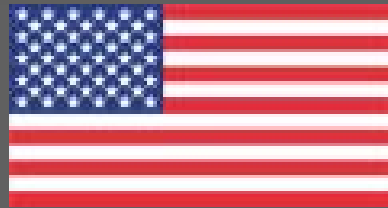







Mold in Construction



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-  **We ARE NOT LAWYERS, and can't give legal advice. If you need it, talk with your own lawyer.**
-  **Our discussion of a topic does not change or create insurance coverage- your insurance policy does that.**
-  **This class does not, and cannot cover all conditions you may encounter in the real world.**
-  **YOU always have FINAL responsibility for YOUR safety.**

Cost of Mold

⇒ New York City

- ▣ 150 families file suit against housing complex owner claiming failure to eliminate mold. 5 are wrongful death suits.

⇒ Florida

- ▣ Construction defect claim against architect, CM and subs. \$11.5 million awarded

Cost of Mold

⇒ California

- ▣ \$33,000 settlement regarding roof leaks

⇒ Texas

- ▣ \$30 million bad faith claim against insurer over mold
 - Reduced to \$4 million

⇒ Ed McMahon

- ▣ \$20 million against insurer and contractor
 - Settled for \$250,000

Insurance Coverage

- ⇒ Coverage is major issue at this time
- ⇒ All insurers are trying to get exclusions
 - ▣ \$1.2 billion paid out in 2001
 - ▣ \$2.5 billion paid out in 2002

Insurance Coverage

Most important thing you can do
is
report potential claims as soon as you are
aware of them

Session Overview

- ⇒ Health and mold
- ⇒ Reasons for mold growth
- ⇒ Prevention
- ⇒ Assessment guidelines
- ⇒ Remediation procedures

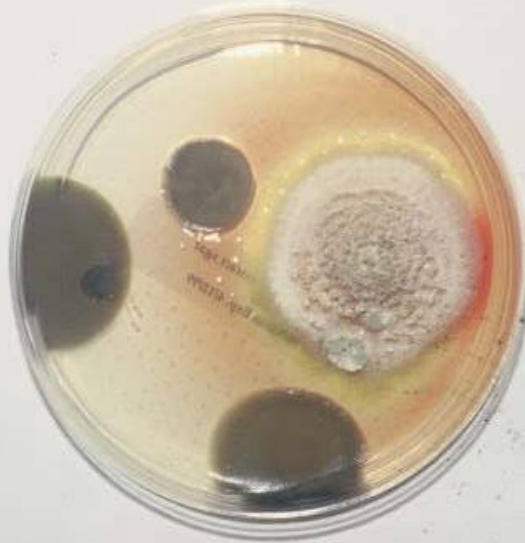
30 Second Seminar

- ⇒ Mold is everywhere
- ⇒ Only 3 things needed for mold growth
- ⇒ Mold will always be here
- ⇒ Can't eliminate the first two – the only option is #3 – control moisture

Mold Verses Fungus

- ⇒ Fungus is one of the kingdoms (plants, animals)
- ⇒ Mold is a term of convenience
- ⇒ All mold is fungus, not all fungus is mold.
- ⇒ We will use the terms interchangeably

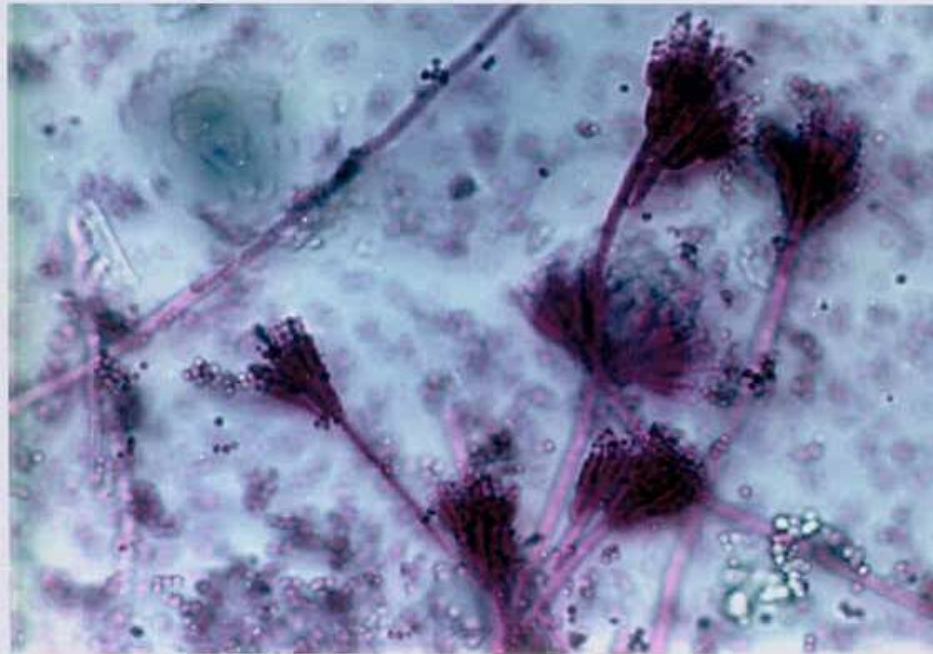
Aspergillus vulpinum (green) &
Cladosporium cladosporioides (dark)



Aspergillus ustus



Penicillium Fungi



Health and Mold

- ⇒ Potential mold reactions depend on:
 - ▣ Species involved (there are 1000s of them)
 - ▣ Metabolic products of species
 - ▣ Duration and intensity of exposure
 - ▣ Susceptibility of individual
- ⇒ Just because mold is present does not create a hazard – it is always there.

Health and Mold

- ⇒ Allergic reactions – probably the most common response
- ⇒ Infections – rare (e.g. histoplasmosis). 95% recover naturally. Medical facilities are high risk location.
- ⇒ Irritation – from chemicals produced by mold.

Health and Mold

- ⇒ Mycotoxins – chemicals produced by some (not all) molds.
 - Some extremely toxic – some therapeutic
 - Most have little or no research on health effects
 - Most human disease due to eating contaminated food or huge agricultural exposures – NOT inhalation

Health and Mold

⇒ Toxic Mold - Stachybotrys

- ▣ 1994 – 10 acute pulmonary hemosiderosis in infants in Cleveland – Stachybotrys found in houses
- ▣ 2000 – CDC study - not enough evidence to conclude an association between indoor mold and childrens' condition
- ▣ CDC position on health effects – no consensus

Health and Mold

⇒ Texas Medical Association – Council of Scientific Affairs

No evidence that *Stachybotrys* causes serious health problems or aggravates existing health conditions.

Houston Chronicle 22 Sept. 2002

Health and Mold

“Levels of exposure in the indoor environment, dose-response data in animals, and dose-rate considerations suggest that delivery by the inhalation route of a toxic dose of mycotoxins in the indoor environment is highly unlikely at best.....”

American College of Occupational and Environmental
Medicine October 2002

Health and Mold

⇒ Annals of Allergy Asthma Immunology

Vol. 87 Dec. 2001 p.57-63

Stachybotrys: Relevance to Human Disease

Conclusions: The current public concern for adverse health effects from inhalation of stachybotrys spores in water-damaged buildings is not supported by published reports in the medical literature

Health and Mold

⇒ Annals of Allergy Asthma Immunology

Vol. 87 Dec. 2001 p. 52-6

Fungi: Toxic Killers or Unavoidable Nuisances

Conclusions: The review led to the conclusion that the primary effect from fungal exposure is allergic disease, and that the evidence for inhalation disease resulting from mycotoxin exposure in residential and office settings is extremely weak.

Medical Tests

- ⇒ Few medical tests available
- ⇒ Can only document that exposure has occurred
- ⇒ Can not determine source, place, time of exposure
- ⇒ Mold exposure occurs naturally all the time
 - both indoor and outdoor

Reasons for Mold Growth

- ⇒ Primary reason – moisture accumulation
 - ▣ Design flaw
 - ▣ Construction flaw (e.g. leaky roof, vapor barrier, installation of wet materials)
 - ▣ Pipe leak, water overflow
- ⇒ Growth can start within 48 hrs.

Reasons for Mold Growth

- ⇒ Modern buildings seem particularly susceptible – tight construction
- ⇒ Increase of wall board vs. metal mesh and plaster

Prevention

- ⇒ Prevent moisture accumulation
- ⇒ US EPA study – 45% of office buildings surveyed had active water leaks

Prevention

- ⇒ Consult envelope engineer on geometrically complex buildings for water tightness
- ⇒ Document any recommended changes to Architect of Record.
- ⇒ If recommendation is rejected copy to owner and your file.
- ⇒ Don't just “shrug and build it”

Prevention

- ⇒ Renovations or additions – pre-existing mold survey.
- ⇒ Prequalify potential subs that they have expertise in specific application
- ⇒ Consult manufactures of moisture critical products:
 - ▣ Fitness for intended service
 - ▣ Confirm product's proper application
 - ▣ Provide preferred installers

Prevention

- ⇒ Proper sequencing of work – keep interior materials away from exterior conditions
- ⇒ Inspect materials at delivery
 - Pre-existing mold
 - Proper moisture content per manufacturer
- ⇒ Storage
 - Dry location
 - Off the ground
 - Loose tarps or sheets to allow air flow

Prevention

Be sure foundation is dry

- ▣ Drain away

- ▣ Slope away

- ▣ Roof drains properly supported and braced

- ▣ Sprinklers will not water the foundation

- ⇒ Proper insulation on chilled water pipes

Prevention

- ⇒ Double check points where moisture may enter
 - ▣ Doors
 - ▣ Windows
 - ▣ Flashings and caulking
 - ▣ Waterproof membranes (proper lapping at joints and corners)
 - ▣ Roofing systems and penetrations
 - ▣ Balconies and decks

Prevention

⇒ Pre-arrange drying equipment

- ▣ Fans

- ▣ Dehumidifiers

- ▣ Wet-dry vacs

Prevention

- ⇒ Dry materials as quickly as possible
- ⇒ If possible, ventilate wall cavity
- ⇒ Be sure it is safe to use equipment
 - ▣ Electrical
 - ▣ Ventilation

Prevention

Hidden moisture during 1993 Mississippi floods.

- ⇒ Pipe chases/utility tunnels
- ⇒ Above drop ceilings
- ⇒ Under carpeting
- ⇒ Wall cavities

Prevention

⇒ HVAC system

- No internal lining – bare galvanized sheet metal
- Cooling coil drip pans
- Filters – good quality and in place
- Humidity levels – 30-50% RH

Vinyl wall covering traps water



Prevention - Drywall

- ⇒ Greenboard – moisture resistant
 - ▣ Wax added to gypsum and paper cover
 - ▣ More resistant to moisture uptake
 - ▣ Cost increase to use greenboard throughout
1 study – 0.08 – 0.6% increase
- ⇒ Capillary breaks or moisture barriers
between gypsum and masonry materials

Prevention

- ⇒ Double check all water lines
 - ▣ Proper installation
 - ▣ Connections leak tight
 - ▣ Proper insulation
 - ▣ Multiple checkers for leak detection
- ⇒ HVAC commissioning – actual air flow tests critical

Prevention

⇒ Consider interim inspections for mold issues

- ▣ Architect

- ▣ Envelope engineer

- ▣ Mechanical engineer

- ▣ Materials manufacturer's representative

Prevention

- ⇒ New building owners must be trained on:
 - ▣ HVAC system
 - ▣ Maintenance of structure
 - ▣ Water damage
 - ▣ Vent moisture appliances
 - ▣ Humidity control
 - ▣ Sprinkler systems not watering building

Prevention

- ⇒ DO NOT use outdoor fungicides for indoor situations.

QA/QC

⇒ Three steps to quality assurance

- ▣ Build in strict accordance with plans and specifications
- ▣ Design professionals correct flaws in plans and specs that are likely to allow intrusion
- ▣ Document every step, including photos of key installations.

Toxic Mold Part 1

Dave Dolnick

Constructor – Oct. 2001

Prevention

“If builders and insurance companies aren’t sensitive (to mold concerns) then they are provoking people to bring claims to justify their own fears”

Plaintiffs often win cases with the argument that mold growth was exacerbated by the insurance company’s or builder’s action, but not proof that the mold made them sick.

John Sweeney Miles & Stockbridge Law Firm

Assessment

- ⇒ No generally accepted levels for mold in environment.
- ⇒ 1986 ACGIH proposes mold TLV
 - 500 CFU/M³ in office environment.
Indoor/outdoor ratio should be less than 0.33.
- ⇒ Guidelines deleted in 1987. Lack of scientific data to support levels and difficulty in interpretation.



Assessment

- ⇒ Visual inspection is the most important initial step in identifying a possible contamination problem.
- ⇒ Testing not required for remediation.
- ⇒ Lots of variables in air monitoring collection and interpretation of results.

Assessment

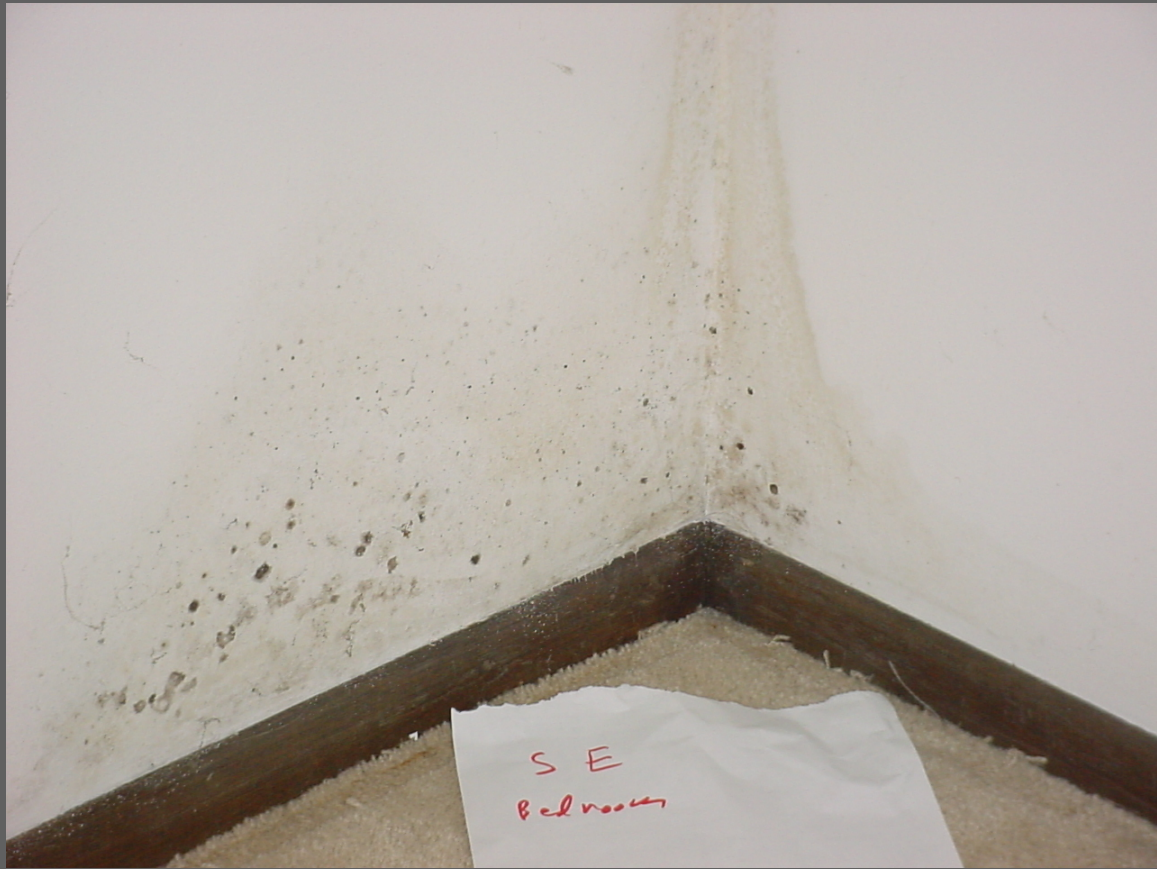
- ⇒ “Bulk or surface sampling is not required to undertake a remediation.” “Air sampling for fungi should not be part of a routine assessment....”

NYC Guidelines

- ⇒ “If it is not possible to sample properly, it would be preferable to not sample. Inadequate sample plans may generate misleading, confusing and useless results. US EPA

Assessment

- ⇒ Moisture meters
- ⇒ Mold growth may occur up to 1 meter past high water mark or visual mold
- ⇒ In addition look for:
 - ▣ Earthy, musty odor
 - ▣ Discolored plaster, wall board, building materials
 - ▣ Suspected water accumulation or intrusion



S E
Bedroom

Assessment – Air Monitoring

⇒ Simultaneous samples collected in

- ▣ Problem area

- ▣ Outdoors

⇒ Compare results

Assessment – Air Sampling

- ⇒ Look for higher levels indoors, or different molds – suggests amplification source
- ⇒ Can not prove sources of health complaints
- ⇒ Can not suggest remediation procedures
- ⇒ Remember – mold is everywhere.

Assessment – Air Monitoring

⇒ Having said all that: Situations that require it:

- ▣ Litigation
- ▣ Building management requires evidence that identified source is being spread
- ▣ Building management (occupants) insist

Assessment – Air Sampling

- ⇒ “Sampling should be done only after developing a sampling plan that includes a confirmable theory regarding suspect mold sources and routes of exposure.” US EPA

Assessment – Air Sampling

- ⇒ What will we learn?
- ⇒ How and who collects and analyzes samples?
- ⇒ What criteria to interpret the data?

Assessment

If you can see or smell mold
you have a mold situation.

May not be a health hazard but it
must be addressed

Remediation

- ⇒ To conquer mold conquer moisture problems.
- ⇒ Most important action **STOP THE MOISTURE.**
- ⇒ Don't bother doing anything until the moisture source is eliminated

Decontamination

- ⇒ Non-porous materials (e.g. glass, brick, plastic)
- ⇒ Porous materials (e.g. carpet, drywall, cloth)
- ⇒ EPA and OSHA do not recommend routine use of bleach or other biocide

Decontamination

- ⇒ Read labels
- ⇒ Follow directions
- ⇒ Use PPE
- ⇒ Don't be Mr. or Ms. Science and start mixing things.

Decontamination -Drywall

- ⇒ In some situations – decontaminate and encapsulate
 - ▣ Limited mold growth
 - ▣ Can access **both** sides of drywall
 - ▣ Zinc rich paints can be used to control mold
 - ShieldZ – Zinzer
 - Foster 40/20 – H.B. Fuller

Decontamination

- ⇒ Ozone generators – not recommended
- ⇒ UV lights – not recommended

US EPA Guidelines

- ⇒ Level 1 – Small areas – 10 ft² (ceiling tile)
- ⇒ Level 2 – Medium – 10-100 ft² (one to several wallboard panels)
- ⇒ Level 3 – Large – over 100 ft²

- ⇒ New York City has additional guidance for HVAC remediation

US EPA Guidelines

- ⇒ EPA Guidelines assume clean water damage
- ⇒ Get help for sewage, chemical/biological contaminated water damage
- ⇒ Everything is just a starting point – each job needs professional judgment

Workers and Supervisors

- ⇒ Level 1 – Trained building staff
- ⇒ Level 2-3 – “Qualified” safety professional makes cases-by-case determination

(From NYC Guidelines)

Respirators

- ⇒ Level 1 - N95 disposables or better
- ⇒ Level 2 - Full face with N100 filters
- ⇒ Level 3 - PAPR with N100 filters
- ⇒ Remember OSHA Respirator Program

Worker Protective Clothing

⇒ All levels

- ▣ Impervious gloves – mid-forearm
- ▣ Goggles – sealed or indirect vent only
- ▣ Disposable coveralls
- ▣ Hand and face washing station

Containment

- ⇒ Level 1 – none required
- ⇒ Level 2 – increasing levels as specified
- ⇒ Level 3 – under negative pressure similar to asbestos abatement
- ⇒ All levels – light water misting – not soaking
- ⇒ Lots of professional judgment is needed here

Waste Disposal

⇒ Bag

⇒ Rinse

⇒ Toss – check with local authorities just to be sure. Moldy material is NOT RCRA hazardous waste.

New Resources

- ⇒ OSHA Draft Mold Recommendations – release date unknown. VERY similar to US EPA
- ⇒ AGC of America – Managing the Risk of Mold in the Construction of Buildings – March 2003
 - www.agc.org

Regulatory Action

⇒ States planning or taking legislative action

- ▣ Connecticut

- ▣ Massachusetts

- ▣ New York

- ▣ Virginia

- ▣ California

- ▣ Maryland

- ▣ Texas

Review

- ⇒ Mold will always be with us.
- ⇒ Health effects may be scientifically questionable, but public perception is reality.
- ⇒ To control mold, control moisture.
- ⇒ Visual inspection is first step in assessment
- ⇒ No PEL or TLV for mold.
- ⇒ EPA and NYC have remediation guidelines

Mold in Construction

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