

DATE 8/22/83	BULLETIN TITLE Industrial Hygiene	RESPONSIBLE DEPT Employee Health Services	BULLETIN NO 4
SUBJECT Asbestos		SUPERSEDES Same	DATED 7/18/75

Asbestos is a generic term that describes a variety of naturally occurring fibrous, incombustible silicate minerals. Although tremendously valuable to industry, these minerals have been closely linked to asbestosis, a degenerative lung-scarring disease, and to lung cancer. The Occupational Safety and Health Administration (OSHA), therefore, has regulated employee exposure to asbestos since shortly after the agency's inception. OSHA has defined asbestos, established standards for its use, and set permissible exposure limits. The initial airborne asbestos fiber limits have been revised downward. Regulations under the OSHA asbestos standard are covered in 29 CFR 1910.1001. Asbestos exposure in Ontario is regulated under the Occupational Health and Safety Act (Revised Statutes of Ontario, 1980, Chapter 321, August 1982). Exposure limits presently differ under the two regulations; however, industrial hygiene work practices to control dust and fiber in air are the same.

Six fibrous minerals, members of a family called silicates, are recognized as asbestos: chrysotile (white asbestos), actinolite, amosite (brown asbestos), anthophyllite, crocidolite (blue asbestos) and tremolite. Commercially, chrysotile is the most important form of asbestos, accounting for approximately 95% of the asbestos used in North America. Some talc contains various amounts of asbestos.

Asbestos has about 3000 different uses, with approximately two-thirds being used in the construction industry in building products, insulation, friction materials, and textiles. Manufactured products have included reinforced asbestos cement sheets and pipes, patching and taping compounds, floor and ceiling tiles as well as paints, coatings and sealants containing asbestos as reinforcing fillers, pipe linings and fillers for various liquids. Friction products include clutch facings and brake linings for automobiles and trucks, railroad cars, airplanes, and industrial machinery. A variety of other uses are known including theater curtains, fire blankets and other thermal protection, filtration materials and, until recently, dry wall patch compounds and imitation fireplace ashes.

Once incorporated into manufactured items, hazards resulting from asbestos are less probable, as long as the substance is not disrupted. However, the fibers are nearly indestructible, and a potential health risk arises whenever asbestos fibers are set free, resulting in airborne asbestos dust.

Health Hazards

Asbestos exposure can cause asbestosis, cancer of the lungs and digestive tract, and mesothelioma.

Asbestosis is a diffuse fibrotic lung disease caused by exposure to high concentrations of asbestos dust and fiber, usually after several years of exposure. The onset of asbestosis appears to depend on dust and fiber concentration, fiber shapes, type of asbestos, and length of exposure. Usually, the disease becomes evident 20 or more years after the first exposure to asbestos. Once established, however, a highly disabling pneumoconiosis can progress even after exposure has ceased.

Bronchogenic carcinoma (lung cancer) and mesothelioma of the pleura and peritoneum (cancer of membranous lining of the chest and abdominal cavities) are also associated with asbestos exposure. Excesses of cancer of the larynx, stomach, colon, and rectum have also been observed. Some forms of asbestos appear far more hazardous than others. As with asbestosis, there can be a long latent period, generally more than 25 years for mesothelioma. The mechanism of action is not currently known. Asbestos is different from most chemical carcinogens because it is not metabolized. Thus even limited exposures to high levels leads to continuing presence of inhaled asbestos particles or

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fibers within the lung. These can translocate to the abdominal cavity and to other tissues. The prognosis for asbestosis and asbestos-induced cancer is generally poor.

Risks of disease due to asbestos exposure have not been defined clearly for all occupational groups known to have significant exposure. Firm epidemiological data are available only for heavily exposed workers employed in asbestos mining, manufacturing and insulation handling. However, there is evidence that the problem is more widespread than previously believed and that workers from a variety of trades and occupations, including painters, electricians, carpenters, machinists, boiler makers, pipefitters, mechanics, welders, and others, may be at increased risk. The issue of risk of disease from asbestos exposure is further complicated in that smokers who have had asbestos exposure clearly have markedly increased risk of developing lung disease related to asbestos.

Asbestos exposures within Ford Motor Company may occur from:

- . Insulated pipe covering for parts washers and cleaners, steam and hot water lines.
- . Insulated coverings for boilers and associated parts in powerhouses. Drying oven and furnace insulation. Asbestos blocks, bricks, sheets, and sleeves.
- . Clutch and brake linings for various machinery and transportation equipment (power presses, conveyor belts, hi-los, locomotives, tow tractors, trucks, automobiles).
- . High temperature gasket materials for manifolds, pipes.
- . High temperature blankets, gloves.
- . Asbestos-containing parting compounds, certain talcs. Filtration media.

Employee Exposure

Since we do not manufacture asbestos materials, exposures are primarily limited to those who work with asbestos-containing products. However, these exposures are no less significant. Employee exposure can generally occur during material handling and maintenance of asbestos-containing friction materials. Exposure can occur during grinding, sawing, sanding, drilling, or otherwise disturbing or finishing asbestos-containing products. Demolition, removal, and repair of asbestos coverings and coatings offer other sources of worker exposure. Insulation removal or repair and brake and clutch servicing can be especially hazardous.

Permissible Occupational Exposure Limits (PEL) -- Breathing Zone Concentrations

Eight-hour time-weighted average exposure: 2 fibers longer than 5 micrometers per cubic centimeter of air (2 f/cc $> 5 \mu\text{m}$). Ceiling concentration: 10 f/cc $> 5 \mu\text{m}$.

Ontario TWAE PEL for amosite, crocidolite, and other forms of asbestos are 0.5, 0.2, and 1.0 f/cc $> 5 \mu\text{m}$, respectively. The Ontario ceiling PEL for amosite, crocidolite, and other forms are 2.5, 1.0, and 5.0 f/cc $> 5 \mu\text{m}$, respectively.

Methods of Compliance

- . Engineering controls, such as isolation, enclosure, local exhaust ventilation, and dust collection are required and should be used to meet the PEL.
- . Compliance with the PEL may not be achieved by sole use of respirators or shift rotation except under special conditions approved by Industrial Hygiene.
- . All hand and power operated tools, which may produce or release asbestos fibers in excess of the PEL, must be provided with local exhaust ventilation.

Insofar as practicable or unless the usefulness of the product would be diminished, asbestos must be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state. Wet methods of control are very effective in suppressing airborne asbestos fiber and dust in pipe and furnace insulation repair and demolition.

INDUSTRIAL RELATIONS BULLETIN

DATE 8/22/83	BULLETIN TITLE Industrial Hygiene	RESPONSIBLE DEPT Employee Health Services	BULLETIN NO 4a
SUBJECT Asbestos Brake and Clutch Servicing (Supplement to Bulletin No. 4)	SUPERSEDES New	DATED	

The following procedures are recommended to minimize asbestos dust exposures during brake and clutch servicing of trucks, tractors, trailers, automobiles, locomotives, forklifts, and tow tugs. Strict adherence to these procedures will eliminate exposures of mechanics to asbestos during brake and clutch servicing.

1. An area should be designated for all brake and clutch repairs. The normal maintenance area for tug tractors and forklift trucks could serve as the designated area for these plant vehicles. Entrances into this area shall be posted during brake and clutch servicing with an asbestos exposure warning sign:

ASBESTOS
Dust Hazard
Avoid Breathing Dust
Wear Assigned Protective Equipment
Do Not Remain in Area Unless Your Work Requires It
Breathing Asbestos Dust May Cause Asbestosis and Cancer

2. Only essential personnel should be present in the immediate maintenance area during brake and clutch servicing.
3. During brake servicing, an air purifying respirator, either single-use or with replaceable particulate filter(s), as approved by Industrial Hygiene and Mining Enforcement and Safety Administration (formerly Bureau of Mines) or NIOSH, shall be worn during all procedures starting with removal of wheel and including reassembly. During manual clutch servicing, such a respirator shall be worn during removal and cleaning of clutch, pressure plate, and housing assembly, and during installation of new clutch assembly.
4. Dust shall first be cleaned from brake drums, brake backing plates, brake assemblies and clutch assemblies using an industrial type vacuum cleaner equipped with a high efficiency filter system (>99% efficiency for 0.3 μ m diameter aerosols). After vacuum cleaning, any remaining dust shall be removed using a rag soaked in water and wrung until nearly dry. Under no circumstances shall compressed air or dry brushing be used for cleaning. (See Industrial Hygiene Bulletin No. 4 for approved vacuum cleaners.)
5. During arcing and riveting operations, an approved respirator, as described in (3) above, shall be worn. Grinding (arc) machines shall be provided with local exhaust ventilation such that exposures are maintained below the OSHA asbestos standard (29 CFR 1910.1001). At a minimum, dust bag of the arcing machine shall be removed and replaced with hose of high efficiency industrial vacuum described in (4) above.
6. During removal of vacuum bags, an approved respirator, as described in (3) above, shall be worn. Industrial vacuum cleaner bags containing asbestos dust, cloths used for wiping brake and clutch assemblies, and other asbestos-contaminated debris shall be sealed in plastic bags and labeled with following warning label printed in letters of sufficient size and contrast to be readily visible and legible:

CAUTION
Contains Asbestos Fibers
Avoid Breathing Dust
Breathing Asbestos Dust May Cause Asbestosis and Cancer

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6. (continued)

All asbestos waste must be disposed in accordance with OSHA asbestos regulations and the appropriate sections of Subpart B - National Emission Standard for Asbestos, Title 40 - Protection of the Environment, Chapter 1, Environmental Protection Agency. Asbestos-containing waste must not be incinerated or discharged into community water supplies. Specific information regarding waste disposal should be obtained from the Stationary Source Environmental Control Office (SSECO).

7. All floor cleaning in areas where brakes and clutches are repaired should be done with the high efficiency industrial vacuum cleaner as described in (4) above. Grinding (arcing) machines shall also be cleaned with this vacuum cleaner and any remaining dust wiped with a damp cloth. An approved respirator, as described in (3) above, shall be used during this cleaning.
8. Although adherence to above procedures should minimize contamination of work clothing, it is recommended that the appropriate portions of OSHA regulations on asbestos concerning special clothing, change rooms, etc. be followed. duPont "Tyvek" disposable coveralls are acceptable for these asbestos-product maintenance operations.
9. Industrial hygiene work practices in this bulletin and the OSHA asbestos exposure standard should be provided to all employees with potential exposure to asbestos at brake and clutch servicing and reviewed with their designated representatives.

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INDUSTRIAL RELATIONS BULLETIN

DATE 8/22/83	BULLETIN TITLE Industrial Hygiene	RESPONSIBLE DEPT. Employee Health Services	BULLETIN NO. 4b
SUBJECT Asbestos Insulation Removal and Repair (Supplement to Bulletin No. 4)	SUPERSEDES New	DATED	

Most boiler, furnace, steam, and condensate piping insulation installed prior to 1975 contains asbestos. The removal or maintenance of dry asbestos insulation can be very hazardous to health. Old asbestos-containing insulation tends to be dry, very friable, and can easily generate high concentrations of airborne fibers and dust if carelessly handled. Stringent industrial hygiene precautions must, therefore, be taken to protect employee health by preventing inhalation of asbestos dust and fibers.

The following procedures and steps are recommended to minimize dust exposures during asbestos-containing insulation demolition, removal, and repair. They supplement work practices, engineering controls, and personal protective equipment usage specified in Industrial Hygiene Bulletin No. 4 and in OSHA and Ontario OHSI asbestos standards and regulations. These procedures apply primarily to protection of pipe coverers and insulation maintenance and installation employees. Compliance with these procedures should assure that others in vicinity of insulation maintenance activities are not excessively exposed to airborne asbestos fibers. These industrial hygiene work practices focus on safe techniques for removing asbestos insulation from older equipment and buildings. They do not address asbestos encapsulation, top-coating, or enclosure methods.

1. Steam and hot water pipes, furnaces, boilers, ovens, and other equipment must not be reinsulated with asbestos-containing products including insulation cements, tape, and grout. Suppliers of acceptable substitute insulation for asbestos can be provided by Plant Engineering Office, Manufacturing Staff (Mechanical Design and Equipment Standards, page M4-1, January 1976).
2. Unless there is specific evidence to the contrary, all insulation should be treated and handled as if it is asbestos-containing until proven otherwise. Samples of insulation materials suspected of containing asbestos may be submitted to the Industrial Hygiene Laboratory who will return an analytical report of amounts and types of asbestos in the samples. Contact Industrial Hygiene at 33-78955 for sampling procedure and shipment method. A profile and map of asbestos-containing insulation in the plant can be established by a judicious sampling and boiler and steam pipe tagging procedure.
3. Removal of asbestos-containing insulation associated with renovation or demolition should be done by an outside contractor with proven experience in successfully handling this hazardous work in compliance with OSHA standards. The cost and/or inconvenience associated with utilization of a specialized contractor is justified by elimination of potential inhalation health risks. Any outside contracting should be consistent with the outside contracting clearance procedure provided for in the current Company-UAW agreement.
4. Insulation-handling areas must be posted and restricted to prevent unauthorized entry as specified in OSHA regulations.
5. The number of employees authorized to handle asbestos-containing insulation should be kept to a minimum. A designated crew, educated and trained in proper insulation-handling work practices, who understands OSHA asbestos regulations, and has reviewed this bulletin, is recommended. As far as feasible, work should be performed at a time when any inadvertent fugitive asbestos fiber emissions would expose fewest people in adjacent areas.
6. Insulation should not be removed, handled, or scored, sawed, or drilled until it has been thoroughly soaked with water. Wherever possible, steam flow should be interrupted to prevent wet insulation next to pipe from drying out during insulation

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removal. A wetting agent such as a dishwasher rinsing aid can be added to the water to promote rapid, complete wetting of the insulation. During handling and saving, a small atomizer bottle (e.g. "Windex") can be used to spray insulation to keep it wet until sealed in labeled, plastic trash bags.

7. Employees handling wet insulation must wear respiratory protection equivalent to that provided by a 3M 9920 air-purifying respirator. All employees must be included in a respiratory protection control program in compliance with OSHA standards.
8. Disposable polyethylene sheeting should be placed on floor below removal site to catch insulation debris provided the drop is not too far (e.g. greater than 10 feet). Otherwise, polyethylene sheeting hammocks should be suspended below steam pipe lines to catch wet insulation as it falls. Wet residue should not be allowed to dry before it is placed in trash bags. Vehicle and pedestrian traffic should not be allowed to disturb unbagged insulation debris.
9. An alternate dust containment procedure is available for situations where wet methods of dust suppression cannot be used during removal of asbestos pipe covering. A polyethylene bag attaches to a pipe and seals the insulation for isolated removal by the attached "Tyvek" and latex gloves. The bag is moved along the pipe in sections until the insulation is removed. About 50 feet of pipe insulation can be handled with one bag. The bag and attached remote-handling gloves containing the asbestos insulation debris may be disposed after precautionary labeling. Bags are available from:
Asbestos Control Technology, Inc.
38 North Pine Street
Maple Shade, New Jersey 08052
Employees removing insulation by this method must wear respiratory protection as specified in Item 7.
10. Employees must wear disposable protective clothing if, during insulation removal and maintenance, regular work clothing could be contaminated with asbestos dust and fibers. duPont "Tyvek" coveralls, jackets, and hoods are recommended. Gloves and disposable overshoes are required.
11. When insulation cannot be worked thoroughly wetted with water or within enclosed containment bags (as specified in Item 9), more rigorous respiratory protection is required. Depending on respiratory protection factor required, either full-facepiece powered air purifying respirators or Type C full-facepiece supplied-air respirators, continuous flow or pressure demand class, must be used. Such situations would be rare and should normally be handled by approved outside contractor. Industrial Hygiene should be consulted when wet methods, containment bags, or outside contractors cannot be used.
12. The use of power-operated tools on asbestos-containing insulation is discouraged unless the asbestos is thoroughly wetted or mechanical local exhaust ventilation captures all airborne dust and discharges outside the plant with no possibility of reentry.
13. The use of compressed air to remove asbestos insulation from pipes is prohibited. Dry wire brushing of asbestos-contaminated pipes is not permitted unless local exhaust ventilation is used.

14. Two training aids are available:

Employee Health Services slide-tape cassette mentioned in Industrial Hygiene Bulletin No. 4.

An OSHA film: "Asbestos Control: Encapsulation, Enclosure, and Removal", a nine-minute presentation using on-site scenes to stress good work practices for the control and removal of asbestos (\$28).

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NOVEMBER 7, 1983

BULLETIN NUMBER 83-22

Article No. 83-22-1

ASBESTOS BRAKE AND CLUTCH SERVICING

FORD

ALL VEHICLES — ALL MODEL YEARS

LINCOLN-MERCUARY

ALL VEHICLES — ALL MODEL YEARS

LIGHT TRUCKS

ALL VEHICLES — ALL MODEL YEARS

MEDIUM/HEAVY TRUCKS

ALL VEHICLES — ALL MODEL YEARS

The purpose of this article is to re-emphasize asbestos health hazard warnings contained in the shop manuals.

Breathing asbestos dust is hazardous to your health. Dust and dirt present on automobiles and truck brake and clutch assemblies may contain asbestos fibers that are hazardous to your health when made airborne with compressed air or dry brushing.

The following procedures are recommended to minimize asbestos dust exposures during brake and clutch servicing of automobiles, trucks, tractors and trailers. These procedures are consistent with asbestos regulations set forth by the Occupational Safety and Health Administration (OSHA). Adherence to these procedures will eliminate exposures to asbestos during brake and clutch servicing.

An area should be designated for all brake and clutch services. Entrances to this area must be posted with the following sign:

ASBESTOS
Dust Hazard
Avoid Breathing Dust

Wear Assigned Protective Equipment
Do Not Remain in Area Unless Your Work Requires It
Breathing Asbestos Dust May Cause
Asbestosis and Cancer

Only essential personnel should be present in the immediate maintenance area during brake and clutch servicing.

During brake servicing, a toxic dust air purifying respirator, either single-use or replaceable cartridge as approved by the Mine Safety and Health Administration

(MSHA) or by the National Institute of Occupational Safety and Health (NIOSH) shall be worn during all procedures from removal of wheels to reassembly. An example of an acceptable respirator is the 3M 8910 or 8920.

During manual clutch servicing such a respirator shall be worn during removal and cleaning of the clutch, pressure plate, and housing assembly, and during the installation of the new clutch assembly.

Wheel brake assemblies and clutch facing must be cleaned using a vacuum cleaner recommended for use with asbestos fibers. A vacuum for this purpose is available from the Rotunda Equipment Catalog. Similar vacuums are also manufactured by Nitish and Heko ("Minuteman"). If additional cleaning is necessary, a rag soaked with water or a brake and clutch washer must be used.

Grinding or sanding on brake linings, pads, rotors, drums, or clutch facings shall be done only while using properly exhaust-ventilated equipment. A respirator must be worn while performing these operations.

During removal of vacuum bags, an approved respirator, as described above, shall be worn. Industrial vacuum cleaner bags containing asbestos dust, cloths used for wiping brake and clutch assemblies, and other asbestos-contaminated items shall be sealed in plastic bags and labeled with the following warning label printed in letters of sufficient size and contrast to be readily visible and legible:

CAUTION
Contains Asbestos Fibers
Avoid Breathing Dust
Breathing Asbestos Dust May Cause
Asbestosis and Cancer

All asbestos waste must be disposed in accordance with OSHA and Environmental Protection Agency (EPA) asbestos regulations. Asbestos waste must not be incinerated or disposed in community water supplies.

All floor cleaning in the asbestos servicing area and clean-up of waste from grinding or sanding must be done using an approved vacuum cleaner while wearing a proper respirator.

If there are any questions concerning these procedures, the Ford Motor Company Industrial Hygiene Department may be contacted at: (313) 337-8955

OTHER APPLICABLE ARTICLES: None
WARRANTY STATUS: INFORMATION ONLY

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