

Steel is Part of the Anti-Mold Solution

by Larry Williams
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Cold-formed, steel-framed structures are strong, resilient and offer a tight building envelope.



Cold-formed steel offers virtually unlimited design capabilities so that even stairwells, like the one pictured here, can be built with an inorganic material like steel.

The most recent statistics from the U.S. Census Bureau report there are more than 126 million housing units and roughly 4.7 million commercial buildings in the United States. At some point, almost all are likely to experience some form of excessive indoor dampness such as a water leak or flood. And when there is excessive moisture as well as a sufficient food source, mold can grow and lead to serious health problems.



Mechanical fasteners, such as the one shown, make connections for steel-framed projects stronger, faster and more economical.

HEIGHTENED AWARENESS

High-profile litigation in recent years has resulted in the public's heightened awareness of negative health consequences such as chronic respiratory disease and hay fever-like allergy symptoms from mold- and mildew-causing fungus, and the demand for healthier indoor environments. In a 2006 report by the Center for Disease Control (CDC) titled "Mold Prevention Strategies and Possible Health Effects in the Aftermath of Hurricanes and Major Floods," findings concluded that "excessive exposure to mold-contaminated materials can cause adverse health effects in susceptible persons regardless of the type of mold or the extent of contamination."

Mold spores are rampant in the air, both indoors and outdoors, a fact that cannot be changed. But when excessive moisture, sufficient food source, temperature, and other factors are present, mold can grow and digest whatever it grows on to survive. While there is no practical way to eliminate all mold or mold spores in the indoor environment, steel-

framing offers a way to help control it. As an inorganic material, steel does not provide a food source for mold to grow.

Let's first take a look at the three primary factors that can influence the amount of moisture available for mold growth:

For the last 30 years, buildings have been constructed with new materials and production techniques, including thermal insulation and mechanical HVAC systems, etc., to "tighten them up" in order to save energy. Efforts to be more energy conscious have proven successful. The total number of commercial buildings and amount of occupied commercial floor space has dramatically increased since 1979, but total energy consumption has remained flat.

This energy-saving trend also spurred an increase in moisture levels, in terms of relative humidity, inside the building. As buildings became "tighter," the amount of air exchanged between the interior conditioned space and the outdoors diminished. This resulted in significantly less dilution of moisture and indoor pollutants, such as volatile organic compounds (resulting from some species of mold) and even carbon dioxide.

LEAKY BUILDINGS

Additionally, construction flaws or simply older, less maintained buildings can permit the presence of unwanted moisture inside. Leaks occur most often around window and door openings, from the roof because of missing or inadequate flashing, or blocked or missing gutters. Water may also come from foundation and plumbing leaks and a host of other sources. And when small cracks or openings are located in the drainage path, large amounts of water can pass through. Typically, cracks occur at critical junctures like the base of window openings, or roof and wall intersections where they can do the most damage. Regardless of the cause, unwanted water infiltration must be prevented to control the growth of mold.

Beyond leaks, water present in organic building materials at the construction site is a recipe for mold disaster. For example, wood framing, OSB, and



Steel framing has the highest strength-to-weight ratio of any construction material, which means less material is required to carry the same structural loads.

gypsum board wet from rain can provide ideal conditions for mold growth once the materials are installed. Other hosts for common indoor mold include building and material substrates like window sills, walls, carpets, textiles, wood, wallpaper glue, house dust, soil, paper, paint, and food. Many types of mold thrive on organic materials that provide a nutrient source with enough water and the right temperature.



Since cold-formed steel is 100 percent compatible with standard building materials, steel and concrete is a perfect marriage for reducing the opportunity for mold to grow.

There are also some regions where mold growth is prevalent, such as the Gulf Coast because of its humid climate and more severe storms. Hurricanes Katrina and Rita, however, exacerbated an already serious problem—one that continues to be a challenging issue.

For weeks after the hurricanes many New Orleans homes remained flooded, which promoted heavy mold growth. In a post-Katrina study to evaluate flood cleanup procedures led by researchers at Columbia University's Mailman School of Public Health, scientists evaluated three homes that were previously considered structurally sound. Their findings showed that household levels of mold and bacteria actually equaled or surpassed levels found in waste-water treatment plants, cotton mills and agricultural environments.

STEEL, PART OF THE SOLUTION



In addition to being non-combustible and prescriptively designed to withstand extreme weather conditions such as high

Today's steel framing construction technology can help mitigate the growth of mold in buildings. First, structures must be built so that there is adequate ventilation, while allowing for controlled internal environments that are safe and energy-efficient. Buildings must also be constructed to prevent the infiltration of water due to sagging and other structural changes that may produce cracks and crevices in the building envelope. And, the construction industry should use materials that limit the sources of food for mold.

winds and earthquakes, cold-formed steel's galvanized zinc coating can protect even a waterfront structure against corrosion for hundreds of years.

Steel framing is one important way to build homes and non-residential buildings that can help resist the onset and growth of mold. Cold-formed steel-framed structures are stronger, more resilient and offer a tighter building envelope since members are dimensionally straight and connected mechanically (screwed vs. nailed). This means no nail pops or drywall cracks (e.g. where the roof meets the walls).

Ventilation is efficiently built into the design, and energy-efficiency is maintained or increased due to steel's inorganic properties. Moisture does not get into steel studs, substantially eliminating the expansion and contraction of construction materials around windows and doors, where leaks can occur. And steel does not provide a food source for mold to grow.

Furthermore, with steel framing technology, building components are often built off-site in a controlled environment, and then installed on the jobsite. Processes of building with steel framing have become so efficient and economically feasible that builders are choosing to use steel alone or with other building components. As we get smarter in building design and construction, uses of cold-formed steel framing will continue to grow. W&C

Larry Williams

Larry Williams was president of the Steel Framing Alliance in Washington, D.C.