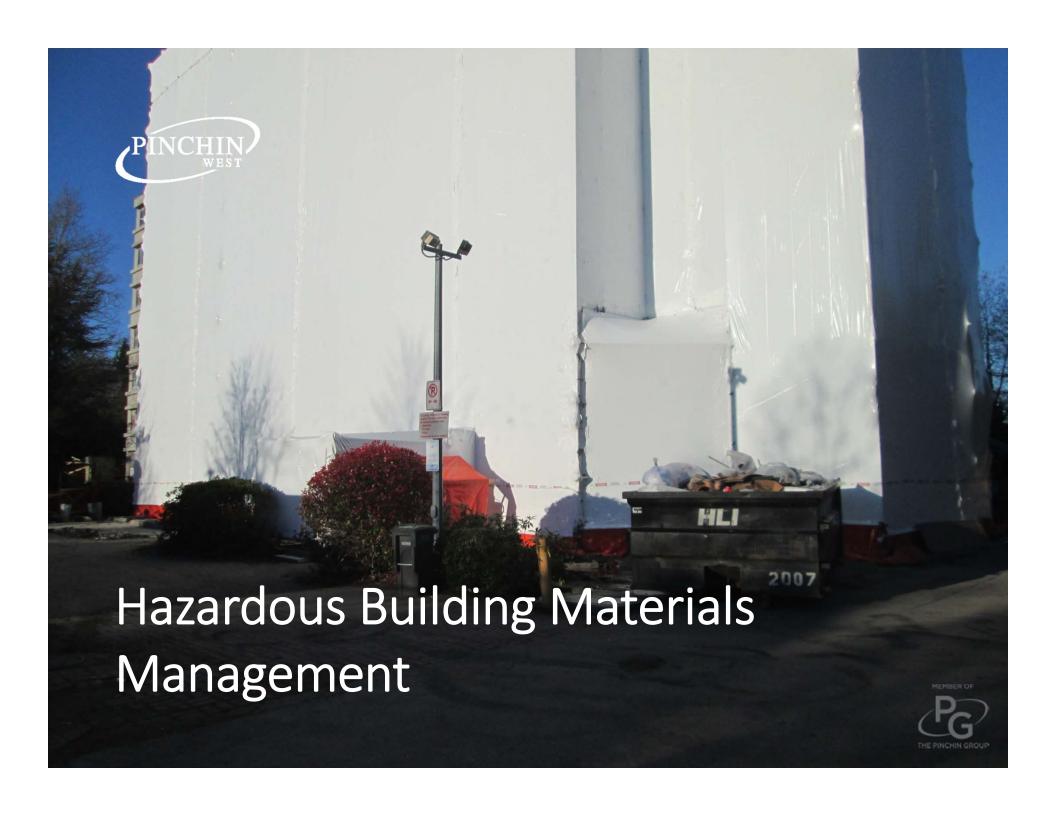


Lunch and Learn Overview

- Hazardous Building Materials (HBM)
 - Regulatory Requirements
 - Common Asbestos-Containing Building Materials
 - Lead Paint, Mercury and PCBs issues
 - Management Strategies for hazardous materials
 - HBM Abatement, what does it look like?
- Mould and Water Damage
 - Building Materials Commonly Impacted by Mould
 - Water Damage Due Diligence
 - Restoration Review and Oversight
- Building Science Investigations
 - Leak investigation following water ingress
 - Repair of water ingress to prevent future mould growth
 - Preventing water ingress through proactive inspection
- Project Case Studies





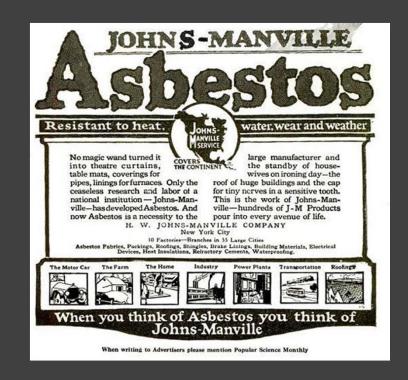
Regulatory Requirements

- Section 20.112 of the BC OHSR
- Before any renovation or demolition work begins, the employer or owner must retain a Qualified Professional to:
 - Inspect the site to identify any asbestos, lead, heavy metals, toxic, explosive or flammable materials that may be handled, disturbed or removed.
 - Have the inspection results available.
 - Ensure that hazardous materials are safely removed.
 - Cease work if additional hazardous materials are identified during demolition.



What are the Useful Properties of Asbestos – why was it used?

- Inexpensive
- Incombustible and heat resistant
- Flexible, can be woven
- Strong
- Electrical insulator
- Resistant to water, weathering and many chemicals
- Increases tensile strength and alters viscosity of liquids
- Over 3,000 commercial products used asbestos as an additive.





FRIABLE VS. NON-FRIABLE

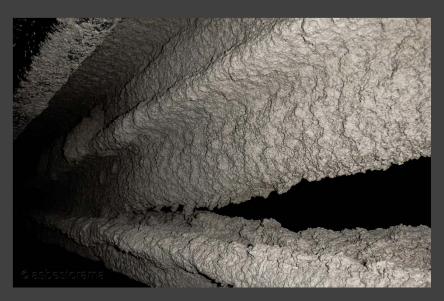
- Friability: ease with which a material can be ground or pulverized, and which fibres can be released into air
 - Friable: when dry, can be easily crumbled or powdered by hand pressure (fireproofing, texture coat, pipe/vessel insulation, vermiculite)
 - Non-Friable: not easily crumbled or powdered by hand pressure (vinyl floor tiles, drywall, plaster, Transite, caulking, mastic, gaskets)





Friable Materials





Pipe Insulation

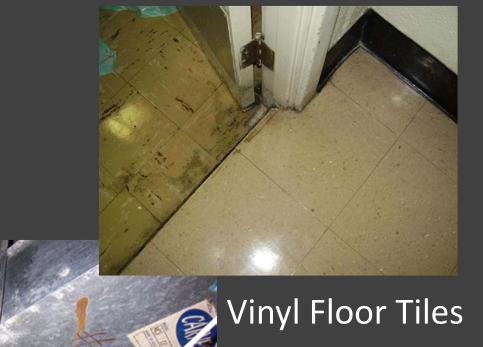
Fireproofing



Non-Friable Materials



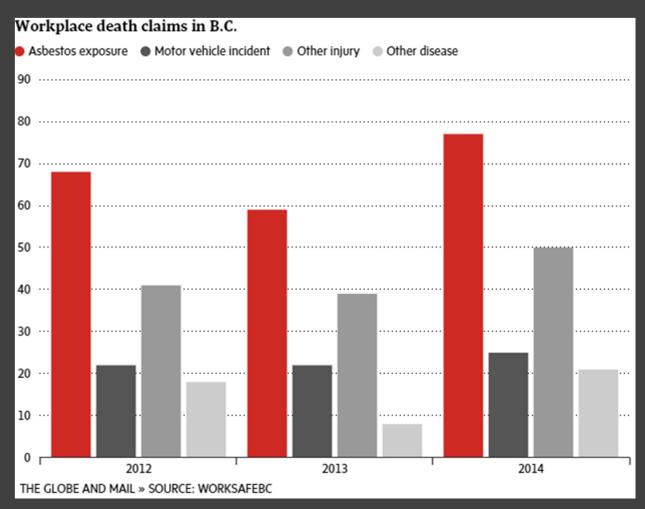
Drywall





Duct Mastic

Asbestos-related claims on the rise.





Lead Paint

- Lead was widely used in paints to increase durability and resist corrosion up to 1978.
- Causes nervous system damage, stunted growth, and delayed development in children.
- WorkSafe BC using 0.009% as criteria for LBP.





Structural Steel Coatings





Lead Cladding





Poly Chlorinated Biphenyls (PCBs)

- PCBs were used widely as coolants for electrical apparatus from (1930 to 1977)
- PCBs bio-accumulate in food chain, and are possible human carcinogen (IARC 2A*)
- All PCB-containing equipment must be carefully disposed of, prior to demolition.



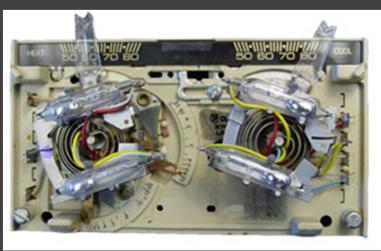




Mercury

- Mercury is used in control switches, thermostats, fluorescent light bulbs
- Inhalation is the most significant route of entry, resulting in impaired neurological development in children.
- All mercury-containing materials must be carefully disposed of, prior to demolition.







Silica

- A natural occurring mineral present in the cement, concrete and aggregate,
- Exposure to dust results in silicosis, characterized by: shortness of breath, coughing, fever and cyanosis.
- WCB requires exposure control plan and work procedures for silica.





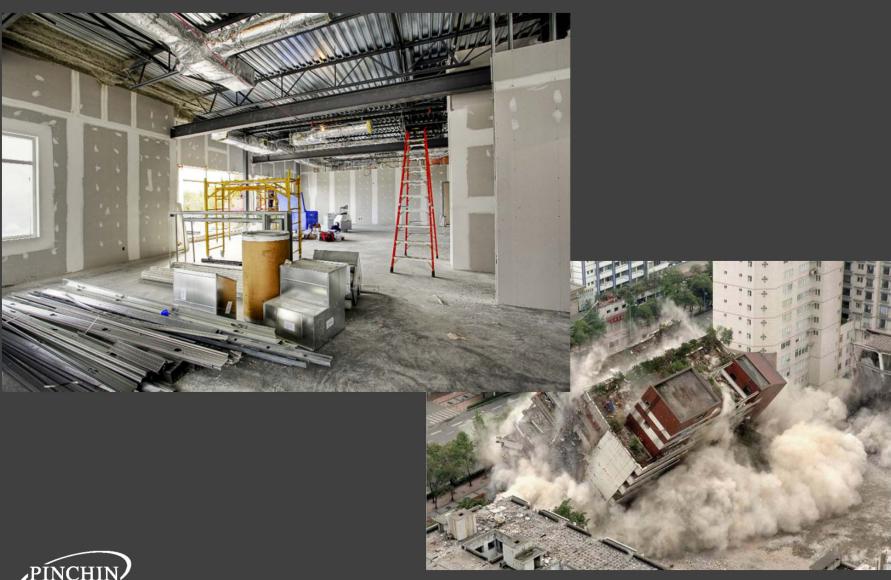
Management Strategies

- Management Surveys (HMIS)
 - Asbestos Management Plans
 - Labelling
 - Worker Awareness Training
- Pre-Renovation and Pre-Demolition Surveys
 - Be pro-active!
 - Hazardous Materials Abatement





Typical Drivers for Abatement

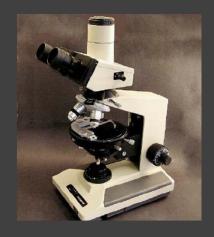




Tools of the Trade











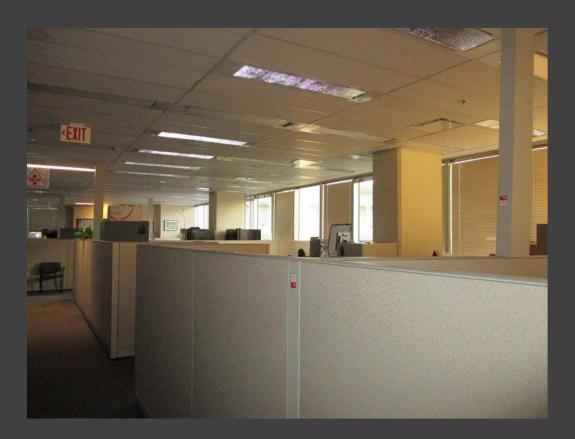






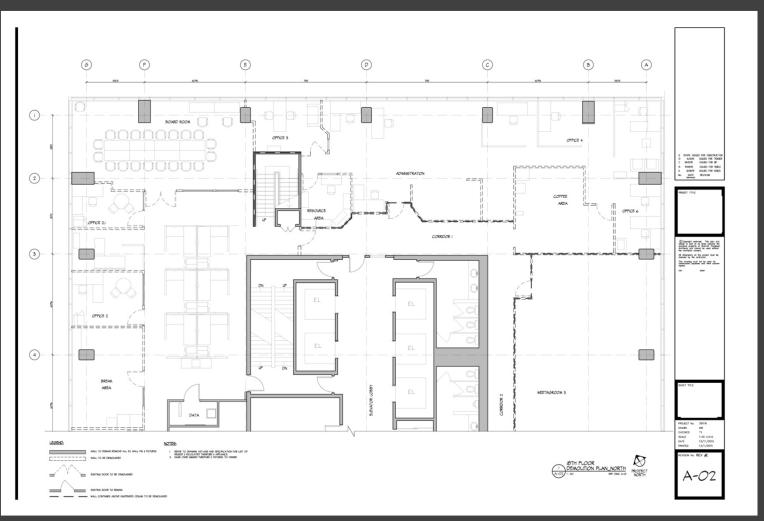
Project Example

 Renovation of an office building to accommodate a new tenant.



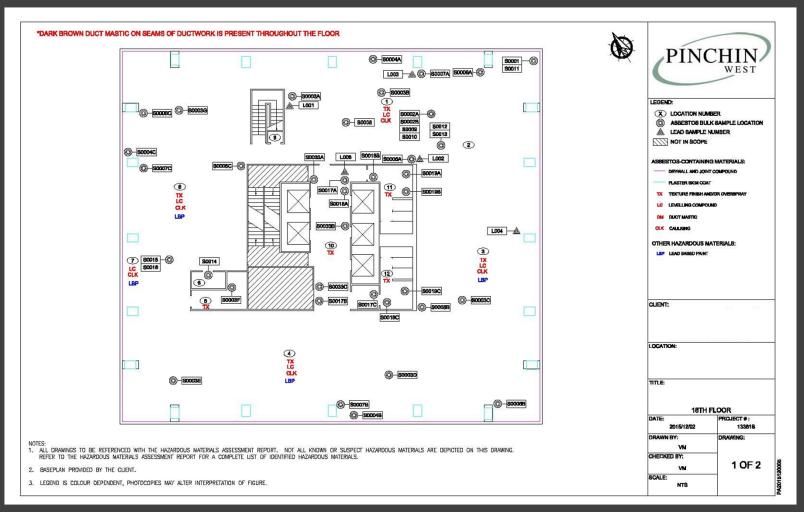


Demo Drawing Provided by Client





Materials Sampled by Pinchin





Asbestos Abatement





Asbestos Abatement







New Developments

- City of Vancouver now requires certification and sign-off BEFORE a demolition permit can be issued (2016).
- Salvage and Abatement Permit issued before Hazmat Abatement.
- Must include hazardous materials assessment report.
- Closure report certifying all hazardous materials have been removed completed prior to demo permit issue.
- Form must be signed by a P.Eng., AScT, or Certified Safety Professional.
- Effective April 1, 2016.



Proposed Regulatory Changes (effective 2017)

- Notice to WorkSafeBC for asbestos work increasing from 24 hours to 72 hours (NOPA).
- Removing lead paint is notifiable to WorkSafeBC and will require 72 hour advance notice.
- Hazardous Materials Assessment report must include drawings locating hazardous materials.
- More onus on "Building Owner", not just Contractor or Employer to manage asbestos.











Mould and Water Damage





What's the big deal?

- Water is the single most destructive element with respect to buildings.
- Responding quickly and aggressively in the first 24 hours results in the best outcome, lowest overall costs, and less disruption to occupants.



It's just a little bit of water right?

- 24 to 72 hours for mould to grow
- Water
 contamination
 gets worse with
 time
- Rapid response saves time and money





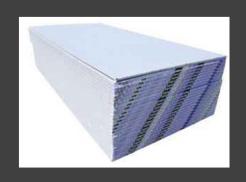


Why is mould a problem?

- Mould exposure can result in allergy-like symptoms.
- Water damaged buildings have been linked to childhood asthma.
- Immune compromised individuals can become very sick, and even die if exposed to mould.
- Most types of water damage are covered by insurance policies, mould often is <u>not</u>.



Commonly Impacted Materials















What does mould look like?



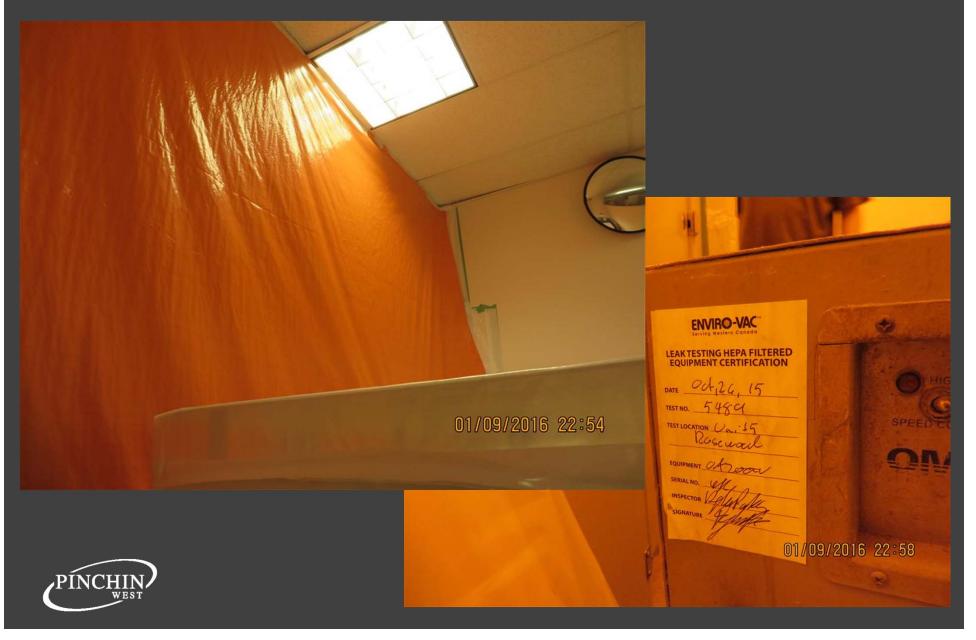


What does mould look like?





Mould Remediation



Mould Remediation



Tools of the Trade













Water Damage Due Diligence

- Do not ignore musty odours
- Special care required in healthcare environment (medical clinics, dental offices, etc.)
- Source of water is important to identify (sewage vs. potable water)
- Respond to water losses within 24-48 hours
- Perform aggressive structural drying, this may require sacrificing low value building materials (baseboards, etc.)
- If mould growth is identified a professional should be engaged to review site conditions and determine appropriate work procedures to protect occupants and building
- Fix the problem that caused the water damage event!



What is the most important step to mould remediation?

FIX THE PROBLEM!

Fixing the <u>root cause</u> of a problem is the only effective way of preventing it from occurring again.

- •Investigate Cause
- Determine Solution
- •Implement Project



Building Science











Reactive Investigations

Common Sources of Water Ingress















Investigation Techniques















Investigation Techniques









 Mould growth identified on asbestoscontaining drywall at exterior wall in a commercial building by occupants.





Root cause
 determined to be
 water ingress
 from poor
 drainage from
 alley parking area.





 Water proofing membrane installed to redirect water away from the wall.





 Interior building materials reinstated, ready for paint, following verification of membrane effectiveness.







- Example of failed Exterior Insulation Finishing System (EIFS) cladding
- Poor architectural detailing
- EIFS application too thin; resulting in cracking







- Mould developed due to water ingress through EIFS
- Exterior GWB
 susceptible to water
 damage (paper faced)
- New GWB resistant to water damage (FG)







- Increased thickness
 of EIFS less
 susceptible to
 cracking
- New architectural detailing; improved flashings
- Discreet Enclosure constructed so not visible to customers



Pro-active Investigations

- Capital Planning takes the surprises out of Facility
 Management
- Monitoring the condition of a building is critical to this process
- Maintenance and Renewals scheduled and budgeted to maximize Projected Useful Life
- Deferral may lead to increased costs and risk
- Tools: Condition Assessments (BECA, RCA, UPG),
 Maintenance Manuals, etc.



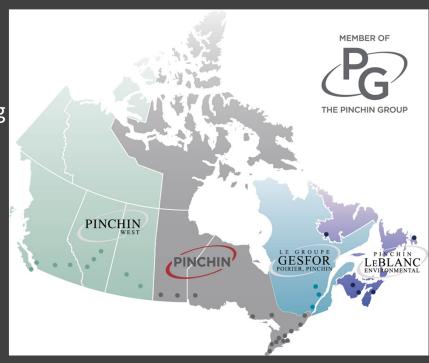
Conclusion

- Hazardous building materials must be identified prior to renovation or demolition. Removal of these materials requires special procedures.
- Water damage can quickly result in mould growth, rapid response is essential to minimize costs.
- Reactive building inspections can identify and repair the root cause of water problems.
- Proactive building inspection, maintenance and repair is the most effective way to manage risk.



Pinchin Group of Companies

- Pinchin West Ltd., established in 1984
- Part of the Pinchin Group of Companies with offices across Canada and more than 700 employees
- Specialize in consulting, engineering and training in:
 - Occupational Hygiene and Safety
 - Indoor Air Quality & Microbial Contamination
 - Building-Related Hazardous Materials
 - Construction/Maintenance Infection Control
 - Environmental Air and Noise
 - Industrial Air Emissions
 - Building Sciences
 - Environmental Management
 - Laboratory Services (Asbestos, Mould, Odour)





Questions?

