

TOXIC MOLD IS NOT THE PROBLEM
by: Michael D. Geyer and Kenneth V. La Conde

Toxic mold has grabbed its share of news headlines in the last few years. Dozens of stories have surfaced about mold growth in buildings, ruining homes and making people sick. Yet, is all this media attention warranted? Or, is mold being dragged through the mud?

Those who have dug a little deeper into the mold media frenzy have discovered that mold is merely a symptom of a much larger problem: moisture. In fact, moisture is the root cause of mold germination, growth, and amplification. The key to solving problems created by mold is to control the amount of moisture that intrudes into buildings.

Does Mold Deserve its Bad Reputation?

Mold spores are easily dispersed into the air and are present everywhere. Given the right environmental conditions, mold will grow just about anywhere.

Many molds are harmful, but their danger ultimately depends on concentration and an individual's susceptibility. The reality is that molds, also called fungi, are essential components of our ecosystems. Fungi break down and consume plants and other organic materials, which in turn release nutrients for other organisms. Some fungi are saprophytic, consuming dead organisms; others are parasitic, subsisting on living hosts; and some do a little of both.

However, some fungi, such as *aspergillus* and *penicillium*, may possess pathogenic and/or toxigenic properties. One of the more well-known toxic molds is *stachybotrys*, a greenish black fungus found in soils of the southwest U.S. *Stachybotrys* has been linked to "sick building syndrome," a condition marked by such symptoms as respiratory and throat problems, nasal and sinus congestion, eye problems, chronic fatigue, diarrhea, and skin irritation. There also have been reports of central nervous system problems such as constant headaches, memory problems, mood changes, and unexplainable aches and pains. It should be noted, however, that *stachybotrys* is not the most toxic of molds, and some strains do not appear to be toxic at all.

Similar to the triangle of fuel, heat, and oxygen needed to create fire, a mold triangle consists of food, spores, and moisture. Food sources for many molds are organic materials with a high cellulose and low nitrogen content, such as paper, fiberboard, gypsum board, wood and wood products, dust, and lint. Many of these materials are present in our homes and places of work.

Combating the *Real Problem*

Given that mold spores and their sources of food are already present in the environment, the only reasonable controlling factor we have in preventing mold growth in buildings is moisture control. No other environmental factor has such a profound influence on the growth of mold as does moisture. Humans have been trying to control, prevent, or combat moisture in their buildings for thousands of years.

Older structures in particular can have moderate, persistent moisture problems. Sometimes, the source of moisture causing mold growth is easily determined, such as a broken water pipe or leaking drain. In other instances, the cause may be obscure, such as when moisture seeps through deep grade beams during periodic high water table events, affecting only interior, first floor closets and cabinets. In some locations, flooding is the culprit.

In particular, *stachybotrys* grows on material that becomes chronically moist or damaged due to excessive humidity, water leaks, condensation, water infiltration, or flooding. High risk areas for this toxic mold include wet drywall, floors, and carpet from such events. *Stachybotrys* also can grow behind drywall or in hidden areas of a house such as air ducts containing organic debris, particularly in areas where the relative humidity is above 55 percent, and temperatures range from 2-40 degrees Celsius (35.6-104 degrees Fahrenheit).

Moisture not only enhances the growth of mold, it enhances the growth of other biological species, such as bacteria and protozoa, and it enhances the conditions for insects; all of which can be harmful to a building and its occupants.

There are several key elements associated with building design, construction, and maintenance that may need to be addressed and improved in order to effectively combat moisture intrusion. These elements are outlined below:

1. **Planning.** Where possible, structures should be located in areas where moisture intrusion can be minimized, the adverse effects of which can be controlled adequately

through engineering. Where moisture problems exist, ordinances should be developed to deal with locations where building codes do not provide sufficient guidance.

2. **Building Design.** Increasingly complex building designs may inadvertently predispose structures to moisture accumulation. Designers sometimes think about buildings abstractly, leaving the "how to" questions to the contractor. This can create conflict and result in potential susceptibility to the building envelope.
3. **Construction Materials.** All construction materials have limitations with respect to moisture, and sometimes too much is expected of these materials. Poor choice of construction materials, often based on cost considerations, may affect a building's integrity. Materials should be compatible with the environment and installed by knowledgeable workers. Contractors must take the initiative to refuse materials that are delivered damaged, dirty, or moldy (in the case of timber and sheeting).
4. **Construction Methods.** While many workers in construction may be experts in their craft, they do not always fully understand a structure as an integrated system. Moreover, many such workers are not formally educated, nor do they keep current on emerging trends, changes in industry practice, or improvements in building materials. Construction companies therefore must enhance supervision and oversight, improve quality control checks, educate their superintendents, and hold subcontractors accountable.
5. **Landscaping and Building Maintenance.** The best-built structure in the world can fall victim to a plant palette requiring copious quantities of water to maintain a verdant surrounding. Introducing and maintaining a moist environment around a structure provides substrate, food, and water for mold growth and its amplification. The adverse effects of poor landscape planning often can be engineered away. Mitigation via enhanced maintenance can enhance the life of the asset. Proper maintenance is a necessity and should be the responsibility of the building owner.
6. **Costs.** Decisions regarding building placement and location, design options, selection of contractor, choice of building materials and building maintenance are often significantly impacted by cost. The owner determines the budget, and often wants the best construction for the least amount of money. Short-term savings can often be greatly exceeded by future expenditures for repairing moisture damage and decay. Owners should consider the initial costs to prevent moisture intrusion, versus the costs to repair damages down the road.

7. **Building Occupants.** Occupants of a structure profoundly affect the indoor environment. This is especially true of residential units. The best built units can be destroyed by the carelessness of occupants. Hygiene and housekeeping practices, laundry use, pets, and house plants are a few of our daily activities that contribute to the moisture load of a structure and increase the potential for mold growth. Purchasers of residential portfolios should be keenly aware of a structure's moisture history, building integrity, and maintenance practice prior to reconveyance.

Who are the Real Experts?

Non-experts (those with little or no construction background) tend to blame mold problems on building contractors, managers, owners, and building materials. They often overlook the contribution of occupants and environmental influences.

The real experts in assessing structure moisture control and associated mold growth are the building specialists, including forensic architects, consulting engineers, and contractors who have been working in the area of moisture control and mold for some time.

One particular group, the Building Environment and Thermal Envelope Council of the National Institute of Building Sciences, has been especially observant of the effects of moisture on the building envelope. Its work since 1982 has been very comprehensive. The Council is aware not only of molds that are unhealthful to occupants, but also of those that cause structures to decay.

Is the Problem Dissipating?

With the ever-expanding pressure for quality housing, mold and moisture intrusion cases will continue to make news headlines. Nearly 1.6 million housing units were built in the U.S. each year from 1996 through 2000. Engineers, architects and contractors have been building more structures, planned communities, and office buildings as fast as they are approved. New building materials and construction methods are being developed to help meet this demand.

Consequently, the building industry's rush to keep up with demand may be creating a higher risk for mold-related problems. Control of moisture is paramount to combating mold and providing safer and healthier environments for building occupants.

As owners, managers, and occupants of structures, we must be diligent in investigating and controlling moisture, and in cleaning up mold before it grows into a real problem.

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