Individuals who may contact asbestos in their work area should be aware of its health effects, how to recognize damaged asbestos-containing materials (ACM), locations in buildings where ACM may be found and the proper response to a fiber release.

Per Occupational Safety and Health Administration (OSHA) regulation 29 CFR 1910.1001(j)(7)(iv)
Asbestos—What is it?

- Naturally occurring mineral (rock)
- Six types – chrysotile, amosite, crocidolite, actinolite, anthophyllite and tremolite.
- Fibrous structure. Long bundles of fibers subdivide into tinier fibrils, like strands of fraying rope.
- Found all around the world.
- The most commonly used is chrysotile, accounting for 95% of all ACM.
Asbestos outcrop beside California roadway
Asbestos - The Good

- Fire resistant (a thermal insulator)
- Chemical resistant
- Electrical insulator
- Bacteria resistant
- Strong (high tensile strength)
- Light-weight
- Absorbs sound
- Amosite form is water resistant

Asbestos has been used in thousands of building materials.
How It’s Been Used

Construction Materials

• Concrete
• Siding
• Roofing
• Asphalt
• Spray-on fireproofing
• Wallboard and joint compound
• Acoustical plaster

• Vinyl floor tiles and mastic
• Linoleum and mastic
• Vinyl baseboard and mastic
• Carpet mastic
• Thermal system insulation (TSI)
• HVAC insulation and seals
• Ceiling panels and mastic
How It’s Been Used (con’t)

Non-Construction Related Materials

• Friction materials -- automotive and elevator brake pads
• Electrical insulators -- transite backer panels
• Laboratory equipment – transite lab tops, counters, panels, certain chemistry equipment
• Fire resistant materials – protective suits, gloves
• Miscellaneous – lamp wicks, fire resistant cloth
Uses in the Home

- Roofing Felt
- Transite Shingles & Siding
- Dry Asbestos Insulation Material used to insulate alleys - Very unusual
- Asbestos Siding
- Linoleum Backing
- Vinyl Asbestos Floor Tiles
- Acoustic Ceiling Material
- Block Insulation
- Door Gaskets
- Pipe Insulation & Elbow Mud
- Taping Compound & Asbestos Plaster
- Asbestos-Cement Logs & Artificial Ash
- Asbestos Taping Inside Registers
- Aircell and Sheeting Ductwork Insulation
- Aircell Pads inside Furnaces
- Insulation Inside Fuse-Boxes and Old Wire Insulation
- Asbestos Fabric Vibration - Insulation Joint
- Asbestos Taping on Return Seams
Important!

You can’t tell just by looking that a material contains asbestos.

It is necessary to test the material in a qualified lab to see if it really is asbestos.
Asbestos – The Bad

- The fibers are small, even microscopic.
  - They can get through the filter of a regular vacuum or dust-mask.
- It’s very light. Tiny fibers go airborne easily and stay in the air a long time.
- Easily inhaled.
- Odorless. It’s not detected by smell.
- It’s strong. The body can’t break it up.
- Chemically resistant. The body can’t dissolve it.
• It’s bacterially resistant. Intestinal bacteria and white blood cells can’t break it down.

• Asbestos fibers are long and sharp and stick in living tissue like needles.

• Once it’s stuck in the body, it stays.
Asbestos – The Bad

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asbestos microscope magnification
Your Body Has Defenses

- Nasal hair
- Mucus – a sticky substance in the nose and throat. Fibers stick to mucus and are swallowed or expelled.
- Coughing and sneezing
- Airway branching. With each branch the airflow slows down. Fibers and dust settle out and are brushed or coughed out.
- Bronchial constriction slows airflow.

These help keep fibers from getting stuck in the body!
More Defenses

• Tiny hair cells called **cilia** very efficiently brush particulates up and out of the bronchial tubes.

• **White blood cells** (phagocytes) engulf and digest foreign matter. These are found in the outermost part of the lungs in the alveoli. They contain enzymes that add in the destruction of foreign matter.
Who’s At Greatest Risk?

Workers who are *occupationally* exposed to asbestos are at greatest risk of developing asbestos-related diseases.

These would be people working in:

- Mining asbestos or minerals mixed with asbestos
- Manufacturing asbestos-containing materials (ACM)
- Demolition of ACM
- Insulating with ACMs or in areas with damaged ACM

The OSHA and EPA asbestos regulations were written for these people. Everyone else who’s work brings them in contact with ACM are swept in with them, even if their exposures are dramatically lower than that of those occupationally exposed.
Occupationally Exposed Workers
Occupationally Exposed Workers
• Most health effects from asbestos are exposure related—the more one is exposed the greater the health effect. This is called dose-response.

• The **number one illness caused by asbestos exposure is lung cancer.** Asbestos is a carcinogen, an EPA hazardous air pollutant that does most damage to the lungs.

• Two illnesses are caused **only** by asbestos, asbestosis and mesothelioma.

• Asbestosis is a scarring of the lungs (not a cancer) and is dose-response.

• Mesothelioma is a cancer and is not related to the amount of exposure. It is also **very rare.**
Lung Cancer

- Cancer is an abnormal growth of tissue called a tumor.

- Asbestos is a known carcinogen, one of many substances that can cause cancer.

- Asbestos is particularly irritating to the lungs.

- Lung cancer is the second most common type of all cancers.

- It causes increasing difficulty in breathing as oxygen exchange cannot occur through tumors.

- The **primary** cause of lung cancer is **smoking**.

- The disease is survivable if treated in time.
Compare Chest X Rays

Normal Lungs

Lung Cancer

Small Cell Cancer of the Lung

trachea

aorta

left lung

right lung

heart

cancer
Smoking, Lung Cancer and Asbestos

**Risk Factor Combinations Increase Odds of Lung Cancer**

- **No Risk Factors**: Normal risk of cancer.
- **Asbestos Exposure**: 6x the risk.
- **Smoker**: 11x the risk.
- **Smoker + Asbestos**: 59x the risk.

- Ten percent (17,000 cases) of lung cancer occur in non-smokers.
- Non-smokers living with a smoker have a 24% increase in risk of developing lung cancer.
- Up to 3,000 yearly lung cancer deaths attributed to passive smoking, or the inhalation of tobacco smoke from other smokers.
- Primary lung cancer occurs 50 to 100 times more frequently in asbestos-exposed individuals who smoke than in the nonsmoking, nonexposed population.
In 1952, claims that smoking causes cancer caused Kent cigarettes to come out with an asbestos filter to protect its smokers.
Cigarettes contain 44 carcinogens, 7 heavy metals and the carbon monoxide (CO) affects the heart immediately.
Asbestos being a carcinogen, it has also been linked to cancers of the esophagus, stomach, colon and pancreas.

These cancers are not uncommon but can be caused by exposure to other carcinogens beside asbestos.
Asbestosis

- Asbestosis is a **scarring of the lungs**

- Caused only by asbestos exposure occurring in large doses or many small doses over time.

- Scars develop because white blood cells can’t destroy asbestos fibers. They die, rupture and it’s their spilled enzymes that damage the lung tissue.

- The body repairs the damage with scar tissue.

- No oxygen exchange through scar tissue, increasing difficulty in breathing.

- The disease is not common. It is related to heavy overexposure to asbestos such as seen by occupationally exposed workers (miners, manufacturing, gross demolition.)
Compare Chest X Rays

Normal Lungs

Asbestosis
Mesothelioma

- Mesothelioma is a cancer of the lining of the lungs or abdomen.

- It is directly linked to asbestos exposure.

- Once diagnosed it was 100% fatal. Some are living with the disease for years, but a cure has not yet been found.

- It is a very rare disease.

- Mesothelioma is the reason asbestos regulations are so stringent. It is not dose-response.
Compare Chest X Rays

Normal Lungs

Pleural Mesothelioma
Mesothelioma Tumors

MRI—view of mesothelial tumors
Asbestos: When is it a Hazard?

- Asbestos is a hazard when it gets inside the body, particularly the lungs. The U.S. EPA has designated it a hazardous air pollutant for that reason.

- **Asbestos-containing material** (ACMs) that are **frangible** (i.e., can be crumbled, pulverized or powdered by hand pressure) release asbestos fibers to the air easily. (For example, spray-on acoustical plaster, fire-proofing.) Non-frangible ACMs release asbestos fibers when the material is cut, ground, drilled or sanded. Examples are floor tile and lab countertops.

- Special procedures are used when disturbing or cleaning up ACM to keep the fibers out of the air. Wetting down the ACM with water is one way to temporarily keep the fibers from going airborne.
• Although some products are banned from production in the United States, it is still produced in other countries and imported.

• Asbestos-containing materials installed before the ban do not have to be removed unless they become damaged to such a degree that fibers may be released.
The Good News

• Asbestos is usually mixed in a binding material that keeps the fibers from going airborne, or is wrapped and sealed.

• In **good condition**, ACM presents **no danger to you**.

• ACM in poor condition is removed or repaired.

• ACM is gradually being eliminated from our facilities as budgets allow.
Damaged Asbestos-Containing Materials

- Damaged pipe insulation
- Damaged fitting insulation
- Damaged floor tile and mastic
Handling Asbestos-Containing Materials

• Don’t pull down loose ACM. It only makes matters worse.

• Don’t clean up ACM debris. Notify your supervisor that you’ve located damaged ACM and where it’s located. Keep people from walking through it by closing off area or putting barriers around the debris.

• Contact the Environmental Health and Safety Department whenever potential ACM debris is detected.

• Hold the line! Don’t let the material be disturbed or removed until it has been determined that it is not ACM or a licensed or trained Operations and Maintenance asbestos worker has come out to carefully clean the affected area so it is safe to reoccupy.
• Be careful not to bump acoustical plaster ceilings, spray-on fireproofing or other plaster surfaces. Vacuum cobwebs from them rather than wipe.

• Keep a good coat of wax on ACM tile floors. When using a polishing or burnishing machine, keep the speed below 300 rpm. Do not grind the tile surface as this can produce a fiber release. Keep a good seal on floors.
Working Around ACM (con’t)

- Avoid bumping walls and ceilings with tool boxes, buckets, handles or other equipment.

- Avoid damaging ACM when removing fixtures or other building components.

- Don’t brush dust, debris or cobwebs down from asbestos containing surfaces. HEPA vacuum them away.

- Don’t hang anything, even temporarily, from ACM ceilings or ACM-wrapped pipes.

- Do not dry-sweep to clean up insulation or visibly deteriorated ACM. Dry sweeping only piles asbestos fibers up in corners and edges of the room. Wet mopping dampens and captures the fibers, preventing them from going airborne. HEPA vacuums remove and trap the fibers.
When asbestos workers are sent out to clean up or remove ACM material

- Respect the “Danger Asbestos” signs or warning tape. Do not enter when they are up. You will be exposed to asbestos fibers.

- Respect the containment or seals. Do not cut or pull down plastic sheeting. The asbestos worker will remove it when it is safe to do so.

Why obey the signs and leave the seals alone?
So you are not exposed and so you don’t expose others to asbestos by letting the fibers out of containment.
Decontamination

• If you have an incidental physical contact with ACM dust and debris, decontaminate by washing your hands, arms, face with soap and water.

• Should severe contamination occur it will be necessary to dispose of clothing as asbestos waste. Bag contaminated clothing as fabric cannot be decontaminated.

• Cellphones, wallets, belts, jewelry and most shoes can be decontaminated by wet wiping. If you experience serious contamination, it is strongly recommended you shower so not to bring the contamination home. Protective suits will be provided.
Asbestos in good condition is harmless. There is no need to fear it.

Asbestos in poor condition can become a hazardous air pollutant.

Do not disturb ACM. Be careful working where asbestos exists in your work area.

If you find or damage ACM, notify your supervisor so a trained asbestos worker can be sent out to attend to the matter swiftly and safely. **Do not clean it up yourself, and especially do not dry sweep!**

If you come in physical contact with ACM dust and debris, decontaminate yourself by washing hands, arms, face.

Use your new knowledge of ACM.

Be aware so asbestos can’t harm you.
Questions? Contact Us

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Asbestos Man

Asbestos Lady