Fungus Shui
The Balance of Design, Construction and Maintenance

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Perhaps you have noticed those new, small fountains in offices, or small sand boxes and miniature rakes. Water runs over small pebbles, you rake the sand and you are supposed to relax. Okay, you are a skeptic, but the world of Feng Shui professes balance among the Five Elements (fire, earth, metal, water and wood) and resulting harmony between people and their environment. Feng Shui means "wind" and "water," the same elements designed to be kept out of the built environment. To do so, design, construction and owner maintenance all have to balance. Without such balance, the result is water infiltration, mold growth and the newest public scare, so-called "toxic" mold.

Everything Mold Is New Again

Mold has been around since the beginning of time and is literally all around us. Even the Bible describes a process for mold remediation: "And he shall cause the house to be scraped within round about, and they shall pour out the mortar that they scrape off without the city into an unclean place. And they shall take stones, and put them in the place of those stones; and he shall take other mortar and plaster the house." Leviticus, 14:41. A later verse also requires sacrificing a bird and sprinkling dead bird blood around the house. Mold is still here, in thousands of varieties. Fortunately our remediation technology has improved and most molds will not kill us.

Mold only needs moisture, a food source and relative warmth to grow and produce spores. Spores from certain molds produce toxic chemicals or mycotoxins. Spores themselves can generate allergic, asthmatic or more serious health responses from certain people, and certain mycotoxins can produce more serious symptoms. Other components of buildings and the environment in general may also produce similar responses. For these reasons, it may be impossible to isolate the true causes of so-called "sick building" illnesses.

The molds of greatest concern in the construction industry include Stachybotrys, Penicillium and Aspergillus, all pronounced different ways by different people, but all can produce pathogens or be potentially toxic. Results from exposure can vary from no reaction at all, to asthma attacks to more serious infections of the lungs, eyes, throat, ears and skin. While the scientific literature has been unable to directly link individual mold exposure to specific disease, it has been relatively clear that certain individuals with certain allergies or with reduced immunity (children, the elderly or the ill) are at greater risk. Moreover, the media and general public are becoming more frightened and frenzied about the possibility of mold infestation.

GUEST ESSAYS

Yin and Yangst

One can hardly open a newspaper without reading the plight of some public school, local home or other building suffering closure due to mold infestation. Moisture from the ground, condensation, failure of mechanical systems or other leakage create just enough humidity for mold spores to populate and feed from organic materials used in construction of new sealed buildings. Nearly every element of design and construction can be implicated - foundations, curtain walls, windows, roofs, flashing, mechanical systems, plumbing, equipment, interior and exterior finishes right out to the Stucco.

Taking the Fun Out Of Fungus

And now for the really bad news. Insurance policies, both general and professional liability, have long included exclusions for "pollution", including release of smoke, vapors, fumes or chemicals. Just in case there were any room for argument that mold is not pollution, the insurance market is responding to mold by expressly excluding coverage for injuries or property damage arising from mold, mildew or fungus. Mold infestation is not likely to arise without other allegations of defective design or construction, however, so the carriers are likely to be required to defend the claims. It also seems likely that state regulation and market forces will make such coverage available. Talk to your brokers about available coverages, particularly if you are a M/E/P consultant.

A novel underground ductwork application is to be installed in a new school. Soil borings are not taken for the site and the ductwork is installed out-of-sequence, and is forced underneath previously installed plumbing. The result is ductwork well below the intended depth, and groundwater well above what was anticipated. After the slab was poured, the ductwork filled with groundwater and the mechanical system blew damp, moldy air throughout the school.

The plans call for insulated pipe through a soffit. The plumbing contractor installs the required pipe and fully insulates it on the days when the a/e is present at the site. On the other days, however, he forgets about the insulation. The soffit is constructed and the uninsulated pipe is covered before the a/e returns. Six months after substantial completion, the soffit is damp to the touch and covered with black mold. The entire corridor smells of a cat's litter box.

A reputable window supplier provides windows, skylights and a "kit" for installing sunrooms in a new condominium development. The sunrooms are assembled according to manufacturer specifications, except that the fit is so tight that they will not fit with all of the caulk suggested. Rather than seek a clarification, the contractor omits the caulk cap between two horizontal panels. All of the sunroom units begin leaking at many of their seams seven years later. Black mold grows on the walls, ceilings and carpet. The manufacturer, contractor and window supplier all take samples, examine the parts and blame the condominium association for deferring all maintenance, caulking and tuckpointing on the buildings. The association sues all involved for fraud and breach of warranty.

Covering Your Aspergillus

In the movie Coconuts, Groucho Marx was auctioning a house, and said "*You can have any kind of a home you want to. You can even get stucco --- Oh, how you can get stucco.*" Good design with poor installation will always be a bad product. Poor design, even with good installation, will always be a bad product. Good design with good installation and poor maintenance, will be a good product for a short time. Design, construction and maintenance must all be properly executed for a good product.

From the viewpoint of the a/e, avoiding liability for a bad project is seldom the goal. Rather, a/e's seek to produce a good project and happy clients - Feng Shui rather than Fungus Shui. It is therefore of little comfort to structure a contract to avoid any liability for mold infestation.

Mildews and Don'ts

Here are some things to consider as you think about the coming mold hysteria.

Don't Presume Perfect Execution: If your design requires flawless execution, you are asking for trouble. There are simply too many variables controlled by too many forces to presume perfection. Similarly, any product or design that assumes a complete barrier to water or moisture is more likely to create a mold incubator than a permanent desert. Water that gets behind the EIFS, for example, is a recipe for disaster. Vapor drive through an old concrete slab makes a vinyl floor product a poor choice. In many conditions, assume entry of water, moisture or vapor and the analyze the use of weeps, ventilation, drainage or redundant water barriers.

For critical connections or details, suggest to your clients that additional Construction Administration may be justified. If you are an architect, make sure that your consulting engineers have the same opportunities to observe the work. If you are an engineer, remind the architects that your presence during certain installations may be critical, even if they cost a bit more.

Use Mock-Ups For New Or Novel Applications: Mock-ups are not just for skyscrapers. Any time you are combining systems, products or elements, tell your client about the virtues of mock-ups, in writing even. Involve the manufacturers or suppliers and remember that mock-ups represent ideal conditions only. Assume a caulk failure or deferred maintenance and see if your analysis changes.

Be Skeptical: New products claim or even warrant water resistance or that they may be left uncovered during construction. Have the materials tested in a mock up. Find out whether there are any other local applications that can be examined before the product is specified. Did the water resistance create other problems? Did the wood material bond well despite sitting out in the elements. Be skeptical of the brochure and sales rep., particularly for new products or applications.

Make Sure There Is Value In Value Engineering: Even in the more generic "sick building" context, value engineering, quality reduction and dollar-driven decisions often come back to haunt even careful design professionals. Make sure that any such decisions are the result of an explanation of the effect on operations, serviceability and maintenance. A two-pipe system is cheaper that a four-pipe system, but will require much more finesse, operator involvement and long term maintenance. A Yugo and a Mercedes will

both drive you to work, but one will work longer and more reliably. Both will require maintenance, but to very different degrees. Explain the difference to your client and then write it down in letters, minutes or reports of meetings.

Require Operating Manuals, Training and Offer Maintenance Specifications As An Additional Service: Don't assume that your client understands its maintenance obligations or burdens, or that it will hire those who do. Many specifications require production of operating manuals and training, but think about recommendations for a maintenance specification or for retention of an additional consultant to prepare one. If your client declines, write a letter to congratulate them at the end of the project and offer to help with maintenance specifications in the future.

Determine whether or not your professional liability policy has a mold exclusion: Much is happening in the insurance world today that is causing insurers to narrow coverage and to increase rates. Right now insurers are hypersensitive to mold. Many are fearful that mold will present a watershed of claims similar to asbestos and other toxic torts. All insurers today are looking at the mold problem with concern but the response is not uniform. Some are placing a broad exclusion virtually eliminating coverage for any problem associated with mold. Others are waiting to learn if the mold problem is truly catastrophic like asbestos or if it is more like Y2K. Some insurance buyers will have no choice but many will have the option to select an insurer that will cover mold related claims.

Fungus Shui

There is nothing new about balance and harmony among elements, or among design, construction and maintenance. Media and market forces, however, are creating cause for caution. Design should assume imperfect construction or details, and respond accordingly. Owners, too, must assume responsibility for maintenance. With these elements in balance, we can all enjoy our little motorized water gardens and sand rakes without worrying about fungus shui.

About the Author: Eric L. Singer is with Wildman, Harrold, Allen & Dixon, Lisle, Illinois. His practice concentrates in construction law and in the representation of design professionals in all aspects of construction claims and dispute resolution.

NOTE: This article is intended for general discussion of the subject, and should not be mistaken for legal advice. Readers are cautioned to consult appropriate advisors for advice applicable to their individual circumstances.