

Facts Regarding Mold on Wood Structural Building Components

Builders, homeowners and insurance companies are encountering mounting concern over mold. Unfortunately, the emotion of this situation leads to actions unsupported by the facts. Here are the facts about mold on lumber and wood structural building components.

HEALTH EFFECTS

Fact: Humans are exposed constantly to molds in the environment. Mold spores are in the air we breathe, the soil in our gardens, and in and around virtually every part of our home.

Fact: Exposure to mold can be through skin contact, inhalation and ingestion. Framing lumber and structural building components in a newly finished house are typically encased by panels or siding on the outside and drywall on the inside—thus there is virtually no chance for occupants in a home to be exposed to any mold on the wood through skin contact or ingestion. Inhalation exposure may be possible but is extremely rare.

Fact: One testing company, GlobalTox, sampled many buildings with chronic water leaks and large amounts of enclosed mold. Mold concentrations found indoors were similar to or less than the levels found outdoors. Given this fact, it is reasonable to infer that any small amounts of mold not remedied at the time of construction and enclosed in walls, floors, or ceilings will not have a large impact on the indoor air quality.

Fact: Adverse health effects from inhalation of mold spores in water-damaged buildings are not supported by available peer-reviewed reports in medical literature.

Fact: There is no health-based standard for exposure to mold. According to the Centers for Disease Control and Prevention (CDC): “There are very few case reports that toxic molds (those containing certain mycotoxins) inside homes cause unique or rare health conditions such as pulmonary hemorrhage or memory loss. These case reports are rare, and a causal link between the presence of the toxic mold and these conditions has not been proven.” The majority of common molds are not a concern to healthy individuals.



Fact: The CDC further reported in 2000—“At present there is no test that proves an association between *Stachybotrys chartarum* (or *Stachybotrys atra*, two different scientific names for the same mold) and particular health symptoms.”

GENERAL FACTS

Fact: Moisture content above 19 percent for approximately one week is required for significant surface mold growth to occur on lumber and/or wood structural building components. Lumber surface mold growth occurs on most species of wood when the moisture content by weight is between 20 and 28 percent.

Fact: Surface mold growth is a superficial phenomenon that does not affect the strength or long-term durability of the wood.

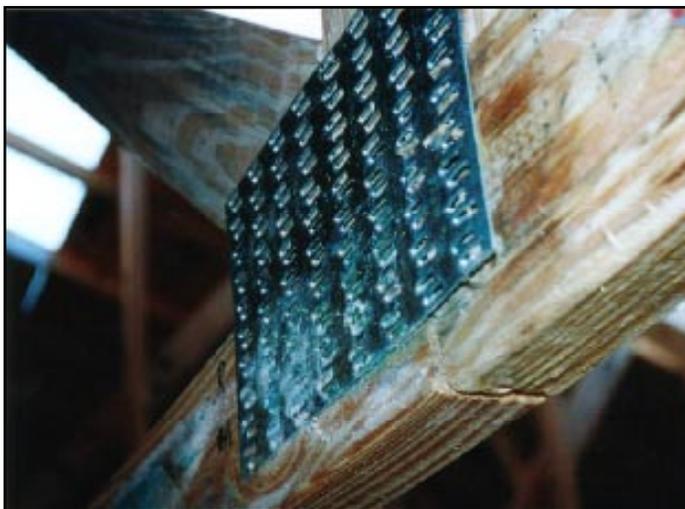
Fact: Wood decay fungi, on the other hand, require much higher moisture levels to grow, as the wood moisture content must be above the fiber saturation point (i.e., at least 28 percent by weight, varying for different species) for more than one week.

Fact: Molds can grow on cloth, carpet, leather, wood, wallboard, household dust or anything that is made of organic material. Sustained mold growth requires moisture, organic material (a food source), and a suitable temperature generally in the range of 40° F to 100° F. Ideal temperatures for mold growth are between 68° F and 86° F. When one or more of these three conditions does not exist, the mold colony will become dormant. The easiest condition to control is moisture.

Fact: Any well-designed, well-constructed and well-maintained home, regardless of the materials used in its construction, will not support conditions suitable for the growth of mold. If built properly, the inside of the home (including the interior spaces and the building cavities) will stay dry enough to stop mold spores from becoming active.

Fact: A few potential sources of unwanted moisture in buildings are: (1) improperly maintained A/C systems that can create excessive condensation, (2) plumbing leaks, (3) gaps in flashing, roofs, siding or masonry, (4) poorly sealed windows, (5) porous slabs and foundations, (6) inadequate drainage, (7) faulty roof drains and downspouts, and (8) poor ventilation and/or air circulation combined with high indoor humidity—from showers, cooking or other activities can result in condensation that promotes mold growth.

Fact: During both the manufacturing process and construction, mold can occur naturally on structural wood components; normally this is due to warm temperatures and the presence of moisture in or on the wood for a prolonged period of time. Surface molds, which come from a variety of sources including airborne spores, feed off the sugars and starches that are readily available in wood.



Fact: Mold on the surface of lumber does not cause rotting or otherwise affect the strength of wood framing. Mold is a symptom of high moisture which, if allowed to exist for prolonged periods, can be damaging to any structure and will cause wood to decay.

Fact: According to the Western Wood Products Association (WWPA), in research conducted by Oregon State University, none of the 45 species that formed on samples of Douglas Fir lumber were *Stachybotrys*. In 1990 and 1992, Forintek in Canada conducted a study of fungi associated with green (not dried) lumber; from the samples taken there was no record of *Stachybotrys*. This type of mold is typically found growing on chronically wet building materials such as lumber, wood panels, drywall backing, insulation and ceiling tiles. This kind of moisture is usually caused by excessive flooding or leaks.

Fact: Reasonable amounts of wetting can be endured during the framing process. Assuming the structural components are not exposed to further wetting from rain, framing will dry out under dry outdoor weather conditions after the structure is put under roof, sheathed, sided and roughed-in. Such drying must occur before the framing is closed-in or covered up with insulation and drywall. Closing-in is considered the point at which structural components are covered up with additional materials that restrict their ability to dry.

Fact: Before closing-in the structure, it is essential to allow wet building components a chance to dry. Good construction planning allows construction projects to be sequenced to protect all moisture-sensitive building materials, including structural components, from excessive wetting that could lead to mold.

Fact: Drying lumber, while reducing the likelihood of mold formation, does not guarantee the wood will remain free of mold. Even if dried, lumber exposed to moisture will support mold growth.

Fact: Homes with exposed dirt crawl spaces and basements tend to have more airborne mold spores than homes without.

Fact: Although there is no evidence to support the claims that mycotoxins from certain mold spores are causing illness in humans, prudent avoidance is still advised.

Fact: Active mold growth indicates an underlying moisture problem that should be corrected. Moisture also permits the growth of bacteria and dust mites that may cause illness by themselves or in concert with molds.



REMEDICATION OF MOLD ON STRUCTURAL BUILDING COMPONENTS

Fact: While superficial mold that occurs on lumber does not affect the performance of the wood, the general public increasingly perceives it as a problem. Superficial mold can be easily removed by scrubbing with water and detergent followed by rinsing.

Recommendation: When mold on structural components is identified before close-in:

- Identify and correct any underlying moisture infiltration or exposure problems.
- Scrub any surface mold with detergent and water, rinse and allow drying before covering, enclosing or painting.
- Remove and replace damaged building materials that cannot be cleaned.

Fact: The goal of mold remediation is the removal of most of the mold; it is not necessary to kill the mold to remove the mold. The mold clean-up is done when the involved area is free of dust and no material transfers to a clean cloth or glove that is wiped across the involved surface.

Fact: It is not necessary to test for mold once it has been identified. Testing air samples for mold is rarely useful in any building and is of no value in a new building during construction.

Fact: If residual staining is present or the mold has penetrated a surface of a material that is not easily removed (e.g., a structural beam), it can be protected with a permeable latex paint. Some paints contain zinc, which acts as an inhibitor of mold growth.

Fact: Mold spores cannot be permanently eradicated by cleaning or disinfecting. While such cleaning will remove spores present at the time of cleaning, it will not protect surfaces against mold spores that arrive at any time after the cleaning solution is gone.

REFERENCES, ADDITIONAL READING & TRAINING

American Lung Association

www.lungusa.org/press/association/asnairm.html
Moisture Control Tips for Homeowners, 212/315-8700.

American Society for Testing and Materials (ASTM)

www.astm.org
ASTM MNL 40: Manual on Moisture Analysis and Condensation Control in Building Envelopes, 2001, & ASTM MNL 18: Manual on Moisture Control in Buildings, H. Trechsel (Ed.), 1994, 610/832-9585.

American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE)

www.ashrae.org, 800/527-4723.

California Department of Health Services (CDHS)

www.cal-iaq.org/iaqsheets.htm
Indoor Air Quality Program Infosheets and Related Links.

Canada Mortgage and Housing Corporation (CMHC)

www.cmhc-schl.gc.ca/en/index.cfm
Several documents on mold-related topics available, 613/748-2003.

Carpet and Rug Institute (CRI)

www.carpet-rug.com
Carpet maintenance, restoration guidelines for water-damaged carpet, other carpet-related issues, 800/882-8846.

Centers for Disease Control and Prevention (CDC) National Center for Environmental Health (NCEH)

www.cdc.gov/nceh/airpollution/mold
Information on health-related topics including asthma, molds in the environment, and occupational health. Questions and answers on *Stachybotrys chartarum* and other molds, 888/232-6789.

Council on Scientific Affairs (CSA)

www.nmhc.org/Content/ServeFile.cfm?FileID=3191
CSA Report 1-I-02 Subject: Black Mold and Human Illness, Presented by: O. Edwin McClusky, MD, Chair.

Forintek Canada Corp.

www.durable-wood.com
604/224-3221

GlobalTox

www.globaltox.com
425/556-5555

Health Canada

www.hc-sc.gc.ca/main/hc/web/ehp/ehd/catalogue/bch_pubs/fungal.pdf

Dated 1995, the scientific report entitled Fungal Contamination in Public Buildings: A Guide to Recognition and Management provides a protocol for investigating buildings with suspected fungal problems affecting human health.

NAHB Research Center

www.nahbrc.org

The Research Center has excellent information on this and related construction topics. For their current information on mold, click on "Moisture and Leaks." Also ToolBase Technotes published in April 2002, 301/249-4000.

National Association of Mutual Insurance Companies (NAMIC)

www.moldupdate.com

This site is dedicated to the mold issue and includes comprehensive information.

**New York Department of Health & Mental Hygiene
Bureau of Environmental & Occupational Disease
Epidemiology**

www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.html
Guidelines on Assessment and Remediation of Fungi in Indoor Environments, 212/788-4290.

Structural Building Components (SBC) Magazine

www.sbcmag.info

Nathan Yost, M.D. Building Science Corporation, Mold & Construction, January/February 2003, 608/271-1176.

University of Minnesota

www.dehs.umn.edu/iaq/fungus

This site includes Environmental Health and Safety, Fungal Abatement Safe Operating Procedure, Glossary, Hidden Fungi in Buildings, Investigation/ Interpretation of Results, Links, Managing Water Infiltration, Pictures and References, 612/626-6002.

U.S. Environmental Protection Agency (EPA)

www.epa.gov/iaq/molds/

EPA's Mold Resources. U.S. EPA, Indoor Environments Division, 1200 Pennsylvania Ave., NW, Mail Code 6609J, Washington, DC 20460, 202/564-9370.

Western Wood Products Association (WWPA)

www.wwpa.org/index_lumberandmold.htm

This site on Mold and Wood Products, contains the report Mold, Housing and Wood (TG-2), Coreen Robbins, Ph.D. and Jeff Morrell, Ph.D., 2002, 503/224-3930.

**WTCA's Truss Technology Workshop:
Mold & Structural Wood Components**

www.wtcatko.com

This workshop teaches the facts on mold and other fungi and how their presence affects structural wood components such as metal plate connected wood trusses. Participants will learn the conditions that lead to mold growth, how to remediate existing mold, why public attention to this issue has increased and some recommended steps to deal with mold, 608/274-4849.



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