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GREEN BUILDING: Mold can be green, too!

By Carroll Hughes, AIA
Moisture ID

As a follow-up to the many well written articles in this column, I want to emphasize the goal of quality construction, whether the material and design emphasis is “green” or otherwise. Not only do we need to choose materials, techniques and designs wisely, we must always be concerned about moisture management. For clarity, I will focus on the Asheville area, which has a mixed-humid climate, although many of the same concerns are present in other climates. Buildings are vulnerable from rain water, vapor drive from the ground and our daily living activities, such as cooking and bathing. After several years of studying building science and evaluating buildings that have sustained moisture damage, I believe that recognizing the ability of materials to store and then release moisture from within wall and roof assemblies is as important as the goal of keeping moisture out . It is extremely difficult to keep all wind-driven rain out of a wall assembly and virtually impossible to keep water vapor from diffusing through a wall assembly. Thus, accepting that vapor travels through and within our structures is the beginning of understanding that moisture storage and drying potentials are important considerations, especially in our climate with wet-cold as well as wet-hot conditions.

Mold is a topic of debate, a headline for news articles, a claim for lawsuits and a named exclusion for insurance policies for homes, offices, and even directors & officers of boards. So, how do we keep mold out of our buildings? Some suggest that we choose materials that do not contain a food source, since mold spores and moisture are omnipresent. Metal framing, fiberglass faced materials, masonry products and concrete can all be used, but they do not have the comfort of organic materials such as wood, carpet and fabric . The perfect building material has yet to be discovered so we must make compromises. For example, metal studs create substantial thermal bridging effects reducing insulation values by about 40% in a typical wall, whereas the use of wood framing creates less thermal concerns. However, wood is a potential food source for mold, when moisture is not properly managed. The lower surface temperatures of metal framing can allow water vapor to condense into a liquid state within a wall causing rust and deteriorating other materials. Wood materials have a limited ability to absorb moisture and release it over time. Mold grows on the surface of materials not from within and our observations have shown that solid lumber is more resistant to mold growth than some other manufactured materials such as oriented strand board. In the design and construction industry materials can be chosen from a very wide variety of sources and assembled in unique ways, some of which work well to control moisture intrusion and others do not.

Windows are weather-resistant, but over time they will leak. It has become common for designers and builders to take extra precaution when installing windows in framed openings. Some windows are being installed using the “barrier” concept of taping the window fin against the sheathing. Others are being installed using the “drainage” concept of wrapping the opening and installing a sill pan, under the sound assumption that water will find its way in and must have a drainage plane to exit the assembly. We, typically, use a combination of both in our designs.

Correctly designing heating, cooling, ventilation and exhaust systems is very important. Maintaining a positive pressure inside the home, office or motel is important but ensuring that negative pressure zones are not created is more important. This delicate balance of systems helps reduce air infiltration and moisture intrusion and improves thermal comfort.

Some of the important things to consider in construction are 1) moisture will get in the building envelope (i.e., floor, walls and roof) in the form of vapor or bulk water, 2) how the moisture is stored in and released from the building envelope and 3) if porous materials become moisture saturated, either during construction or after, remove and discard them, if possible, in less than 48 hours to keep a water problem from becoming a mold problem. Building healthy is building green and building wisely can prevent the green, black and other colors of environmental mold.

Carroll Hughes, AIA is principal of SPACEPLAN/Architects and a partner with William Rabbino in the forensic firm of Moisture ID, LLC with affiliates at Duke University Medical Center, Division of Occupational & Environmental Medicine, Department of Community & Family Medicine, Durham, NC. Please contact the WNCGBC with any questions at the Green Building Hotline (828) 232-5080 or email at info@wncgbc.org