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Steel Framing Alliance™

Steel. The Better Builder.

MOLD: ONE MORE REASON TO BUILD WITH STEEL FRAMING

Danger lurks in buildings, where moisture can penetrate and accumulate on mold-susceptible materials. In this environment, mold spores can readily feed on nutrient sources and grow to adversely affect the air we breath - inside the building. While exposure to mold and resulting health effects are not well documented, the understanding that mold and mycotoxins can help trigger illnesses ranging from allergies to lung cancer among inhabitants is clear.

Consequently, this highly controversial subject continues to instigate increasing litigation, insurance rates, health care costs, not to mention huge remediation costs and loss of income. What we are left with is not only a massive clean-up, but a massive public outcry for better constructed buildings.

Bottom line: If we build mold-resistant structures, we will live and work in healthier environments. Doing that must be practical and economically feasible, using the knowledge and technology we have today.

What is Mold?

Mold is a fungus, with tens of thousands of known strains in construction environments, which produce tiny spores to reproduce on surfaces such as wood, paper, carpet and foods. 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 and mold spores in the indoor environment, there is a way to control it. In order to grow, mold needs a nutrient source, appropriate temperature, and moisture. First, let's consider moisture – the biggest culprit.

Moisture & Mold Growth

For mold to grow in buildings, sufficient moisture is required for a period of time. Three primary factors influence the amount of moisture available for mold growth:

- Building tightness – not allowing moisture to escape to the outside,
- Liquid water moisture infiltration from the outside due to leaky window/door openings, leaky roofs, no flashing, blocked gutters, foundation leaks, plumbing leaks, and
- Condensation on mold susceptible materials, resulting from water vapor begun inside or outside the building.

Tight Buildings

For the last 30 years, buildings have been constructed with new materials and production techniques, including thermal insulation, mechanical HVAC (heating, ventilation and air conditioning) 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.

Interestingly enough, this energy-saving trend also spurred on 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, resulting in significantly less dilution of moisture and indoor pollutants, such volatile organic compounds (resulting from some species of mold), even carbon dioxide.

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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 leaks, plumbing leaks, and a host of other sources.

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.

Mold-Susceptible Materials

Beyond leaks, water present in organic building materials at the construction site is a recipe for mold disaster. For example, wood framing, OSB, and gypboard wet from rain can provide ideal conditions for mold growth once the materials are installed.

Other hosts for common indoor molds include building and material substrates like window sills, walls, carpets, textiles, wood, wallpaper glue, house dust, soil, paper, paint, and food. Many of the mold types are fast growers on organic materials that provide a nutrient source with enough water and the right temperature.

Building Mold-Resistant Structures with Steel

Now that we've loosely defined mold and described ideal environments for mold growth, let's consider how today's steel framing construction technology can help mitigate the instance and growth of mold in buildings.

First, structures must be built so that there is adequate ventilation, while allowing for controlled environments inside the building to be safe and energy efficient. Buildings must also be constructed to prevent the infiltration of water, by resisting 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.

Steel framing is one important way to build homes and non-residential buildings that can help resist the onset and growth of mold. Steel framing members are dimensionally straight and connected mechanically (screwed vs. nailed) offering a tight envelope with no nail pops or drywall cracks (e.g. where the roof meets the walls). Thus, the building structure is a stronger and more resilient. 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.

With steel framing technology, building components are often built off-site, in a controlled environment, and then erected on the job site. 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 such as wood, cement, insulated concrete forms, among others.

Because steel is non-combustible, not to mention mold-resistant structures, it enjoys a majority of the market share in interior walls in non-residential construction, and recent significant increases in floors and walls in residential construction. As we get smarter in building design and construction, uses of light gauge steel framing will continue to grow. And mold, and the adverse effects it creates in our indoor environments, should not.

For more information about mold in the built environment, visit the U.S. Environmental Protection Agency, www.epa.gov, or HealthyHome.com, www.healthyhome.com, or the Foundation of the Wall and Ceiling Industry, www.awci.org. For more information about steel framing, visit the Steel Framing Alliance, www.steelframingalliance.com.

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TERMINATE THE TERMITES

While fire is a more recognizable harm to North American homes today, termites actually account for more property damage annually. One particularly hearty strain of termite, the Formosan subterranean termite (FST), is ripping through homes and trees in southern Louisiana, neighboring parts of Texas, and surrounding Gulf states of Mississippi, Alabama, and Florida thoroughly devastating old and new homes alike. The FST has also been detected in Georgia, South Carolina, North Carolina, Tennessee, and has had a presence in Hawaii for over 50 years.

A native of China, Formosa and Japan, the FST was introduced to the US via ships right after World War II. It eats wood much faster than other subterranean termites, and grows the largest colonies of any termite species in North America; a mature colony has up to 10 million termites extending passageways 10 feet deep underground and over half an acre in area. The queen can live up to 30 years, laying well over 2,000 eggs a day. Each colony consists of three castes: reproducers, workers/immatures and soldiers. The workers and immatures, which make up a vast majority of the termites in the colony, are the only caste that destroys wood. Winged termites (alates) are reproducers who swarm to find a mate in the spring and summer months, then shed their wings and nest to form new colonies.

New Orleans collection traps have shown a more than 2,000 percent increase in numbers of alate FSTs for the 9-year period 1989 to 1998. This incredible explosion of the FST population has caused an estimated $300 million in annual property damage in the Greater New Orleans Metropolitan Area alone. Approximately $100 million is spent in Hawaii for prevention, control and repair due to the FST annually. Further economic impact studies have shown that for the Greater New Orleans Metropolitan Area, a 21 percent increase in framing lumber, according to the Formosan Wood Products Economic Impact Subcommittee Report, New Orleans, February, 2000.

Recently, policymakers there have changed the regulatory direction from one of mandating the use of treated wood, to another emphasizing alternative materials and methods for controlling the FST. This is plausible because FSTs are aggressive foragers that persistently test chemical barriers, seeking ways in which they can penetrate treated soil. Therefore, pressure treated lumber is not immune to their attack. The termites will enter treated lumber through cut ends and will build tunnels over the treated surface.

Termites, including the FST, however, will not eat steel framing products. This is good news for the structural integrity of the home. While termites including FSTs will eat through other building products commonly used in the construction of steel framed homes, the frame of the home will not be destroyed, saving the inhabitants a lot of money in repairs. The Steel Framing Alliance recommends the use of termite-resistant construction products when building termite-resistant homes. Many insurance companies do not cover repairs necessary due to termite damage. This coupled with exorbitant repair

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costs and a severe devaluation of the home infested with termites, causes homebuilders and homebuyers to rethink the way their homes are constructed. Are the materials long lasting, and termite-resistant? Will these materials and construction methods hold up in other natural disasters such as hurricanes, fires, earthquakes, and tornadoes, especially after termites or other pests (e.g., poria incrasata fungus discovered in California) have done their damage?

The use of steel framing provides an answer to these questions, and helps build termite-resistant homes. With straight walls, square corners, no nail pops or drywall cracks, steel framing offers strong solutions to problems builders are facing all over the US and Canada. Because steel has the highest strength to weight ratio of any building material, it is by nature a superior construction material. It doesn't rot, warp, split, crack or creep. It doesn't expand or contract with moisture content. It doesn't burn or fuel a fire. It is impervious to termites and other wood-eating pests. And a historical graph of steel prices is a flat line; with stable material prices, the framer can hold his quote for the framing package, and be assured the quality of the materials used is consistently high.

Homes built with steel look better, perform better, provide a safer environment for inhabitants and contribute to saving trees. Steel framed homes have a much lower probability of sustaining foundation problems, earthquake and high wind damage, and produce far less job site waste (2% for steel vs. 20% for lumber).

Recently, the US Department of Housing and Urban Development (HUD) issued a policy stating,

"For new construction in affected areas, one of the following must be used:

1. Soil treatment, NPCA-99b, PLUS one year guarantee NPCA-99a; OR
2. Bait system/Wood plus NPCA-99a; OR
3. Any construction determined not requiring termite protection by the CABO One and Two Family Dwelling Code (i.e., steel frame or concrete structures, or structures built of pressure treated or termite resistant wood with only minor interior wood trim. Roof sheathing may be untreated wood.)"

The Steel Framing Alliance and the steel industry, with the help and support of the National Association of Home Builders (NAHB), the NAHB Research Center, and many other organizations, have made huge strides toward fully enabling the residential construction market for steel. Product standards, prescriptive building methods, adoption by the codes, and training the code officials have collectively leveled the playing field for steel. At the same time, innovative steel framing products and effective training programs help to make steel an economically viable option for today's homebuilders and homebuyers.

When considering the materials to build your next home or housing community, consider steel. You won't be bugged if you do.

Join the Steel Framing Alliance.

Call 202.785.2022

or Visit steelframingalliance.com

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