



McMaster University Asbestos Awareness



Environmental & Occupational Health Support Services

Gilmour Hall

Room 304





Topics Covered

- **What is asbestos**
- **Properties of asbestos**
- **Types of asbestos**
- **Uses of asbestos**
- **History of asbestos**
- **Health hazards of asbestos**
- **Activities resulting in potential asbestos exposure**
- **Asbestos regulations**
- **McMaster University's Responsibilities**
- **Where to get help**



What Is Asbestos

- Asbestos is a name given to a group of minerals which occur naturally as masses of long silky fibers.
- Asbestos is resistant to abrasion, inert to acid and alkaline solutions, and stable at high temperatures.
- Asbestos fibers are woven together or incorporated within other materials to create many products.
- The needle-like fibres seemed like nature's perfect gift. Fireproof, indestructible and cheap, from the 1940s to the 1970s, asbestos was everywhere. It was woven into clothes and used to insulate buildings.

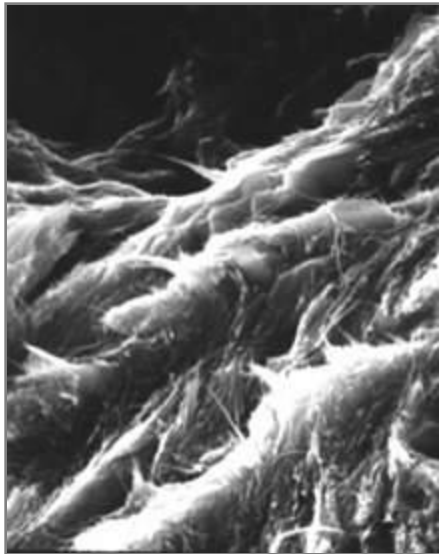


What Is Asbestos

- Asbestos is a natural mineral which was formed during intense volcanic activities millions of years ago.
- Late 1800's asbestos was mined commercially for its fireproof and virtually indestructible properties.



Properties of Asbestos



- Naturally occurring fibrous minerals
- Good tensile strength
- Flexibility
- Heat resistant
- Electrical resistance
- Good insulation
- Chemical resistant



Types of Asbestos

Three Most Common Types

- Chrysotile
 - “White Asbestos”
- Amosite
 - “Brown Asbestos”
- Crocidolite
 - “Blue Asbestos”

Three Other Categories Not Common

- Tremolite in vermiculite)
- Actinolite (possible contaminant)
- Anthophyllite





Chrysotile (White Asbestos)

- Fine, silky, flexible white fibers (the most commonly used asbestos in the United States and Canada). Current evidence suggests that Chrysotile is the most common form of asbestos and less hazardous from a health perspective than Amosite or Crocidolite.





Amosite (Brown Asbestos)

- Straight, brittle fibers that are light grey to pale brown (the most commonly used in thermal system insulation).





Crocidolite (Blue Asbestos)

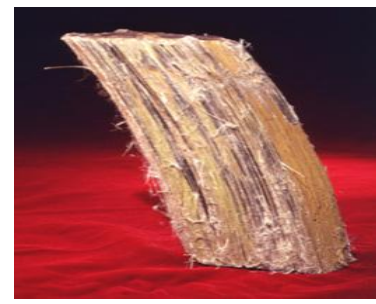
- Straight blue fibers





Match the Picture with the Asbestos Type

- Crocidolite
- Chrysotile
- Amosite



(Do a scramble - where pics move to the right type??)



Uses of Asbestos

Asbestos insulated pipe in utility space



- Thermal system insulation
- Surfacing materials
- Reinforcement of materials
- Fireproofing
- Acoustic and decorative plaster
- Textiles



Sprayed-on fireproofing material



Uses of Asbestos

- Friction materials (brakes, clutches, etc.)
- Asphalt and vinyl felts
- Papers and adhesives
- Flooring and roofing materials
- Filters, sealants, caulk, and gaskets





Sprayed fireproofing





Some Asbestos-Containing Materials

- Cement Pipes
- Cement Wallboard
- Cement Siding
- Asphalt Floor Tile
- Vinyl Floor Tile
- Vinyl Sheet Flooring
- Flooring Backing
- Construction Mastics (floor tile, carpet, ceiling tile, etc.)
- Acoustical Plaster
- Decorative Plaster
- Textured Paints/Coatings
- Ceiling Tiles and Lay-in Panels
- Spray-Applied Insulation
- Blown-in Insulation
- Fireproofing Materials
- Taping Compounds (thermal)
- Packing Materials (for wall/floor penetrations)
- High Temperature Gaskets
- Laboratory Hoods/Table Tops
- Laboratory Gloves
- Fire Blankets
- Fire Curtains



Some Asbestos-Containing Materials

- Elevator Equipment Panels
- Elevator Brake Shoes
- HVAC Duct Insulation
- Boiler Insulation
- Breaching Insulation
- Ductwork Flexible Fabric Connections
- Cooling Towers
- Pipe Insulation (corrugated air-cell, block, etc.)
- Heating and Electrical Ducts
- Electrical Panel Partitions
- Electrical Cloth
- Electric Wiring Insulation
- Chalkboards
- Roofing Shingles
- Roofing Felt
- Base Flashing
- Thermal Paper Products
- Fire Doors
- Caulking/Putties
- Adhesives
- Wallboard
- Joint Compounds
- Vinyl Wall Coverings
- Spackling Compounds



True or False

Asbestos can be found in the ceiling space of older buildings.



History of Asbestos

- 1930's **Major use began**
- 1940's **Use increased during post-war building boom**
- 1950's-60's **40-50,000 tons per year used in Ontario**
- 1970's **Concern over health effects**



History of Asbestos(continued)

1970's-80's **Specific prohibitions legislated**

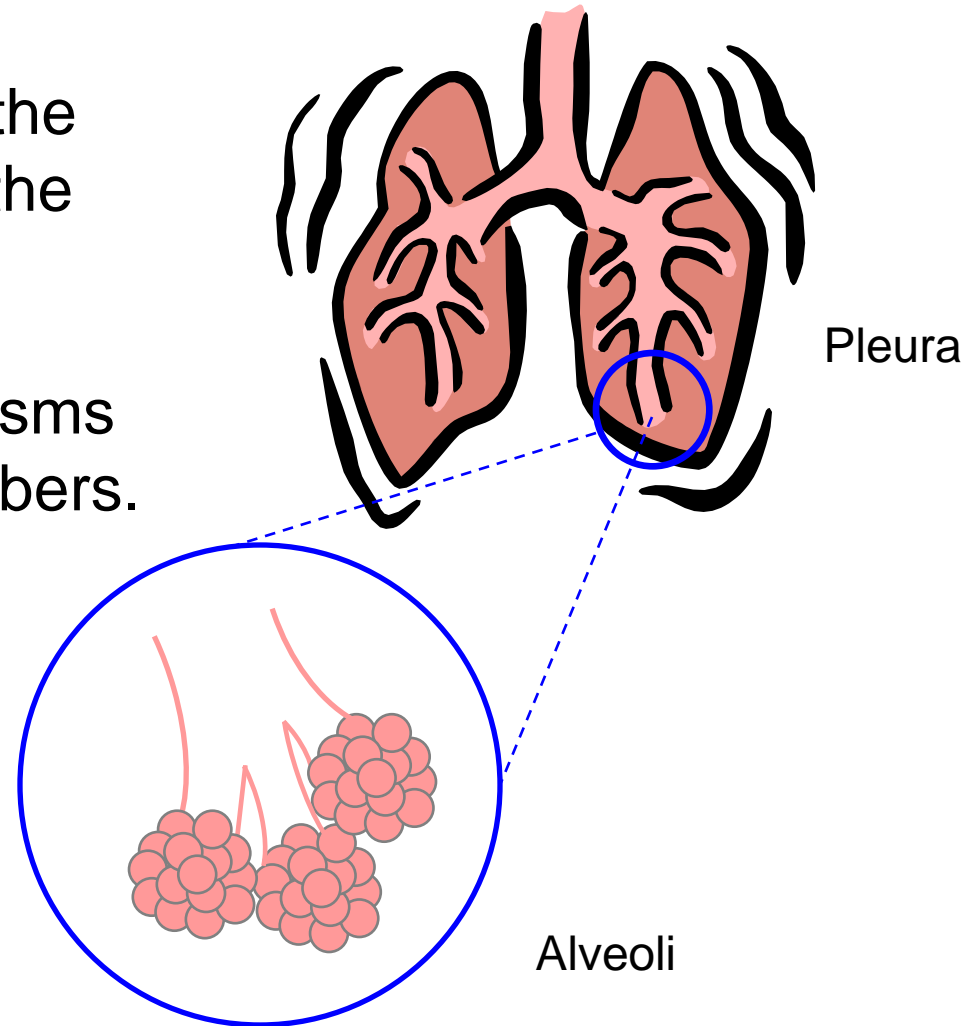
1980's -90's **Removed from many hospitals, schools**

Today **Much still remains and continues to be a risk to workers in maintenance, renovation, repair, and demolition if not managed properly.**



Asbestos is an Inhalation Hazard

- Breathable fibers are deposited in the alveoli, the ending small air sacs in the lungs.
- Body's defense mechanisms cannot break down the fibers.
- Fibers cause damage to respiratory system.





Asbestos-related Diseases

- Asbestosis
 - Mesothelioma
 - Lung Cancer
 - Other cancers
- Usually symptoms take 15 to 30 years or more to develop.
 - Health effects from asbestos exposure may continue to progress even after exposure is stopped.



Asbestos-related Diseases

Healthy Lung



Mesothelioma





What does Friable mean??

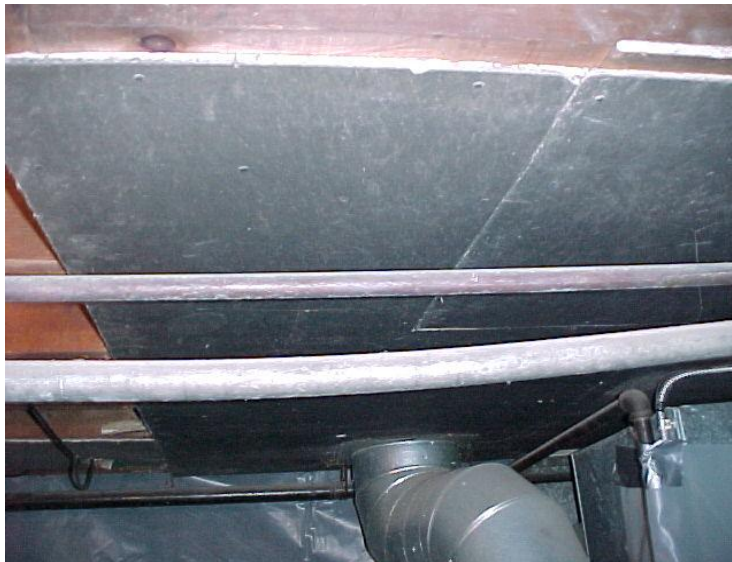
- Friable: can be easily crumbled or crushed by hand, releasing fibers into the air
- Very small fibers stay in the air for long periods
- Damaged or deteriorated ACM increases friability





Non Friable Asbestos

- Non-friable (not easily crushed by hand) asbestos examples include transite, mastic, asbestos gaskets, tracer tape, old floor tiles, etc. The above examples are based on the materials being in good shape.





Test your knowledge!

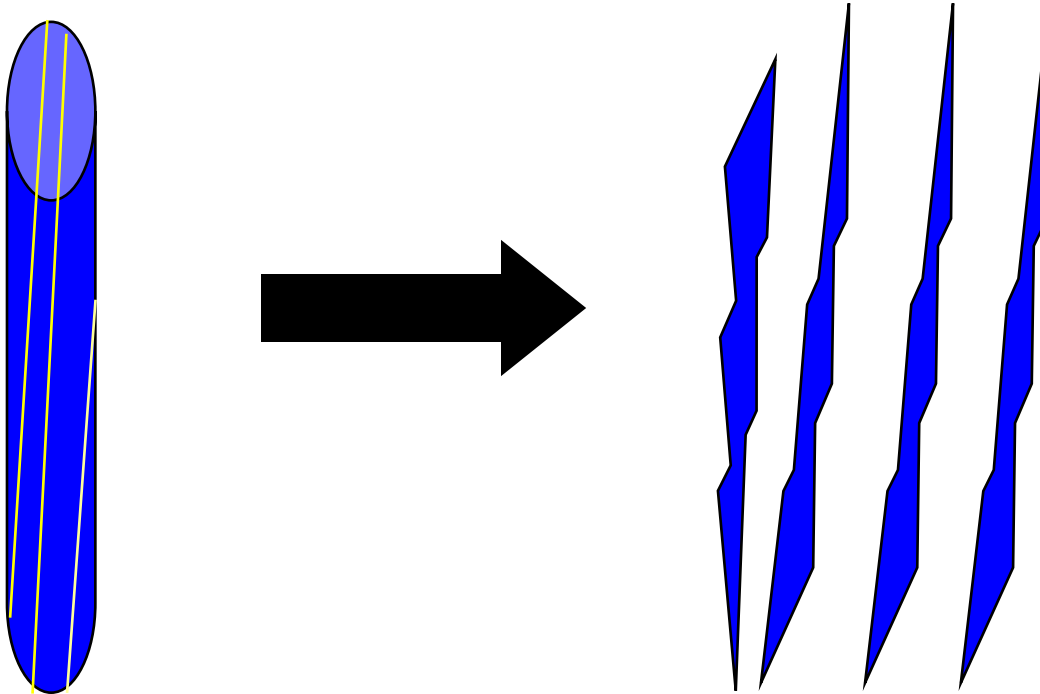
You enter a room and find that there has been a roof leak and the asbestos containing ceiling tiles have become wet and have fallen to the floor breaking into several pieces.

Would you classify the ceiling tiles as friable or non-friable?



How asbestos fibres break

Asbestos breaks along its axis.

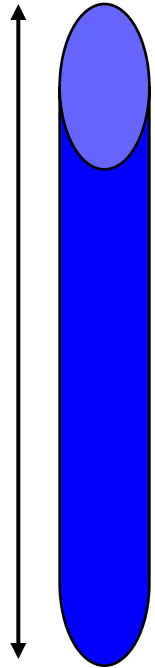




Fibre length is important

Less than
 $3 \mu m$

Greater $5 \mu m$



- Fibre length determines health effects
- Respirable fibres are usually less than $3 \mu m$ in diameter
- Concern with fibres greater than $5 \mu m$
- Fibres can penetrate up to the alveoli

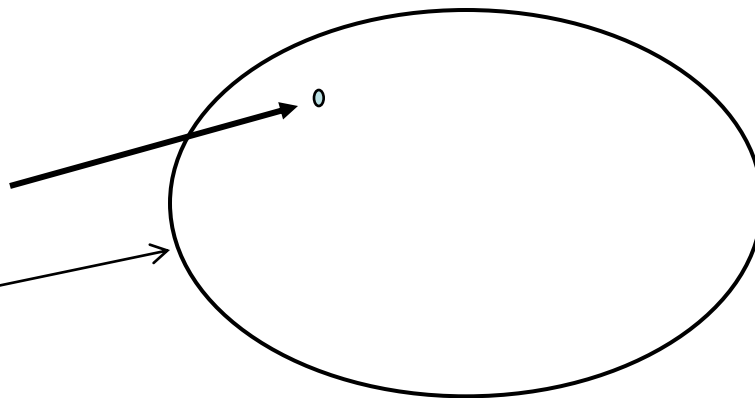


MICROMETER (μm)

- One millionth of a meter
- Can see fibres greater than $100 \mu\text{m}$ diameter
- Human hair is about $50 \mu\text{m}$ in diameter

ASBESTOS FIBRE

HUMAN HAIR





How do asbestos fibers get in the air?



Water damage, deterioration

- Mechanical action on ACM (cutting, sawing, grinding, sanding, drilling, buffing)
- Disturbing/breaking ceiling tiles
- Removing/replacing insulation
- Disturbing sprayed-on asbestos
- Damaged/deteriorated ACM
- Asbestos abatement project



Asbestos Regulations - Ontario

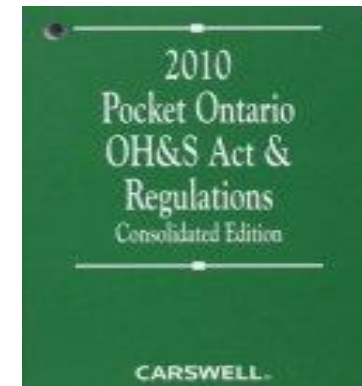
- Ontario OH&S Act – contains the regulations for Designated Substances
- Regulation 278/05 Asbestos on Construction Projects
- Regulation 490/09, previously Regulation 279/05





University Responsibility

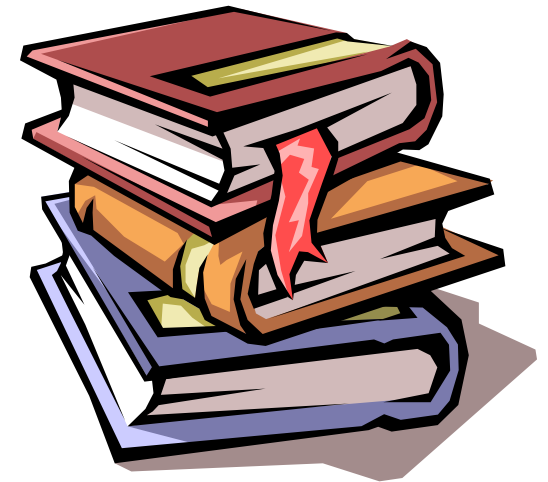
- Maintain accurate inventory of Asbestos on campus
- Follow Regulation 278/05 when removing asbestos
- Provide information under the 'Right to Know'
- Conduct occupant meetings prior to construction
- Conduct awareness sessions for JHSC members or others





Risk Management Manual

- Asbestos Management Control Program RMM #401
- Outlines roles and responsibilities of senior managers, facilities services, supervisors, project managers, contractors, EOHSS/FHSc, and JHSC with respect to asbestos
- Details abatement procedures, sampling, personal protection, training requirements, documentation, and emergency work practices





Exposure Control

□ Type 1 – non-friable

- Wet methods
- Prompt disposal
- Housekeeping

□ Type 2 – friable small

- Unventilated enclosure

□ Type 3 – friable large

- Ventilated enclosure, isolation



HEPA vacuum units

HEPA filter = high efficiency particulate air filter

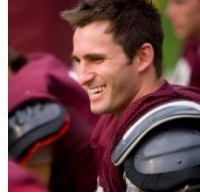




Air Monitoring

- Air monitoring is required during Type 3 projects only.
- Conducted at the start, during and following a project.
- Clearance is given prior to enclosures being torn down.
- The allowable limit for asbestos fibres is 0.01 fibres per cubic centimeters.





Questions?

Contact EOHSS at ext 24352

or

Facility Services ext 24740