Part 2  Hazards in Collections: Mould

• What is mould?
• How and where does it grow?
• Why is mould damaging / a health hazard?
• How to prevent mould growth
• How to safely remove mould
What is mould?

Common name to describe a group of fungi that grow on the surface of a variety of materials

Lifecycle
• Spores settle on surface and germinate into hyphae
• Hyphae penetrate the material in order to feed off it
• Hyphae grow to form a colony known as a mycelium
• Mature mycelium send out spores to colonise elsewhere

Identified as white or coloured furry spots and deposits on the surface of materials
How and where does mould grow?

Mould spores are present in the air all around us but given the right conditions they will germinate:

- Temperature - needs 10 – 35°C
- Moisture - over 65% Relative Humidity
- Still air - lack of ventilation
- Suitable foodstuff – museum collections
  - Paper, leather, textiles, wood, basketry, organic glues
  - But also wax and leather dressings
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  - Dirt
How and where does mould grow?

Mould will grow on inorganic surfaces if a food source is present on that surface, for example:

- Grease/oils from handling
- Hygroscopic dust and dirt
Why is mould damaging/ a health hazard?

• Breaks down the surface of the material it feeds on causing physical and chemical changes

• Waste products from mould cause staining and colour changes

• Damaging to human health
Health risks of mould

Mould produces irritant and toxic substances called mycotoxins that can cause symptoms of ill health. They are therefore classified as harmful:

- Harmful if inhaled: allergic reactions, asthma, hay fever-like symptoms, headache
- Harmful in contact with skin: skin rashes and dermatitis
- Severe cases: neurological problems and death
- Respiratory sensitisier: problems for future exposures
- People with allergies, respiratory problems and / or compromised immune systems are more susceptible and should not deal with mould – but everyone should be cautious.
- Warning: serious outbreaks require professional help – do not attempt to tackle in house - consult professional services, mycologists, conservation specialists
Health and safety

The Government legislation that directly relates to mould in the workplace is the Control of Substances Hazardous to Health (COSHH) Regulations 2002. [Harmful substances (hse.gov.uk)](https://www.hse.gov.uk)

COSHH is the law that requires employers to control hazardous substances and put in place measures to prevent or reduce staff member’s exposure to hazardous substances by:

- Being vigilant to potential outbreaks
- Deciding how to prevent harm to health by carrying out a risk assessment
- Providing adequate training and information
- Providing adequate PPE
Personal protective equipment

- Nitrile gloves
- Disposable face mask FFP3 conforming to EN149 + A1 is recommended. Ensure mask is properly fitted
- Disposable overalls – Tyvek
- Goggles
- Dispose of masks, overalls and gloves at the end of the day/shift in sealed plastic bags. Wash hands after removing gloves and wash clothes when home.
How to prevent mould growth

Depriving mould of the environmental conditions that it requires to flourish will halt the spread of mould and prevent it growing in future:

Monitor environment/discover the source of damp or high humidity

Ensure that the source of damp has been dealt with...building maintenance/re-arranging store/moving objects

Reduce the RH of the space to below 65% - de-humidifier, incrementally if necessary. Do not introduce heat

Encourage air movement around objects, introduce cool ventilation/fans when mould is removed
How to safely remove mould: historic objects

Simple but effective methods are best:

• Make sure cause of mould has been dealt with
• Isolate the affected object if possible
• If mould is dead it should be powdery (not smeary)
• Brush mould from sound surfaces into vacuum (in ventilated area)
  • Vacuum must have HEPA filter
  • Dust bag removed and disposed of at the end of cleaning
• Brushes to be disinfected or disposed of
• If surface is sound wipe with smoke sponge/chamois leather
• Avoid using chemicals to clean or de-nature mould
• Consult a specialist conservator if the surface is fragile  https://www.conservationregister.com/
How to safely remove mould: non-historic surfaces

- Any packing materials should be disposed of.
- Virkon disinfectant (used by labs, hospitals).
- Steri 7 alcohol free wipes (used by some commercial companies).
- Hydrogen peroxide bleach (used in America, but % solution unknown).
- H & S and COSHH implications.
- Return objects to shelves when dry.
- Dispose of used cleaning materials, disinfect brushes.
After-care summary

- Introduce policies to prevent future outbreak, building maintenance, locking-up checks of the building
- Monitor and control environment
- Think about ventilation and circulation of air
- Keep objects clean and possibly cover
- Regular inspections including undisturbed areas, behind/under objects
  - UV light/ Raking light
Further resources

• Museum of London e-tool learning  https://hazardsincollections.org
• HSE website  hse.gov.uk  Harmful substances (hse.gov.uk)
• British Library paper and book conservation guides  Preservation guides | Conservation | British Library - The British Library (bl.uk)
• Collections Trust Spectrum 5.0  www.collectionstrust.org.uk/spectrum
• The National Trust Manual of Housekeeping  Chapter 8
• American National Archives website  Mold and Mildew: Prevention of Microorganism Growth In Museum Collections | National Archives
• YouTube videos by NHS and manufacturers on how to fit a face mask correctly
• Institute of Conservation; Conservation Register  Quality conservators - Icon - The Institute of Conservation (conservationregister.com)
Thank You!