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U. S. Department of Labor
Occupational Safety and Health Administration
Directorate of Science, Technology and Medicine
Office of Science and Technology Assessment

Asbestos-Automotive Brake and Clutch Repair Work

Safety and Health Information Bulletin

SHIB 07-26-2006

This Safety and Health Information Bulletin is **not** a standard or regulation, and it creates no new legal obligations. The Bulletin is advisory in nature, informational in content, and is intended to assist employers in providing a safe and healthful workplace. Pursuant to the *Occupational Safety and Health Act*, employers must comply with hazard-specific safety and health standards promulgated by OSHA or by a state with an OSHA-approved state plan. In addition, pursuant to Section 5(a)(1), the General Duty Clause of the Act, employers must provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm. Employers can be cited for violating the General Duty Clause if there is a recognized hazard and they do not take reasonable steps to prevent or abate the hazard. However, failure to implement any recommendations in this Safety and Health Information Bulletin is not, in itself, a violation of the General Duty Clause. Citations can only be based on standards, regulations, and the General Duty Clause.

Purpose

OSHA is issuing this Safety and Health Information Bulletin to inform employees and employers in the automotive brake repair industry of the precautions that must be taken when working with automotive brakes and clutches containing asbestos. In the case of do-it-yourselfers*, OSHA does not have jurisdiction, and OSHA does not require these practices to be followed. To reduce the potential exposure to asbestos, EPA strongly recommends that all automotive brake and clutch repair work be done by professional auto mechanics. Although the use of asbestos in friction products is declining annually, it remains a substantial source of potential exposure. In addition, there is still potential exposure to asbestos contained in automotive brakes and clutches on older vehicles in need of service. Exposure to asbestos, if not properly controlled can cause mesothelioma, lung cancer, and asbestosis. Symptoms may not appear for years, even decades, after contact with asbestos fibers.¹

Background

Many brakes and clutches used in new and recent model automobiles do not contain asbestos. However, it has not been totally eliminated. Some reports have indicated that many mechanics and employees in the automotive repair shops as well as do-it-yourselfers are unaware that asbestos may be present in both old and replacement brakes and clutches.

OSHA's asbestos standard requires the use of controls and safe work practices when employees work with brake shoes and clutches that contain asbestos. These requirements are detailed in [29 CFR 1910.1001](#) and specifically [1910.1001\(f\)\(3\)](#) and [Appendix F](#) of the standard - Work Practices and Engineering Controls for Automotive Brake and Clutch

Inspection, Disassembly, Repair and Assembly (<http://www.osha.gov/SLTC/asbestos/index.html>). The requirements also are discussed in the Federal Register at [59 FR 40964, 40985-87](#) (August 10, 1994) and [60 FR 33983](#) (June 29, 1995), as well as in OSHA Directive [CPL 2-2.63](#) (revised).

OSHA Work Practices and Engineering Controls/OSHA Methods

All automotive brake and clutch repair facilities in the United States must comply with the OSHA asbestos standard. The proper use of engineering controls and work practices by properly trained employees working on automotive brakes and clutches will reduce their asbestos exposure below the permissible exposure level of 0.1 fiber per cubic centimeter of air, expressed as an 8-hour time-weighted average. Respiratory protection is not required during brake and clutch jobs where the control methods described below are used.

The two preferred OSHA methods to control asbestos dust during brake and clutch repair and service are: (1) a negative pressure enclosure/HEPA (high-efficiency particulate air) vacuum system, and (2) the low pressure/wet cleaning method. The employer may use other methods (in conjunction with written procedures), to reduce exposure to levels equivalent to the negative pressure enclosure/HEPA vacuum system. For facilities that inspect, disassemble, reassemble and/or repair five or fewer brake or clutch jobs per week, the wet method (described in paragraph D of Appendix F) can be used. The spray can/solvent system method can be used as an alternative preferred method since it meets the equivalency criterion of the negative pressure enclosure/HEPA vacuum system method. Proper training is essential to ensure that employees use the methods in an effective manner.

Negative pressure enclosure/HEPA vacuum system method

The negative pressure enclosure/HEPA vacuum system method includes the following steps:

1. Enclose the brake or clutch assembly to prevent release of asbestos fibers into the employee's breathing zone during brake or clutch inspection, disassembly, repair, and reassembly operations. Use a transparent enclosure with impermeable sleeves.
2. Seal the enclosure tightly and thoroughly, inspect for leaks before beginning work.
3. The enclosure must be transparent so that the employee can clearly see the operation during brake or clutch inspection, disassembly, repair, and reassembly. The enclosure must also have impermeable sleeves to allow the employee to handle the brake and clutch assembly without penetrating the enclosure. The integrity of the sleeves and ports must be inspected before work begins.
4. Use a HEPA-filtered vacuum to keep the enclosure under negative pressure throughout the operation. Compressed air may be used to remove asbestos fibers or particles from the enclosure.
5. Use the HEPA-filtered vacuum first to loosen asbestos residue from the brake and clutch parts, then evacuate the loosened material from the enclosure into a vacuum filter.
6. When the vacuum filter is full, spray it with a fine mist of water before removing it. Immediately place it in a labeled, impermeable container and dispose of it as asbestos waste in accordance with federal, state, and local regulations and in compliance with [1910.1001\(k\)\(6\)](#). The label must include the following information: "DANGER, CONTAINS ASBESTOS FIBERS, AVOID CREATING DUST, CANCER AND LUNG DISEASE HAZARD."
7. Immediately clean spills or releases of asbestos containing waste material from inside the enclosure or vacuum hose or filter. Properly dispose of waste as asbestos waste.

Vacuum enclosure units should be large enough to fully enclose and remove the brake drum with enough room for hammering if the drums are difficult to remove because of wear, rust, or other reasons. Enclosure systems should have good interior lighting to illuminate the work area. The enclosure should completely enclose the brake drum, and form a tight seal behind the backing plate. Air guns should never be aimed towards the seal as this may reduce or eliminate its protective ability. After cleaning with compressed air, the inside surfaces of the enclosure should be HEPA vacuumed to keep the inside clean and maintain visibility. Each brake component should be vacuumed as it is removed and the backing plate should be vacuumed after all the components have been removed. Rags used to wipe or clean used brake parts, should not be used to wipe hands. Mechanics should wear an appropriate NIOSH-approved respirator for asbestos when changing vacuum unit filters.

Low pressure/wet cleaning method

The **low pressure/wet cleaning method** involves the following steps:

1. Position a catch basin under the brake assembly to avoid splashes and spills.
2. Gently flood the brake assembly with water containing an organic solvent or wetting agent to prevent asbestos-containing brake dust from becoming airborne.
3. For drum brakes, ensure that the water solution flows between the brake drum and the brake support before removing the brake drum.
4. After removing the brake drum, thoroughly wet the wheel hub and back of the brake assembly with the water solution to suppress dust.
5. Thoroughly wash the brake support plate, brake shoes, and other parts before removing the old brake shoes.
6. If your system uses a filter, wet the filter when it becomes full and before removal, with a fine mist of water, and place immediately in an impermeable container. Label the container and dispose of it as asbestos waste.
7. Immediately clean spills of asbestos-containing liquid or asbestos-containing waste material using a HEPA-filtered vacuum and/or wet methods. Properly dispose of waste as asbestos waste.
8. Dry brushing is prohibited.
9. The brake washer solution should be changed regularly for maximum efficiency of the unit.

Wet method

For shops that perform infrequent brake work and clutch repair work, OSHA allows the use of a **wet method** as a "preferred" method. Therefore, in facilities in which five (5) or fewer brake "jobs" (five brake "jobs" are equivalent to five vehicles) or 5 clutches, or some combination totaling 5, are inspected, disassembled, reassembled and/or repaired per week, the mechanic/technician may control potential asbestos exposure through the use of a spray bottle, hose nozzle, or any implement capable of delivering a fine mist of water or amended water at low pressure to wet down the drum or clutch housing before removing it and to control asbestos fiber release during subsequent activities. However, any wastewater generated must be captured and properly disposed of without allowing it to dry on any surfaces. OSHA anticipates that using a spray bottle will adequately control dust without generating a large volume of wastewater.

The wet method requires the following steps:

1. Brake and clutch parts must be wetted with water or amended water before taking any other action.
2. Wipe the brake and clutch parts clean with a cloth.
3. Place contaminated cloth into an impermeable, properly labeled container, and then dispose of it as asbestos waste. Alternatively, the cloth can be laundered to prevent the release of asbestos fibers in excess of 0.1 fiber per cubic centimeter of air, expressed as an 8-hour time-weighted average.
4. Any spilled water or amended water or asbestos-containing waste material must be cleaned immediately with a cloth or HEPA-filtered vacuum and not allowed to dry.
5. Do not dry brush.

The simplicity of the wet control does not eliminate the need for correct work practices. For example, holding the spray nozzle too close to the brake surface may cause asbestos fibers to become airborne. Brake components should be sprayed to saturate the parts as they are removed from the assembly.

Equivalent Methods

Like the preferred methods, an equivalent method must include a detailed description of the practices that must be followed when the method is used. An employer who uses such a method must have a written description of the method that contains sufficient detail that the method can be reproduced. The employer must provide information demonstrating that the exposures resulting from an equivalent method are equal to or less than exposures from the negative pressure enclosure/HEPA vacuum system method. For purposes of equivalency, employee exposures must not exceed 0.016 f/cc, as measured by the OSHA reference method and averaged over at least 18 personal samples. The following method, spray can/solvent system, may be used as an "equivalent" method. The spray can/solvent system may be used when proper work practices are followed. At a minimum, the spray can/solvent system method must follow detailed written procedures including the following:

1. Wet the brake and clutch parts with the spray can/solvent before taking any other action.
2. Wipe the brake and clutch parts clean with a cloth.
3. Place contaminated cloth into an impermeable, properly labeled container, and then dispose of it as asbestos

waste. Alternatively, the cloth can be laundered to prevent the release of asbestos fibers in excess of 0.1 fiber per cubic centimeter of air, expressed as an 8-hour time-weighted average.

4. Immediately clean any spilled solvent or dispersed asbestos with a cloth or HEPA vacuum.
5. Dry brushing during spray can/solvent system operations is prohibited.

The solvents typically used in brake and clutch work are hazardous chemicals, which requires the employer to comply with the Hazard Communication standard. If the solvents are flammable, appropriate precautions against fire and explosion must be taken.

Best Practices

Mechanics should assume that all brakes have asbestos-type shoes. Worn non-asbestos-type brake shoes cannot be readily distinguished from asbestos-type shoes. If a mechanic assumes incorrectly that a shoe is a non-asbestos-type and fails to utilize brake dust control procedures, increased asbestos exposure may result.

Mechanics must be trained in the correct and most effective way to use the control system selected by the facility manager or owner. The danger of increased exposure to asbestos as the result of improper work practices should be explained. Examples of improper work practice include: directing an air nozzle at an enclosure seal, placing the nozzle of a spray mist too close to the work surface, not placing the vacuum nozzle close enough to the contaminated surface, turning on the vacuum pumps before positioning the vacuum enclosure over the wheel and leaving them on when removing the enclosure, and splashing or spilling contaminated solutions on the floor. A control system must always be used and consistent work procedures are essential.

Use pre-ground, ready-to-install parts when possible. If asbestos-containing friction materials must be drilled, grooved, cut, beveled, or lathe-turned, low speeds should always be used to keep down the amount of dust created. All machinery should have an adequate, HEPA equipped local exhaust dust collection system to prevent asbestos exposures and shop contamination. Immediately clean spills of brake dust or contaminated solutions by HEPA vacuuming or wet mopping.

A regular maintenance program for the system used to control brake dust is essential. Maintenance should include checking and replacing seals, nozzles, other hardware, contaminated filters and solutions. Any deficiencies such as ineffective seals, or air nozzles should be repaired. Disposal of asbestos contaminated material, whether it is filters or solutions, must be in accordance with federal and state regulations and in compliance with [1910.1001\(k\)\(6\)](#). Periodic cleaning will help reduce the possibility of asbestos contamination of workbenches, floors, etc. Mechanics should perform brake and clutch work in an area isolated from other work areas. Signs should be posted informing employees not to eat, drink, or smoke in the brake and clutch work area. Asbestos and other potentially toxic materials can be ingested or inhaled during these activities.

Personal hygiene, such as frequent hand washing with soap or detergent, should be stressed. Changing from soiled work clothes into clean clothes before leaving work provides additional protection against bringing asbestos into the home environment. A laundry service with facilities for cleaning asbestos contaminated clothing must be provided for any asbestos-contaminated work clothes.

Conclusion

Engineering controls and good work practices must be implemented throughout the process of performing brake and clutch inspection, disassembly, repair, and assembly. The four types of control systems or methods described here can effectively reduce employees' asbestos exposure below the OSHA permissible exposure level.

Information about job hazards must be disseminated through a training program that describes how to do properly perform a task, how each work practice reduces potential exposure, and how employees can benefit from these practices. No matter, which control system, is used, employees must be trained in how to properly use it. Employees (and do-it-yourselfers who choose not to have brake and clutch work conducted by professional mechanics) who can recognize and control hazards are better equipped to protect themselves from asbestos exposure. Training and work practices should be frequently reinforced. Business owners who are concerned about the cost of professional help can contact the OSHA Consultation Project Office in their state for free consultation service. Priority is given to businesses with fewer than 250 employees at a worksite, with further consideration given to the severity of the worksite problem.

The Consultation Program can help the employer evaluate and prevent hazardous conditions in the workplace that can cause injuries and illnesses

¹Asbestos in Brakes Exposure and Risk of Disease, Richard A. Lemen, PhD, MSPH, American Journal of Industrial Medicine 45: 229-237 (2004)

*Non-employees outside the automotive repair industry who typically repair or replace their own brakes at home. These individuals are not subject to the OSHA requirements in this Safety and Health Information Bulletin.

For more information about EPA's asbestos program, do-it-yourselfers may visit [EPA's website](#) or you may call the asbestos ombudsman's hotline/clearing house at 1-800-368-5888.

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