Health & Safety Committee

Mythbusting Mold: Ten Facts You Should Know

Mold is a ubiquitous concern in conservation (and elsewhere!). Since mold is encountered frequently, it is important that conservators know the facts about it so that they can protect themselves. Some of these facts may be familiar to you, others not. Check out these ten tips and see what new facts you learn!

1. All molds can pose a health risk to humans. Adverse reactions to mold can be a mild skin irritation, or can be severe for those with compromised immune systems. Both dormant and active mold can cause an unsafe reaction.
2. Always wear appropriate Personal Protective Equipment (PPE) in any situation where you might encounter mold; you cannot predict how you will react. PPE should include respiratory protection, as well as eye (impermeable goggles) and skin protection (gloves, lab coats, sleeve guards). Your respirator should have N-95 or P-100 filters for filtration of mold spores and activated charcoal filters if odors are a problem. Be sure to get your doctor's permission before using a respirator (even disposable ones), especially if you have asthma or other respiratory issues. Be certain to be fit tested annually!
3. Surface molds – the molds that conservators usually encounter – produce conidia, which form and release mold spores into the air. Those spores float through the air and land on surfaces along with dirt, skin cells, pollen, fibers, and other materials that make up dust. Cleaning is your best bet for preventing mold, especially when it's dormant. Removing the spores doesn't give them the chance to germinate and colonize.
4. For safe cleaning, be sure to use a HEPA or ULPA-filtered vacuum (variable suction is best) in a fume hood while wearing PPE. Dispose of mold-infested filters, vacuum bags, and other waste by sealing them in thick polyethylene bags and throwing them away with the trash.
5. What is the key element in stopping the mold life cycle? Water availability! Water vapor in the air, water content of the mold, and the equilibrium moisture content and its availability within the substrate all contribute to the life cycle of mold. Controlling your environment by keeping your dew point below 50°F and your relative humidity below 65% will reduce the possibility of spore germination.
6. Mold spores are tough; with thick cell walls, mold spores are not defeated easily. Spores are designed to survive in an outdoor environment so that they do their job: breaking down dead organic matter such as fallen leaves and dead trees. Dormant conidia and spores can survive extreme heat, drought, and freezing temperatures.
7. Active, germinated spores are more susceptible to destruction. Flash or quick freezing around 32°F (0°C) kills active mold spores from the inside out: the moisture in the cytoplasm in the spore turns into ice crystals. As the water expands (freezes), it causes the active mold spore to burst, breaking up the cell wall. Dormant spores should be removed through cleaning (see #4).
8. The colored stains that you see on mold-infested objects are pigments excreted by the actively-growing hyphae of the fungus and/or the pigment in the hyphae that penetrate the substrate. Hyphae are the long, branch-like structures of a fungus that are its main mode of vegetative growth. The pigments are present to help protect the mold cells from radiation (IR, visible, and UV).
9. One element found in molds is mycotoxins. A class of mycotoxins – known as trichothecenes – has been implicated as potentially infecting humans via inhalation rather than ingestion or dermal contact. One of the molds that produces this mycotoxin is *Stachybotrys chartarum*, named in the media as "toxic black mold."
10. Did you know that the AIC's Health and Safety Committee has access to safety resources? If you are a conservator in private practice, or your institution doesn't have an environmental health and safety department, ask us for assistance to point you in the right direction! Have a question about health and safety in your conservation work? Send it to us at HealthandSafety@conservation-us.org. Additional health & safety resources are available on the Health & Safety Committee website and wiki. www.conservation-us.org/healthandsafety and www.conservation-wiki.com/wiki/Health_&_Safety

Fancy yourself a mold expert? Try this online identification quiz (warning: this is a medical site so some of the pictures are a bit gross): http://www.mycology.adelaide.edu.au/virtual/

RESOURCES

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Working on a Site Requiring Hard Hats? Here's What You Need To Know!

This is the first in a series of reminders to AIC members about selecting certain types of PPE.

Work hazards need to be minimized through engineering controls or eliminated altogether through safer methods or non-toxic materials. But sometimes, Personal Protective Equipment (PPE) needs to be worn as well. PPE can serve as an effective safety barrier as long as it is selected to protect the worker against the specific hazards (see "Job Hazard Analysis," AIC News, Vol. 39, No. 6, Nov. 2014, pp. 13-16). It must be worn and maintained properly because, if it fails, you are exposed to the full force of the hazard. Remember: PPE only protects the worker wearing it, not other bystanders in the area. Even in the "casual" atmosphere of museum work, industrial hazards exist and industrial controls must be enforced.

HEAD PROTECTION

Protective helmets (commonly known as "hard hats") are required when working in, or visiting, areas where there is a potential for injury to the head from impact and/or falling objects. Helmets specifically designed to reduce electrical shocks are necessary where heads could contact exposed electrical conductors. Your employer (or you, if you are self-employed) is always responsible for providing PPE. The person in charge of a site may also have a selection for visitors; size selection is rarely an issue as most helmets have interior adjustable headbands. Check before you go!

Protective headwear should meet professional consensus standards incorporated into each country's regulations. These types of performance standards will typically test headwear for electrical protection, impact resistance, penetration resistance, flammability resistance, and water absorption.

Examples:

- ANSI Z89.1-2009 (new revision 2014) *Standards on Industrial Head Protection* (http://webstore.ansi.org/RecordDetail.aspx?sku=ANSI%2FISEA+Z89.1-2014)
- CAN/CSA Z94.1-15 *Industrial Protective Headwear—Performance, Selection, Care and Use* (http://www.scc.ca/en/standardsdb/standards/27865)

TYPES

The most recognizable hard hat is the type that has a short (duck-bill type) brim at the front of the hat dome. This type provides protection from impact both to the top **and** the sides of the head. Another type of helmet, having a full brim encircling the entire dome, offers protection **only** to the top of the head. Helmets and hard hats may also be classified in terms of the amount of electrical protection they provide, if any, to both low-voltage electrical conductors and high-voltage sources.

MARKINGS

Be familiar with the approval markings specified by your country's regulations and prevailing test standards. For instance, ANSI-compliant hard hats will be marked, as a minimum, with:

- Manufacturer's name
- ANSI Z89.1-2009 or
- ANSI Z89.1-2003 or ANSI Z89.1-1997
- Designation regarding electrical protection

Be aware that shells typically listed in catalogues as "bump caps" (the kind sometimes worn by butchers or baseball players) look similar to a true hard hat, but are not manufactured to industrial testing standards and should not be used in your workplace.

Usually listed in safety catalogues as "bump caps"

Listed as ANSI Type 1 Front Brim Hard Hat

INSPECTION AND USE

Protective helmets and hard hats should be inspected visually every time they are worn. Use hard hats that are new and recently manufactured and discard any hard hat that has been damaged by impact, or shows signs of dents, cracks, or any other damage, including damage caused by ultraviolet radiation (UV) damage, if the hats are worn routinely on outdoor projects. Degradation of plastic by UV light will cause the glossy finish of the plastic to fade, turn chalky, and eventually fall apart; the hat should be discarded at the first signs of UV degradation.

Credit: Partial reprint from Ch. 5 of *Health and Safety for Museum Professionals* (2011), Hawks et al, Society for the Preservation of Natural History Collections, New York

Questions about health and safety? Contact us at HealthandSafety@conservation-us.org.