out and meets warm air and creates condensation. Mold will grow unless that seal is replaced or repaired.

Slide 7: Wet laundry in the bathroom

In some cases, occupant behavior can contribute to mold growth. Residents can do things that create an environment for mold, such as leaving food out, having dirty dishes sit in the sink, or leaving towels on the floor. They might keep a bathroom closed up after a shower, trapping warm, moist air.

Here you see pictures of laundry hanging in a bathroom. Leaving damp clothes in the bathroom can trap moisture.

It doesn't take long for mold to take root. If you walk into a room and notice a human behavior issue that could cause a problem, talk to your supervisor. Maybe you can get the property manager or resident services involved to help educate the resident.

Slide 8: Oven as a heating source

Sometimes people use their kitchen ovens for heat. Of course, this is a safety issue. It may also indicate a problem elsewhere, like a faulty heating system. In addition to being dangerous, using an oven to heat can create a temperature gradient between the kitchen and the other rooms, resulting in condensation and potential mold growth.

Slide 9: Effect of warm, moisture laden air currents

Here is an extreme image of mold growth on a ceiling and wall. A steam heater leak can cause a problem like this, with mold following the path of the warm and moist air flow.

Slide 10: Factors Affecting Building Environments

Buildings are dynamic, and the environment within a building is constantly changing. Building environments are influenced by geographic location; season and weather conditions; the age and design of the HVAC system; moisture intrusion; pest colonization; and human activity.

What is moisture intrusion? It means water is coming in from somewhere. It could be rain from outside or moisture from the building's systems.

Why should pest colonization create a condition for mold growth? Roaches or mice, and other pests leave feces behind in areas most likely to be warm and moist, creating three of the elements necessary for mold growth: food, moisture, and temperature. The fourth element—time—is of course the length of time the infestation is present.

Slide 11: What to consider when looking for mold in buildings

Some areas you might consider investigating when looking for mold in buildings include construction flaws; systems or components that are damaged or inoperable; evidence of deferred or delayed maintenance; boarded or closed off rooms; and occupant activities, such as the behaviors we spoke of earlier.

Slide 12: Flood line mold

This slide shows mold growth up to a flood line. Often this level of mold intrusion is not fixable by simply cleaning the surface. In cases like this, it would be best to call a third party professional to do remediation.

Slide 13: Tile grout

Here we see mold in tile grout, which is extremely common. Mold grows in grout easily because of the porous surface, and because bathrooms typically have a continuous source of moisture.

Slide 14: Damp areas in cabinets

Another spot to look is inside cabinets where there are pipes. This is because of condensation or leaks and limited airflow. Mold can eat through the wood and metal if left long enough. Simply cleaning and repainting wood doesn't actually solve the problem, it just traps the mold inside, and it may eventually re-surface.

To prevent mold growth on lumber and wood, the moisture content of the wood needs to be below 20 percent. Using a moisture gauge or a dehumidifier in places where you store building materials can help keep moisture at a level less conducive to mold growth.

Slide 15: Creating mold growth conditions

Here is an example of deferred maintenance on a leaking faucet. That cloth is simply holding moisture from the leak, potentially creating a mold problem. If you see something like this when you come into a unit, it is worth fixing, even if you are there to take care of an unrelated issue. Think of moisture intrusion like a health and safety concern and try to address it right away. In many cases, a quick and low-cost fix can help avoid a mold problem down the road.

Slide 16: Creating mold growth conditions (continued)

If we were able to look behind the paneling here in this image, we'd likely find all four of the elements needed for mold growth: moisture, food, temperature, and time. The cold water from the AC unit meets the warm air in the room and condenses. You aren't going to see it behind the wall so it will have plenty of time to grow.

Slide 17: How water enters buildings

Water can enter a building as a liquid or a gas. In areas like kitchens, bathrooms, and laundry facilities, water can be introduced accidentally through leaks and spills. Smaller amounts of

water vapor enter buildings through building features such as leaky roof assemblies or poorly flashed or improperly installed windows and doors.

Slide 18: Relative Humidity

Mold does not need standing water to grow, but can be influenced by relative humidity, sometimes called “RH” for short.

Relative humidity is a percentage that represents the amount of moisture present in the air relative to the maximum amount that the air can hold at a specific temperature. Condensation occurs when the relative humidity reaches 100%.

The indoor relative humidity should be between 30 and 60% to prevent mold growth.

Slide 19: Condensation

In this slide, we see condensation on a window. Condensation occurs when the relative humidity reaches 100%. In this case, it could be that warm air on the inside is hitting a cold window and creating the condensation. To control condensation, we need to prevent warm, moist air from contacting cool surfaces.

Slide 20: Relative Humidity (Continued)

Relative humidity and temperature will vary within a room, with the cooler side of the room having a higher relative humidity.

The highest relative humidity in a room is next to the coldest surface. Typically, in winter, the coldest surface in a room is an exterior wall. The temperature of the exterior walls varies with exterior temperatures because of gaps in wall insulation. In contrast, interior walls typically carry the average building temperature.

Local cold spots, along with water intrusion, may allow the relative humidity of air next to a surface to exceed 70%. To control relative humidity, you want to prevent warm, moist air from contacting cool surfaces.

Slide 21: Controlling condensation in cold climates

How can you control for condensation in cold climates? You can use insulation to prevent large temperature differences between the outside air and the inside surfaces. Properly installed insulation keeps the temperature differential down.

You can also install a vapor barrier for damp proofing. The vapor barrier should be on the warm side of the insulation (that is, toward the inside) to stop warm, moist air from condensing on a cold surface inside the wall.

You can also use ventilation to reduce interior moisture levels.

If possible, avoid using humidifiers. If a humidifier is not cleaned regularly, it can grow mold inside. If that happens, the fan will throw mold spores into the room.

Slide 22: Controlling condensation in warm climates

To control condensation in warm or humid climates, you can install a vapor barrier on the exterior side, blocking the vapor from the humid outside air that may seep into the walls or ceilings.

You should try to avoid excessive cooling. Some people like to keep the AC really cold. If the AC unit is not equipped to control the amount of moisture in the air and is set at an extremely low temperature, it can produce cold damp air. This cold, damp air can then create condensation on surfaces exposed to the outside warmer air.

Finally, avoid using impermeable vinyl or other wall coverings on interior surfaces, as these can trap moisture.

Slide 23: Topic 2 key takeaways

There are several key takeaways from this topic.

The first takeaway is that buildings are constructed of materials that are rich in nutrients that support mold growth. This means once a building is affected by moisture intrusion, mold can start growing in very little time.

Mold can grow on organic material, feeding off that material directly, but it can also grow on inorganic materials, such as glass, by feeding off surface dirt and dust.

It is difficult to manipulate temperature, food, and time to control microbial growth, but you can control moisture. Controlling leaks is critical but remember that mold does not need standing water to grow. Excessive humidity can also cause mold growth. To reduce mold growth, we need to take steps to keep indoor relative humidity to between 30 and 60%.

Slide 24

That completes training Topic 2, Causes of Mold Growth. Please continue to the next video for Topic 3, which discusses health concerns associated with mold.