Moisture and Humidity in Campus Buildings:

Early Detection and Intervention Are Key to Preventing Serious Problems

BY GRETE HEIMERDINGER

Outside of steam saunas, high levels of moisture and humidity in buildings are undesirable on many levels. Beyond making the interior atmosphere uncomfortable, moisture can pose real dangers to the health of your structures. The standard accepted range for relative humidity is between 30% and 50% at a temperature of 600F to 800F. Deviation from those values can have serious consequences.

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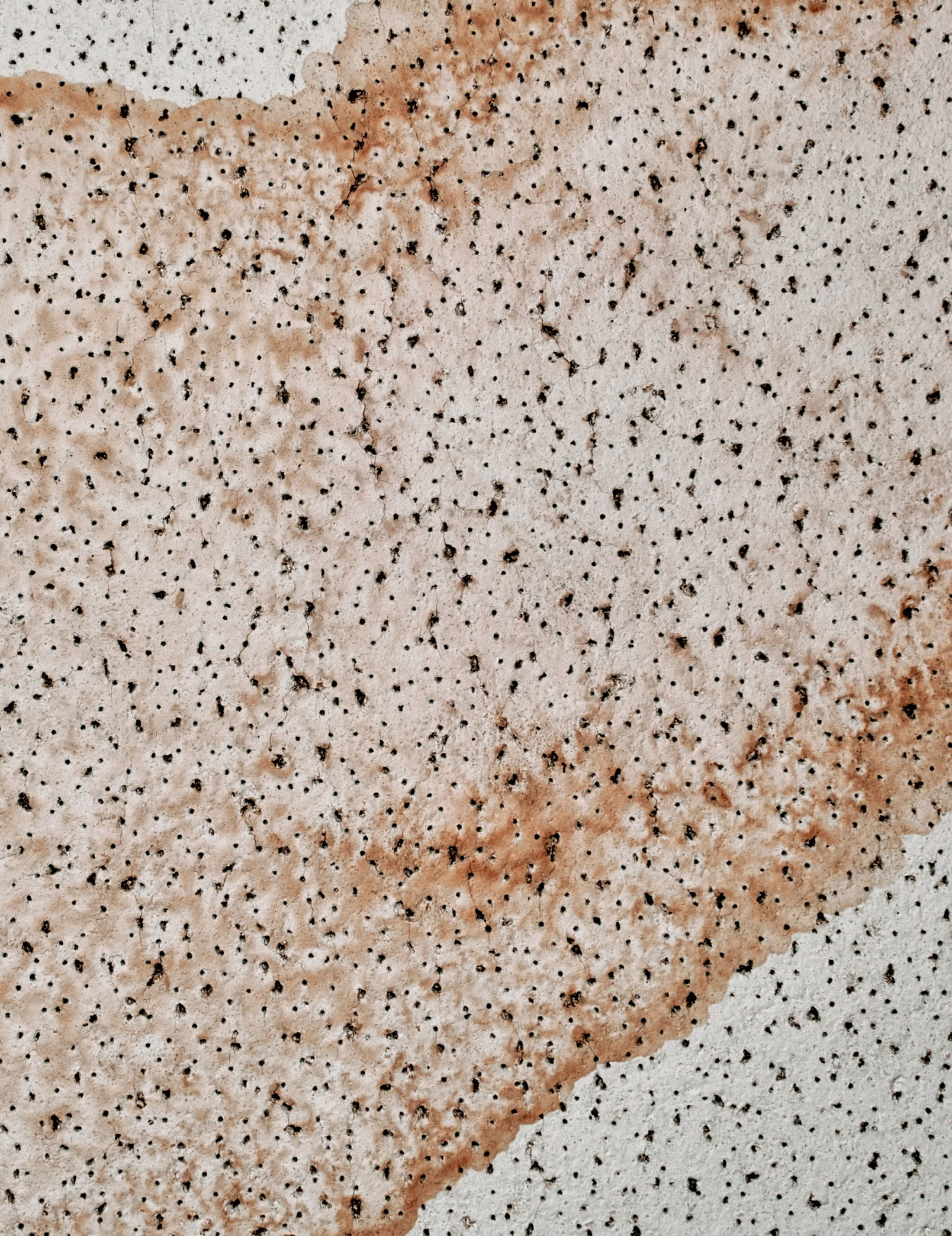

First, changes in moisture content in wood products are accompanied by dimensional changes which ruin their beauty and functionality. Wood floors in gymnasiums can cup, chairs will delaminate, doors become hard to close, to name just a few examples.

Even more serious are mold problems. Mold not only affects the structural integrity of buildings; it also affects indoor air quality, which affects the health of the occupants in the building. A fungus living by its own rules, mold is part of the natural environment and can be found everywhere indoors and outdoors. Spores, the start of any mold colony, are ever-present, dormant, and waiting for the right conditions. Once enough humidity is available, mold will start to grow on any carbon-containing surface. There are many materials containing carbon in buildings from concrete to sheetrock, wood, and even paint (unless carbon-free paint has been used). As the spores grow, multiply, and digest food, toxic compounds are released into the air. A single mold colony can grow millions of spores—so light and small that once they are airborne, they are dispersed throughout the building and can lead to serious health issues.

This is why campus maintenance teams need to be vigilant about keeping moisture and humidity in buildings within in a safe range. Improper cleaning practices, water spills, roof leaks, burst pipes, or flooding can all undermine the structural integrity and safety of a building if left unchecked. Under normal circumstances, buildings are only exposed to seasonal changes, which often can be kept in check with an HVAC system. When moisture exceeds normal ranges, however, maintenance needs to take immediate action.

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Detection is the first step in prevention. A moisture meter and a thermo-hygrometer are the best tools for checking relative humidity and detecting warning signs. Conditions of wood floors outside the ideal range of 6% to 9% moisture can be discovered early enough to prevent problems. Moisture conditions in other materials can also be checked with a wood moisture meter, and Lignomat's BL2 data loggers track humidity conditions with an audible alarm feature and MC Tracker which will record the moisture content. With these tools, a campus maintenance team can pinpoint a problem or area of concern and address it immediately.

Here's what you need to know in a nutshell:

Wood measurements. Measuring solid floor planks requires a meter calibrated for different wood species, and the user needs to set the meter to the floor species for measurements. Pin and pinless meters can be used to measure floor planks. If it is suspected that a moisture problem originated in the subfloor or the concrete underneath, then a pin meter is required with a depth electrode to investigate moisture conditions in the sub floor.

WME measurements. Engineered floor planks composed of a wear layer and a different material core can be measured with a wood moisture meter as well. You may have to calibrate the meter to the

specific type of engineered floor plank. That is an easy task if you have a sample acclimated to a certain relative humidity. For example, in an environment of 45% relative humidity, the sample's moisture content can be assumed to be around 7%. Take a measurement of the test sample at any calibration setting and change the setting until the meter reads 7%. In the future, all measurements of this particular floor can be measured at the setting you found.

This method works well, once the calibration setting has been established. For all future measurements, the setting can be used and changes in moisture content become apparent by comparing past measurements to the values now.

Reference scales or comparative measurements. There are many materials besides wood used in the building envelop. If your moisture meter is calibrated for a specific building material, you can choose the calibration for measuring the material. In order to make sense of the different scales, it is important to know what value represents dry.

For example: wood floors are considered dry at 6-9%; moldings are considered dry at 12%; and construction lumber is considered dry at 16%. When measuring drywall with a drywall scale, the values are very low due to the ratio between the small weight of water and the larger weight of the material. Here the manufacturers of the meters may state a value of .5% for "dry" and .8% already questionable

However, there are still many materials used within building, which are not listed for any moisture meter. The only way to establish moisture levels is by using a reference scale. Most meters have a reference scale, which divides the maximum moisture range between low and high moisture values into equal parts. If your meter does not have a reference scale, you can dedicate a calibration setting to measure a particular material. If measurements were taken of the same material with the same calibration setting, you can detect telltale changes when the moisture levels read lower or higher. This method becomes more meaningful if a dry piece of the material can be found. All measurements can then be compared to the dry value.

Experts recommend that maintenance crews document moisture levels in critical areas even when there are no apparent moisture problems: take measurements and note measured values, calibration settings, and the location where the readings were taken as well as the meter's measuring mode, the meter's name, and the meter's manufacturer.

When moisture problems are discovered, the first step is to establish the extent of moisture infiltration by using a moisture meter. Problems can be confined to the surface or they could come from sources farther away within walls, roofs, or the foundation of the building. A combination or pin and pinless meter with suitable hand probes is the best choice to map moisture problems and find the source. In many cases professional help is required to remedy the problem quickly before more damage has occurred and the environment is contaminated by mold.

For expert help and more information, visit Lignomat at www.lignomat.com or call 800-227-2105.

ABOUT THE AUTHOR: Grete Heimerdinger has been the technical adviser for the moisture meter division for Lignomat. She graduated from the technical university in Stuttgart and started Lignomat with her husband in 1982. Lignomat now offers a full line of pin, pinless and RH meters as well as wireless monitoring devices for buildings. For more information on moisture meters and data loggers contact Lignomat at 800-227-2105 or go to www.lignomat.com.

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