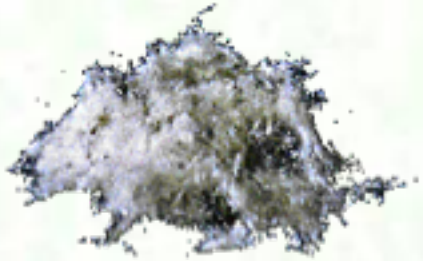
Department of LABOR AND INDUSTRIES

WHITMAN COLLEGE

Asbestos Awareness Training

An overview of properties, health effects and WISHA Rules



Topics Covered

- Properties of asbestos
- Uses of asbestos
- Health hazards of asbestos
- Activities resulting in potential asbestos exposure
- Asbestos regulations
- Where to get help
- Where to find and how to read surveys

General Overview

- 1.3 million workers exposed in the U.S.
- construction industry
  - renovation, demolition heaviest exposures

- general industry
  - manufacture of asbestos products
  - automotive brake and clutch repair
  - housekeeping, custodial

Properties of Asbestos

Asbestos ore

Asbestos fibers

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

Types of Asbestos

Most common:

- **Chrysotile**
  "White Asbestos"
- **Amosite**
  "Brown Asbestos"
- **Crocidolite**
  "Blue Asbestos"

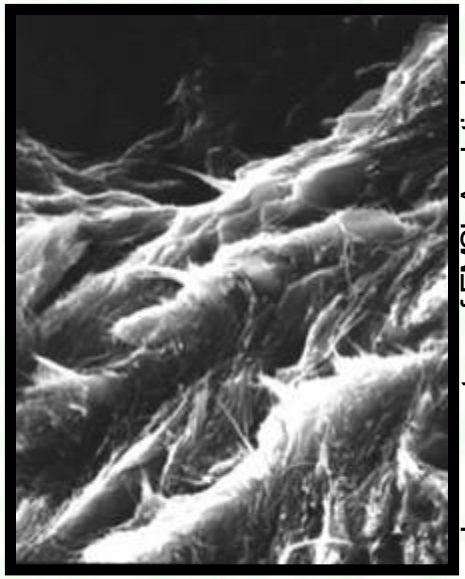


Image courtesy of EMSL Analytical, Inc. Westmont, NJ

Chrysotile fibers, high magnification

Others:

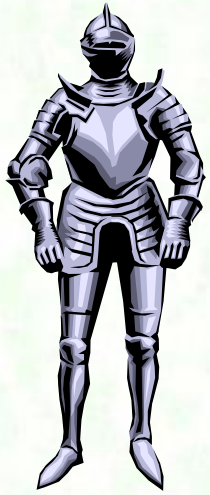
(mostly found as contaminants in other materials)

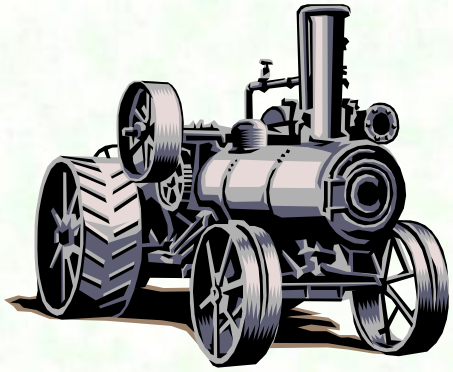
- **Tremolite**
  (possible contaminant in vermiculite)
- **Actinolite**
- **Anthophyllite**

Uses of Asbestos

Asbestos has been used for centuries

- Egyptians; Greeks & Romans
  wrapping pharaohs; lamp wicks, cloth
- Middle Ages
  insulating armor
- Industrial Revolution
  insulating boilers, steam pipes, turbines





- Twentieth century –
  World War II + next 30 years
  insulating; fireproofing; sound-proofing; decorating; strengthening

Uses of Asbestos

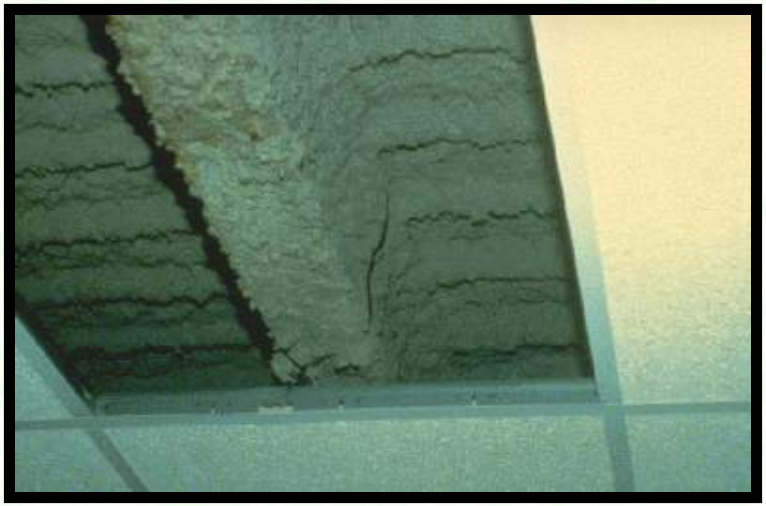
Asbestos insulated pipe in utility space

Asbestos “CAB” siding

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

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-on fireproofing material

Vinyl flooring

Some Asbestos-Containing Materials

(This list does not include every product/material that may contain asbestos. It is intended as a general guide to show which types of materials may contain asbestos.)

- 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

* Source: EPA

Some Asbestos-Containing Materials

(Continued)

- 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

"ACM" and "PACM"

Asbestos Containing Material

Any material containing more than 1% asbestos by weight.

Presumed Asbestos Containing Material

Installed prior to 1981

- Surfacing materials
- Thermal System Insulation
- Flooring

Must be handled as ACM unless proved otherwise

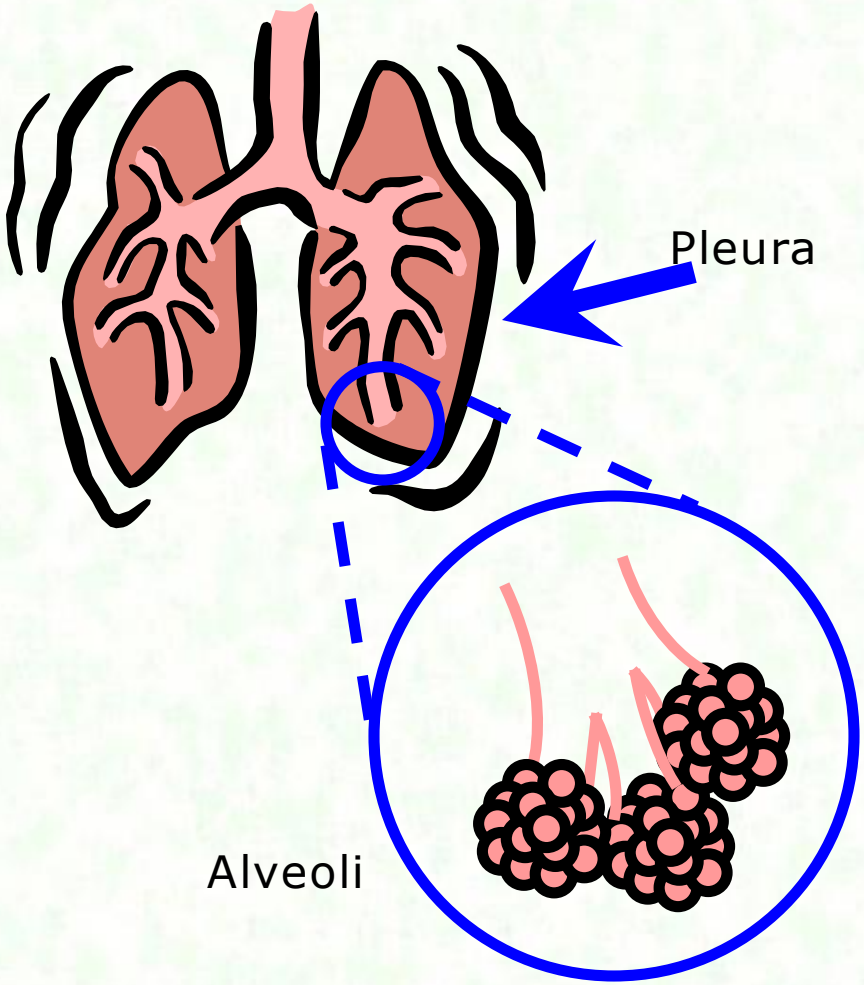
Many uses of asbestos have been banned under EPA and Consumer Product Safety Commission regulations. However, some materials where asbestos fibers are generally well bound in the materials were not banned.

Previously installed products still pose a hazard to workers. Asbestos fibers can be released during repair work, demolition, and renovation of older buildings and structures containing ACM.

Asbestos is an Inhalation Hazard

Airborne asbestos fibers inhaled deep into the lung can cause damage.

- 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.
- Fibers may also travel to the pleura, the membrane lining the lungs.



Asbestos-related Diseases

Asbestos can cause disabling respiratory disease, cancer, and eventually death.

- 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.

Asbestosis Example

Joe Darabant, 1949, covered with chrysotile asbestos fibers. Worked for 30+ years at the Johns-Manville Plant in New Jersey, cutting asbestos shingles and making asbestos block and pipe-covering materials.

Joe, 1989. Forced to retire in 1974 at age 50 from poor health; he died from asbestosis in 1990 at age 66.

Asbestosis is a serious chronic, progressive disease that can eventually lead to disability or death in people exposed to high amounts of asbestos over a long period. Asbestos fibers cause the lung tissues to scar; when the scarring spreads, it becomes harder and harder to breathe. Symptoms include shortness of breath, a dry crackling sound in the lungs while inhaling, coughing, and chest pain. This condition is permanent and there is no effective treatment.

Mesothelioma Example

Mesothelioma is a rare form of cancer of the pleura, the thin membrane lining the lungs. About 200 cases are diagnosed each year in the U.S. Virtually all cases are linked with asbestos exposure.

The cancer is very invasive and spreads quickly, eventually crushing the lungs so that the patient cannot breathe. It is painful and always fatal. It can be caused by very low exposure and is not directly related to dose.

May take 30-40 years to develop.

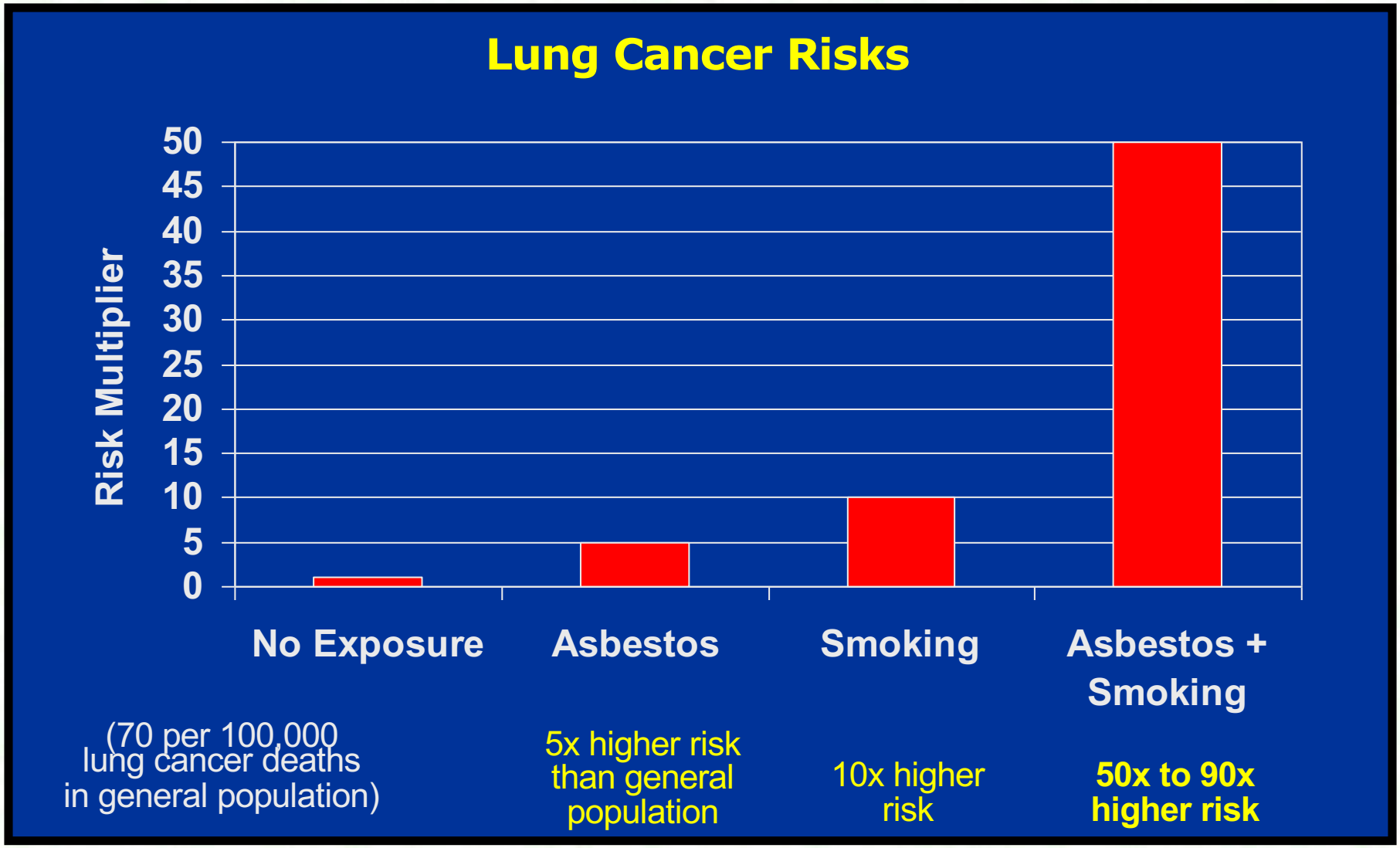
Richard Pankowski, 1986.

Diagnosed in 1985 with pleural mesothelioma; died 5 months later at age 36. In college, he worked for less than a year at the Manville Plant in N.J. Father also worked at the plant 30+ years and died from asbestosis.

Richard's exposure may have begun when he was a child.

Lung Cancer

Lung cancer causes the largest number of deaths from asbestos exposure. The risk greatly increases in workers who smoke.



Asbestos-related Diseases

The potential for asbestos–related disease depends on:

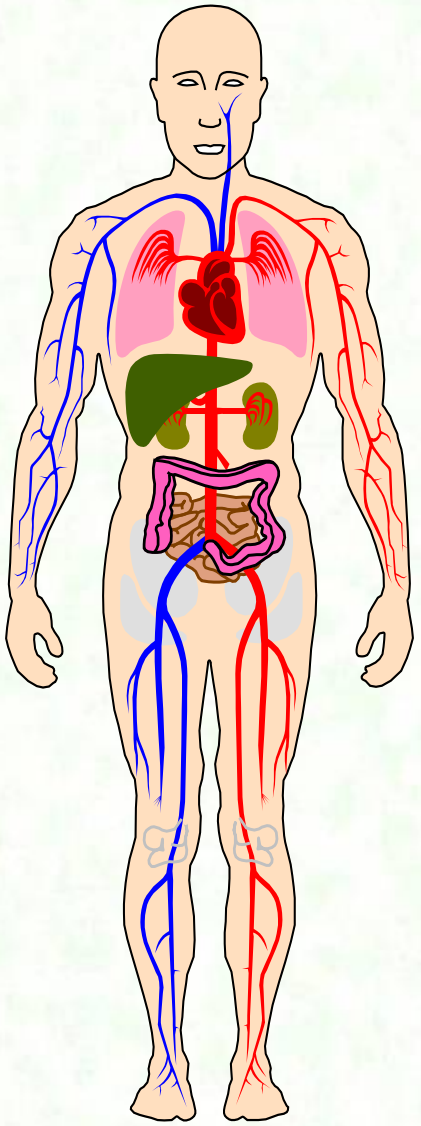
- Amount of fibers inhaled
- Length of exposure
- Whether exposed worker smokes
- Age

Don’t smoke! An asbestos worker is at much greater risk of developing lung cancer if he/she smokes.

Other Cancers

Evidence suggests that ingesting asbestos can cause cancers in the:

- esophagus
- larynx
- oral cavity
- stomach
- colon
- kidney



Fibers can enter the mouth and be swallowed. Poor hygiene, leaving food/drinks out in contaminated areas, and carelessness can result in the ingestion of asbestos.

How do asbestos fibers get in the air?

Physical disturbance of asbestos-containing materials (ACM) suspends fibers in the air.

Asbestos is most hazardous when it is "FRIABLE".

- 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

Photo of friable asbestos

Non-friable ACM (floor and ceiling tiles, siding, fire doors, etc.) won't release fibers unless disturbed or damaged in some way.

How do asbestos fibers get in the air?

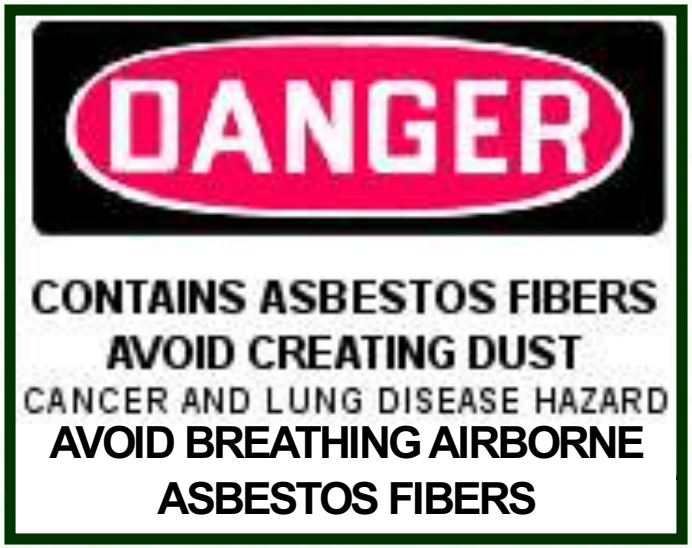
Activities and situations that can result in workers inhaling asbestos fibers:

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
- Un-surveyed construction projects on older buildings
- Vacuuming or sweeping ACM

Communication of Hazards

- Warning Signs
  - regulated areas
  - visible before entering
- Warning Labels
  - attached to all products and their containers



Entrance to regulated area

Building/Facility Owner

Responsibilities

- Determine presence, location, and quantity of ACM/PACM.
- Inform employers, employees, and others who may be impacted.
- Have a "Good Faith" inspection done before starting any bidding or construction/maintenance work.
- Permit only certified individuals to perform work that may release asbestos fibers into the air.
- Submit "Notice of Asbestos Abatement Project" to L & I when project involves 48 sq. ft. or 10 linear feet of pipe.

"Good Faith" Inspection/Survey

- Required for **all** construction and maintenance:
  - Must be done by an EPA-accredited AHERA building inspector
  - documented written report
  - not required if assumed and treated as ACM

* Possible fines of $250/day if not done or poorly done
* Both building owner and contractor can be cited!

Specific requirements for other work

- Automotive brake and clutch inspection, disassembly, repair, and assembly operations

  (View requirements – WAC 296-62-07745)

- Roofing, flooring, siding and gaskets

  as found in WAC 296-62-07712(10)

- Custodial/Light maintenance

  Employees who perform housekeeping activities during and after construction activities are covered by asbestos construction work requirements in WAC 296-62-077.

Further Information

- WISHA Home Page
  http://www.lni.wa.gov/Safety/default.asp
- OSHA Home Page
  http://www.osha.gov
- Environmental Protection Agency
  http://www.epa.gov/
- Department of Ecology
  http://www.ecy.wa.gov/