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information purposes  
**ONLY.**

This is not an “on-line training  
module”!!

This presentation was developed to be  
presented in a classroom setting



# Asbestos Awareness Training

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**ORS**

Department of Health and Human  
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## Asbestos Awareness Training covers:

- Regulation information on asbestos
- Background information on asbestos
- Location of ACM in the buildings
- Health effects of asbestos
- Worker protection programs
- Recognition of ACM damage and deterioration
- The O&M program for buildings
- Proper response to fiber release



# Why are we doing this?

- Asbestos is:
  - Potentially hazardous to health
  - Seems like its everywhere
  - Unpredictable
  - Laws and Regulations



# Asbestos Awareness

This module was prepared with information provided by:

- Agency for Toxic Substances and Disease Registry (ATSDR)
- Occupational Safety and Health Administration (OSHA)
- Environmental Protection Agency (EPA)

# Asbestos Awareness - Definitions

- Asbestos: chrysotile, amosite, crocidolite, tremolite, anthophyllite, actinolite, and any of these minerals that have been chemically altered; includes PACM
- ACM: "asbestos-containing material," any material containing > 1% asbestos
- PACM: "presumed asbestos-containing material"
- Surfacing Material: material that is sprayed, troweled-on, or otherwise applied to surfaces
- Thermal System Insulation (TSI): ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain



# Who regulates asbestos?

- Environmental Protection Agency
  - National Emission Standards for Hazardous Air Pollutants (NESHAPs)
  - Asbestos Hazard Emergency Response Act (AHERA)
  - Toxic Substances Control Act (TSCA)
- Occupational Health and Safety Administration
  - 29 CFR 1910.1001 – General Industry Standard
  - 29 CFR 1926.1101 - Construction Standard
- State and Local Authorities



# Who regulates asbestos?

- OSHA 29 CFR 1910.1001
  - The employer shall also provide, at no cost to employees who perform housekeeping operations in an area which contains ACM or PACM, an asbestos awareness training course, which shall at a minimum contain the following elements: health effects of asbestos, locations of ACM and PACM in the building/facility, recognition of ACM and PACM damage and deterioration, requirements in this standard relating to housekeeping, and proper response to fiber release episodes, to all employees who perform housekeeping work in areas where ACM and/or PACM is present. Each such employee shall be so trained at least once a year.



# Who regulates asbestos?

- OSHA 29 CFR 1926.1101
  - **Class I:** Asbestos work activities involving removal of TSI and surfacing ACM and PACM
  - **Class II:** Asbestos work activities involving the removal of ACM which is not TSI or surfacing material. This includes but is not limited to, the removal of asbestos wall board, floor tile, sheet rock, shingles, and mastics.
  - **Class III:** Asbestos work activities involving maintenance and custodial where ACM including TSI is likely to be disturbed.
  - **Class IV:** Asbestos work activities involving maintenance and custodial activities to clean up waste and debris containing ACM and PACM.



# EPA Bans on Asbestos

- NESHAP
  - 1973 banned spray applied surfacing fireproofing / insulation
  - 1975 banned wet applied and pre-formed pipe insulation
  - 1978 banned sprayed applied surfacing fireproofing for decorative purposes



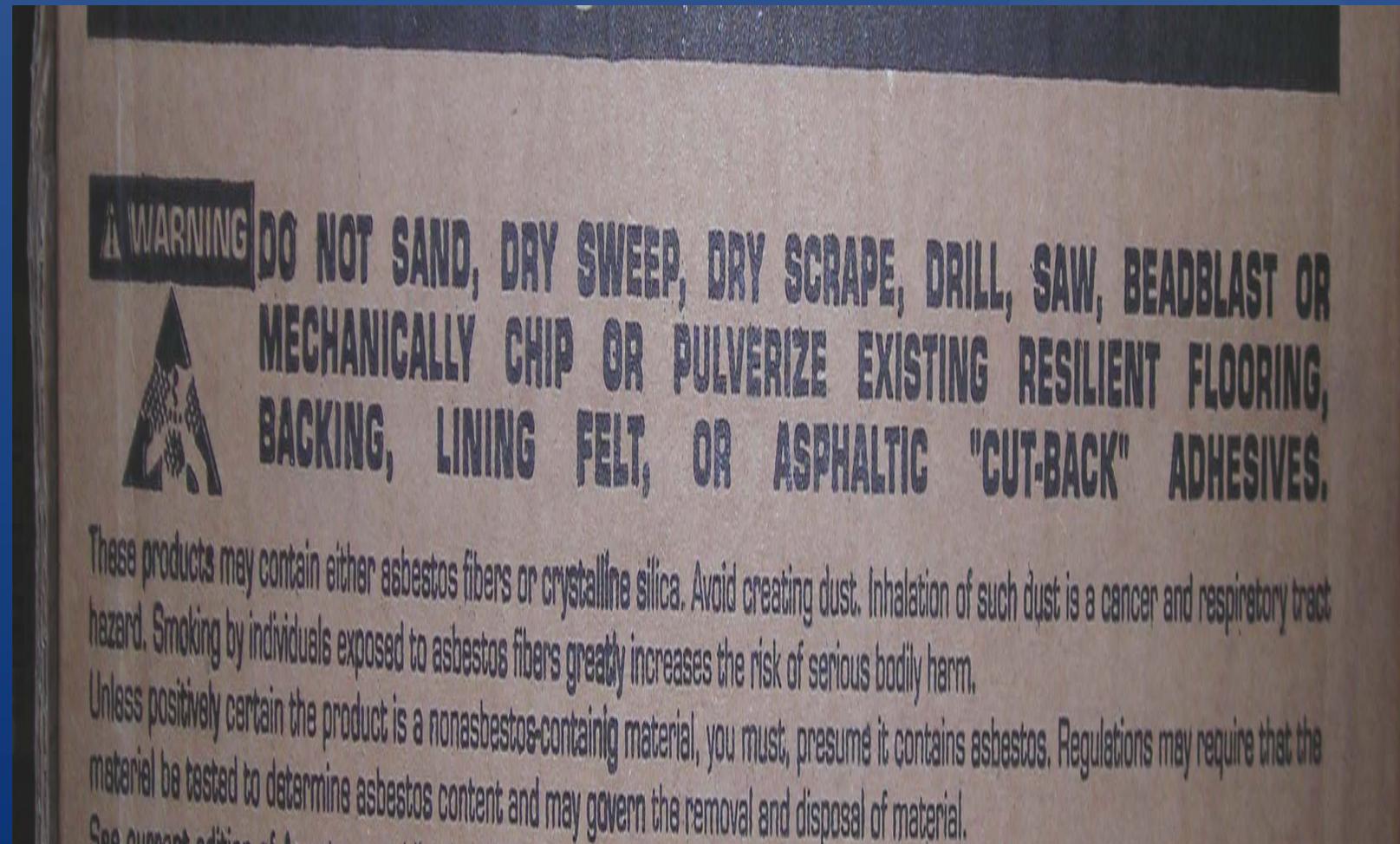
# EPA Bans on Asbestos

- TSCA
  - In 1989 EPA issue the “Asbestos Ban and Phase Out Rule”
  - The majority of the original ban was over ruled by the U.S. Fifth Circuit Court of Appeals in 1991.
  - Six materials were still banned:
    - Corrugated paper
    - Rollboard
    - Commercial paper
    - Specialty paper
    - Floor felt
    - **NEW USES OF ASBESTOS**

# EPA Bans on Asbestos

- TSCA – Material Not banned
  - Asbestos-cement Corrugated Sheet, Asbestos-cement Flat Sheet, Asbestos Clothing, Pipeline Wrap, Roofing felt, Vinyl-asbestos Floor Tile, Asbestos-cement Shingles, Clutch Facing, Friction Material, Disc Brake Pads, Drum Brake Linings, Gaskets, Non-roof Coatings, Roof Coatings, Millboard, Asbestos Cement Pipe, Automatic Transmission Components, Brake Blocks

# EPA Bans on Asbestos





# What is Asbestos?

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# What is asbestos?

- The fire resistance properties of asbestos have been known since ancient times.
- The Greeks used asbestos in lamp wicks.
- It is said that Charlemagne's tablecloth (which according to legend, he threw in a fire to clean) was made of asbestos.
- Asbestos was used in fabrics such as Egyptian burial cloths.

# What Is Asbestos

- Asbestos is a naturally occurring mineral fiber.
- There are 6 types divided into 2 main groups.
- All asbestos groups are complex silicates.
- Asbestos is essentially inert.

## Asbestos Groups:

- The serpentine group
- Characterized by asbestos fibers which form curly structures or appear coiled when viewed in their natural state
- There is only one type of asbestos under the group heading – Chrysotile
- Chrysotile makes up ~95% of the asbestos found in building products.

# Chrysotile Asbestos



# Chrysotile Asbestos



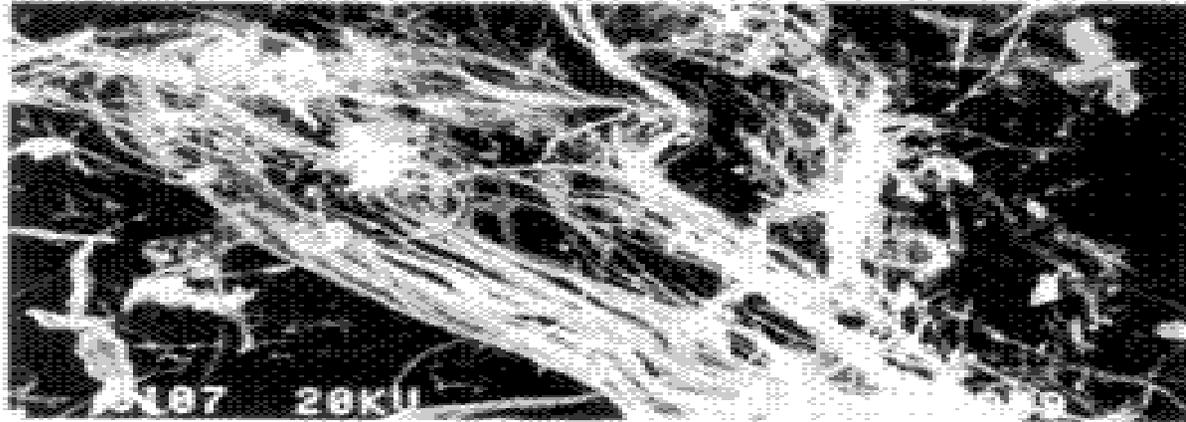
## Asbestos Groups :

- The Amphibole group of asbestos is characterized by families of asbestos fibers which are thin and straight
- This group includes the following:
  - Amosite (brown asbestos)
  - Crocidolite (blue asbestos)
  - Anthophyllite
  - Actinolite
  - Tremolite

# Chrysotile vs. Amphibole

Asbestos

Electron micrographs of asbestos fibers



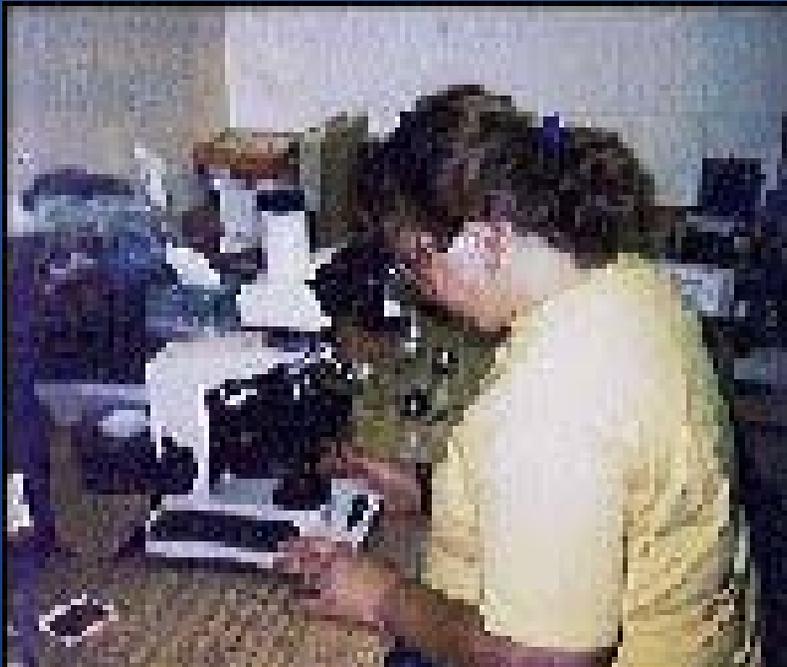
Chrysotile



Crocidolite

*Kirk-Othmer Encyclopedia of Chemical Technology,  
Published by John Wiley & Sons, Inc.*

## What is Asbestos?



Asbestos fibers are identified by using a microscope

All types of asbestos tend to break into very tiny fibers.

These individual fibers are so small they must be identified using a microscope.

Some fibers may be up to 700 times smaller than a human hair.

# What is Asbestos?



Because asbestos fibers are so small, once released into the air, they may stay suspended there for hours or even days.



# What is Asbestos?

- Asbestos fibers are virtually indestructible.
- They are resistant to chemicals and heat, and they are very stable in the environment.
- They do not evaporate into air or dissolve in water, and they are not broken down over time.
- Asbestos is probably the best insulator known to man. Because asbestos has so many useful properties, it has been used in over 3,000 different products.



# What is Asbestos?

- For OSHA and most other regulations a material must contain greater than 1% asbestos to be categorized as Asbestos Containing Material (ACM)
- In addition materials can be Presumed Asbestos Containing Materials (PACM)
- If a material is PACM it is subject to all regulations that apply to ACM



# Where is Asbestos Found?

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# Where is Asbestos Found?

Asbestos may be found in many different products and many different places. Examples of products that might contain asbestos are:

- Sprayed-on fire proofing and insulation in buildings
- Insulation for pipes and boilers
- Wall and ceiling insulation
- Ceiling tiles
- Floor tiles
- Putties, caulks, and cements (such as in chemical carrying cement pipes)
- Plaster material
- Mastic material (pipe, HVAC, sink)



# Where is Asbestos Found?

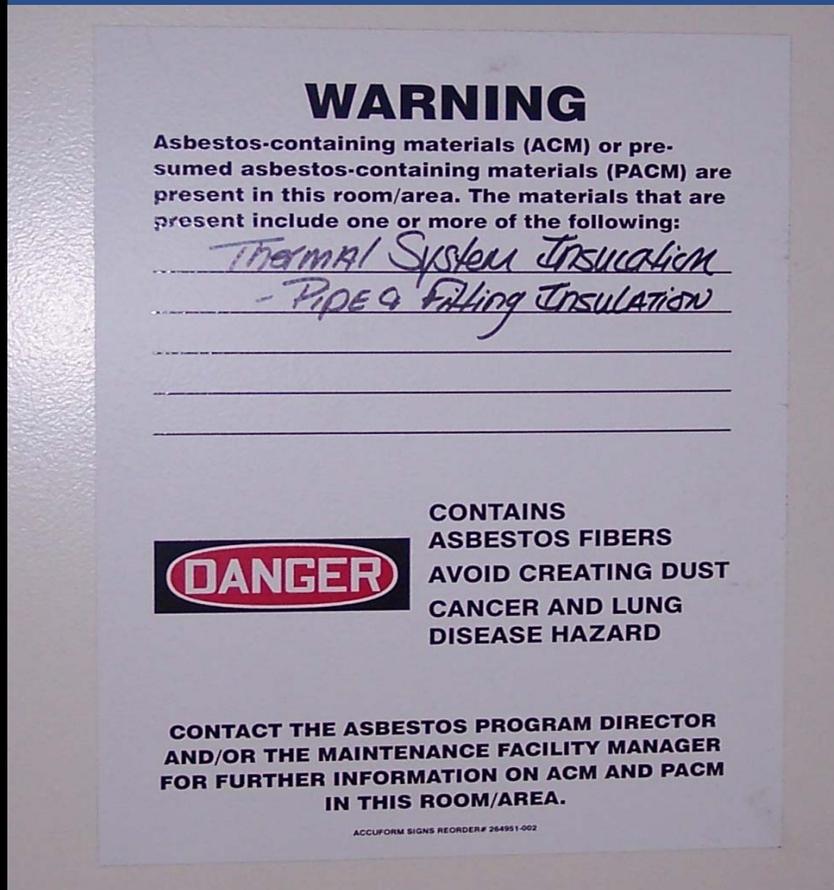
- Roofing shingles
- Siding shingles on old residential buildings
- Wall and ceiling texture in older buildings and homes
- Joint compound in older buildings and homes
- Brake linings and clutch pads
- Fire Curtains
- Lab Bench top Surfaces
- Fire blankets
- Fire doors
- Gaskets
- Roof Coating



# Where is Asbestos Found?

- The Usual Suspects:
  - Sprayed-on insulation in locations such as various mechanical rooms, steel reinforcing beams, and some ceilings in older buildings
  - Most 9" x 9" floor tiles in buildings built prior to 1981
  - Insulation around pipes and boilers
  - Interiors of fire doors

# Where is Asbestos?



- Building areas that have asbestos containing materials in them will have notices posted near the entrances, frequently near the fire alarm panel.

# Where is Asbestos?



- Pipe and boiler insulation that contains asbestos will be labeled with identifying stickers and placards.

# Where is Asbestos?



# Where is Asbestos?



# Where is Asbestos?



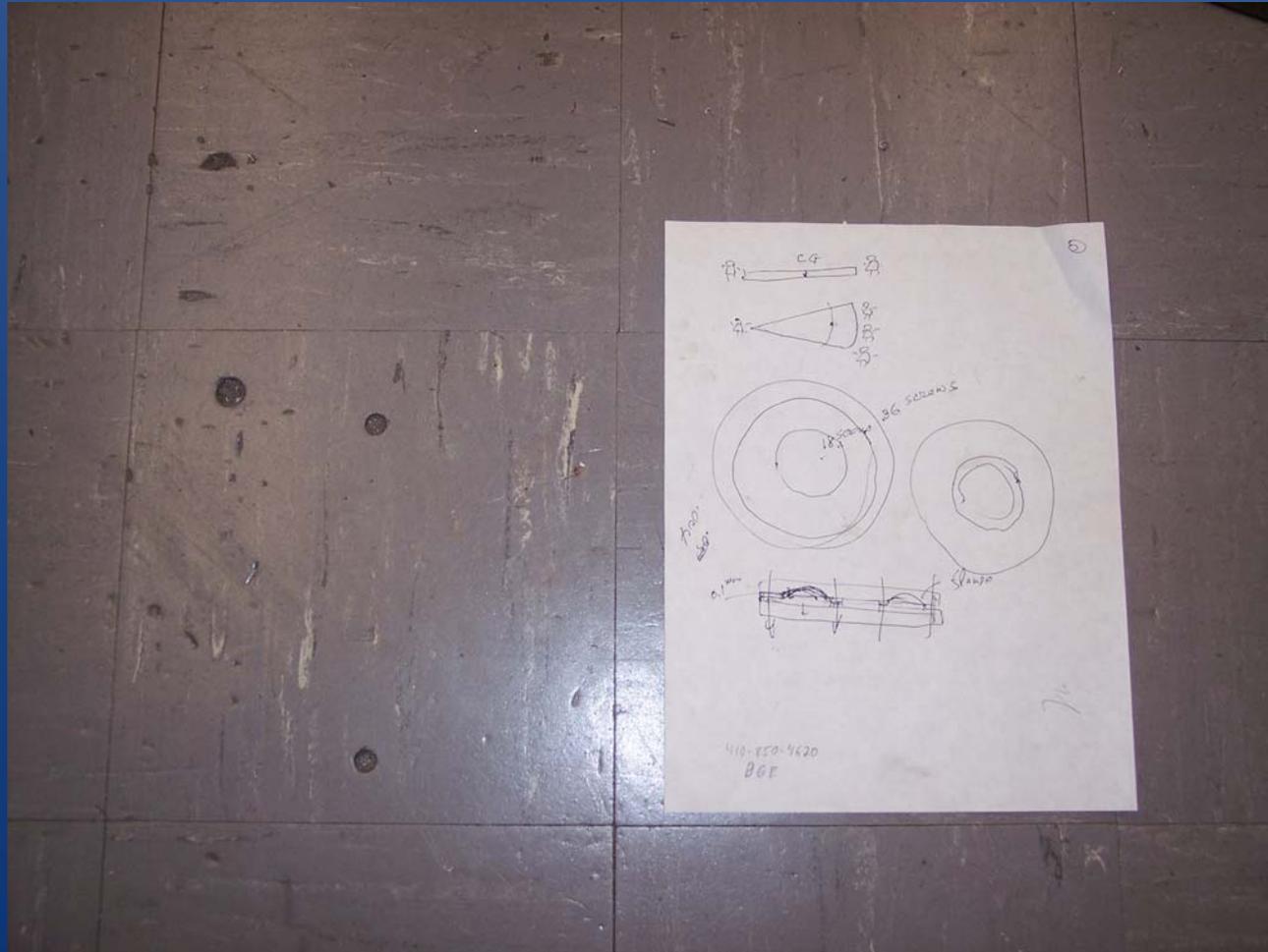
# Where is Asbestos?



# Where is Asbestos?



# Where is Asbestos?



# Where is Asbestos?





# Where is Asbestos?



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# Where is Asbestos?





# Where is Asbestos?



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# Where is Asbestos?



# Where is Asbestos?



# Where is Asbestos?



# Where is Asbestos?



# Where is Asbestos?



# Where is Asbestos?



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# Where is Asbestos?





# Where is Asbestos?



# Where is Asbestos?



# Where is Asbestos?



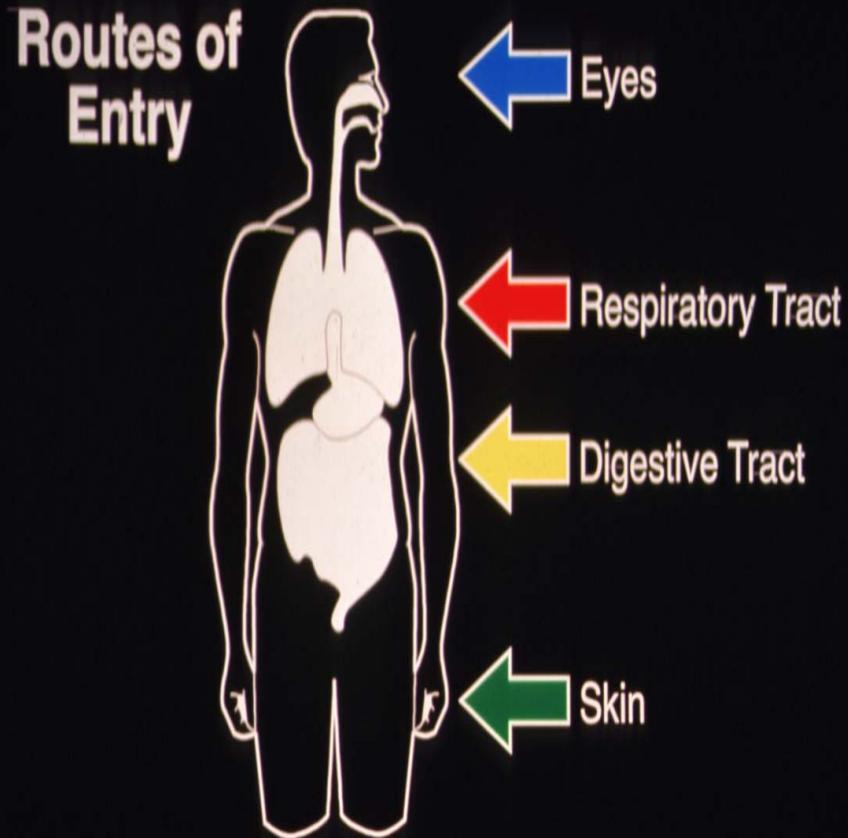


# When is Asbestos Dangerous?

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# When is Asbestos Dangerous?



- The most common way for asbestos fibers to enter the body is through inhalation.

# When is Asbestos Dangerous?

- ACM is not generally considered to be harmful unless it is releasing dust or fibers into the air where the fibers can be inhaled.
- Many of the fibers will become trapped in the mucous membranes of the nose and throat where they can then be removed, but some may pass deep into the lungs.
- Once they are trapped in the lungs, the fibers can cause health problems.

# When is Asbestos Dangerous?



- Asbestos is hazardous when it is friable and is disturbed in such a nature that it releases fibers.
- The term "friable" means that the asbestos is easily crumbled by hand, releasing fibers into the air.
- Asbestos floor tile is non-friable.
- Asbestos ceiling tile is friable

# When is Asbestos Dangerous?

- Asbestos-containing ceiling tiles, floor tiles, undamaged laboratory cabinet tops, shingles, fire doors, siding shingles, etc. **will not release asbestos fibers** unless they are disturbed or damaged in some way.
- If an asbestos ceiling tile is drilled or broken, for example, it may release fibers into the air. If it is left alone and not disturbed, it will not release fibers and doesn't pose a health risk.

# When is Asbestos Dangerous?



- Asbestos pipe and boiler insulation does not present a hazard unless the protective canvas covering is cut or damaged in such a way that the asbestos underneath is exposed to the air.

# When is Asbestos Dangerous?



# When is Asbestos Dangerous?



# When is Asbestos Dangerous?

- Damage and deterioration will increase the likelihood of disturbance of friable ACM, and could result in a fiber release.
- Water damage, continual vibration, aging, and physical impact such as drilling, grinding, buffing, cutting, sawing, or striking can break the materials down making fiber release more likely.



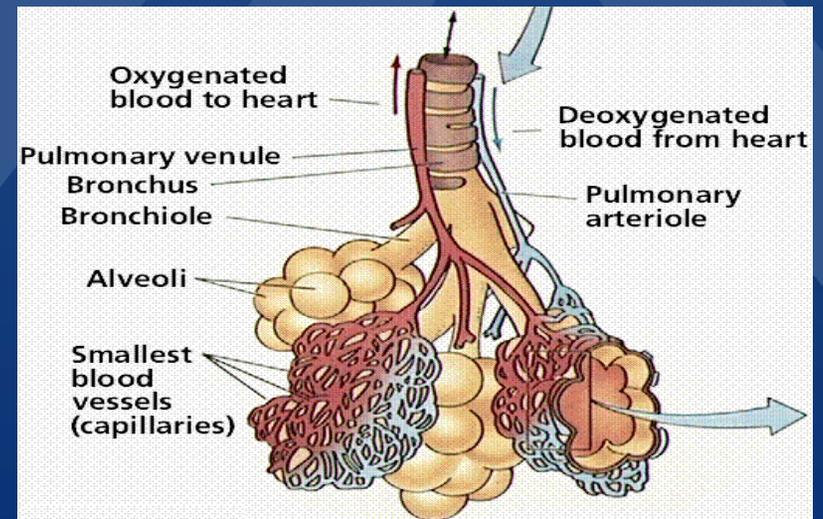
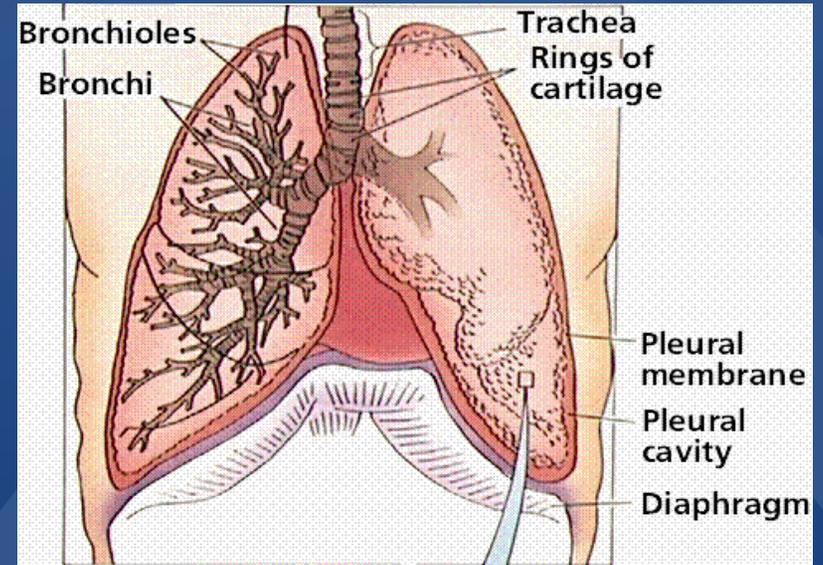
# Health Effects

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# Health Effects

- A Quick Review of the Respiratory System
- Consists of ever smaller tubes
  - Trachea
  - Primary bronchi
  - Secondary bronchi
  - Tertiary Bronchi
  - Gas exchange bronchi
  - Alveoli



# Health Effects

- Because it is so hard to destroy asbestos fibers, the body cannot break them down or remove them once they are lodged in lung or body tissues. They remain in place where they can cause disease.
- There are three primary diseases associated with asbestos exposure:
  - Asbestosis
  - Lung Cancer
  - Mesothelioma

# Asbestosis

- Asbestosis is a serious, chronic, non-cancerous respiratory disease. Inhaled asbestos fibers aggravate lung tissues, which cause them to scar.
- Scar tissue is not able to transfer oxygen therefore as scarring increases lung function decreases.
- Symptoms of asbestosis include shortness of breath and a dry crackling sound in the lungs while inhaling. In its advanced stages, the disease may cause cardiac failure because it is so difficult to breath.

# Asbestosis

- There is no effective treatment for asbestosis; the disease is usually disabling and can cause death.
- The risk of asbestosis is minimal for those who do not work with asbestos; the disease is rarely caused by neighborhood or family exposure.
- Typical latency period is approximately 15-30 years



# Asbestosis

- Smoking and Asbestos
  - Smoking temporarily paralyzes the ciliated cells of the trachea and bronchi
  - These ciliated cells line the trachea and bronchi walls and provide an escalator-like action.
  - This is a mechanism designed to remove particles from the lungs and deposit them into the digestive system where they are passed.
  - As smokers paralyze these cells more particles can be deposited into the deeper portions of the lung, increasing the risk of asbestosis



# Lung Cancer

- Lung cancer causes the largest number of deaths related to asbestos exposure.
- The incidence of lung cancer in people who are directly involved in the mining, milling, manufacturing and use of asbestos and its products is much higher than in the general population.
- The most common symptoms of lung cancer are coughing and a change in breathing. Other symptoms include shortness of breath, persistent chest pains, hoarseness, and anemia.



# Lung Cancer

- People who have been exposed to asbestos and are also exposed to some other carcinogen -- such as cigarette smoke -- have a significantly greater risk of developing lung cancer than people who have only been exposed to asbestos.
- One study found that asbestos workers who smoke are about 90 times more likely to develop lung cancer than people who neither smoke nor have been exposed to asbestos.
- Smoking has a synergistic effect with asbestos exposure



# Mesothelioma

- Mesothelioma is a rare form of cancer that most often occurs in the thin membrane lining of the lungs, chest, abdomen, and (rarely) heart.
- About 200 cases are diagnosed each year in the United States.
- Virtually all cases of mesothelioma are linked with asbestos exposure.
- Approximately 2 percent of all miners and textile workers who work with asbestos contract mesothelioma.
- Mesothelioma has an approximate latency period of 30-40 years.



# Determining Factors for Disease

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# Determining Factors

Main factors in determining your likelihood of developing asbestos related diseases are:

- 1. The amount and duration of exposure** - the more you are exposed to asbestos and the more fibers that enter your body, the more likely you are to develop asbestos related problems. While there is no "safe level" of asbestos exposure, people who are exposed more frequently over a long period of time are at higher risk.

# Determining Factors

2. **Whether or not you smoke** - if you smoke and you have been exposed to asbestos, you are far more likely to develop lung cancer than someone who does not smoke and who has not been exposed to asbestos.

If you work with asbestos or have been exposed to it, the first thing you should do to reduce your chances of developing cancer is to stop smoking.



# Determining Factors

Organizations that may offer programs, support, or information to help people stop smoking are:

- National Cancer Institute (1-800-4-CANCER)
- American Heart Association (1-800-242-8721)
- American Lung Association (1-800-586-4872)



# How to Avoid Asbestos Exposure

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# How to Avoid Exposure

- In order to avoid being exposed to asbestos, you must be aware of the locations it is likely to be found.
- If you do not know whether something is asbestos or not and it fits the suspect material category, **assume that it is** until it is verified otherwise.
- Remember that you cannot tell if floor or ceiling tiles contain asbestos just by looking at them.



## How to Avoid Exposure

- The Division of Occupational Health and Safety has a contractor that can take samples from materials in order to determine whether or not they contain asbestos. If you would like to have materials analyzed or tested for asbestos, please contact DOHS (301-496-3457).
- **Never try to take a sample yourself** unless you have been trained to do so.

# How to Avoid Exposure

## Never...

- Drill
- Hammer
- Cut
- Saw
- Break
- Damage
- Move
- Disturb

**...any asbestos-containing materials or suspected materials. This could render the material Friable.**



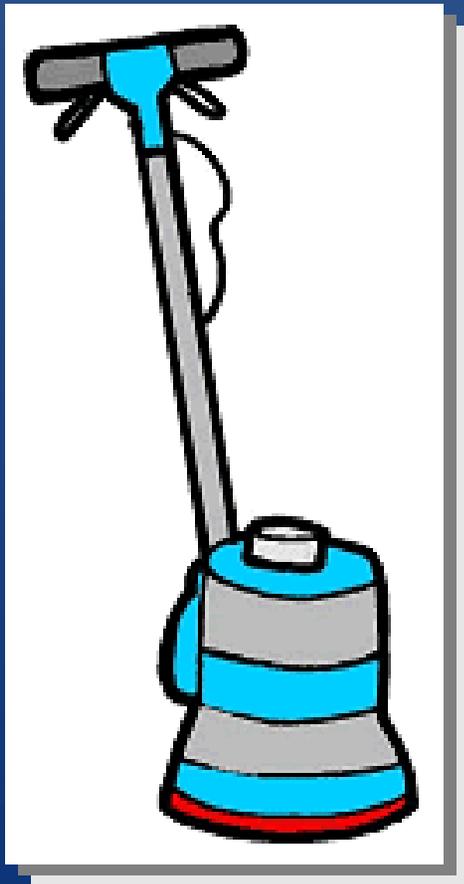
## How to Avoid Exposure

- The NIH has surveyed all campus buildings for the presence of asbestos.
- The NIH also has an Operations and Maintenance (O&M) plan established.
- If you need to do work that might involve asbestos (replacing ceiling tiles, repairing insulated pipelines, drilling into floor tiles etc.), check with DOHS to find out how the work can be done safely.

## How to Avoid Exposure

- For example, before drilling into any floor tiles to perform maintenance work, it will be necessary to ensure they do not contain asbestos.
- If they do contain asbestos, special work practices will need to be taken to prevent rendering the ACM friable during work.

# Housekeeping & Asbestos



- Housekeepers and custodians should never sand or dry buff asbestos containing floor tiles, and only wet stripping methods should be used during stripping operations.
- If abrasion pads are required they should be low abrasion pads, and should be used at speeds below 300 RPM.



# Asbestos Spills

- It is important to report any damaged asbestos-containing materials to DOHS and your supervisor immediately.
- If, for example, you discover some sprayed-on asbestos insulation has been knocked off of a ceiling or wall, this would be considered a "spill."
- As such it would need to be cleaned up immediately by asbestos abatement workers.
- Do not attempt to clean up spills yourself!

# Asbestos Spills



# Avoiding Exposure

By knowing where asbestos is likely to be located and then taking measures not to disturb it, you will protect yourself and others from exposure to this hazardous substance.





# Occupational Medical Services

- If at any time you feel that you have been exposed to damaged or disturbed, friable ACM, notify your supervisor, contact DOHS and visit OMS to document the exposure.
- OMS and DOHS will investigate the potential exposure to determine if additional medical and/or environmental monitoring is required.
- OMS is located at  
Building 10  
6<sup>th</sup> Floor Room 6C306



# Important Contact Information

- Division of Occupational Health and Safety
  - Ph. 301-496-3457
- Occupational Medical Services
  - Ph. 301-496-4411