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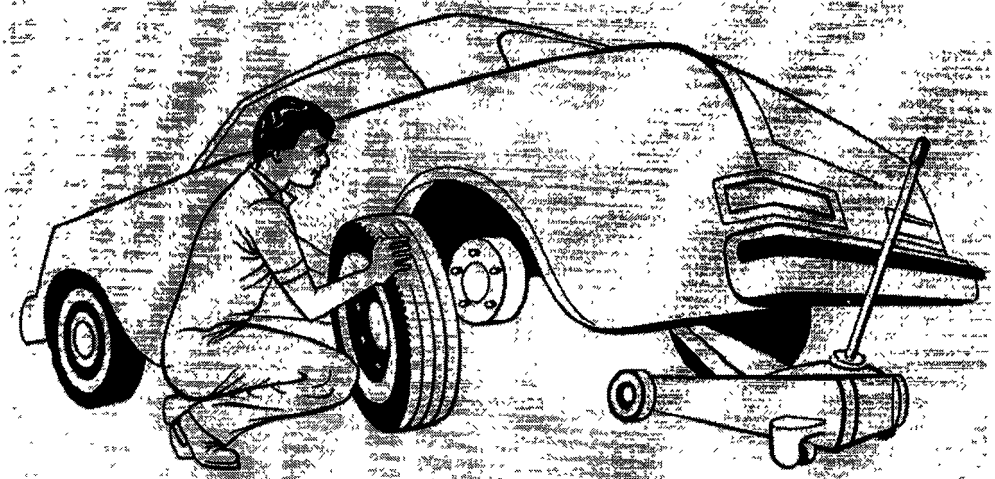
United States
Environmental Protection
Agency

June 1986

Asbestos Action Program

EPA

Guidance for Preventing Asbestos Disease Among Auto Mechanics



PREVENTING ASBESTOS DISEASE AMONG AUTO MECHANICS

I. MECHANICS' EXPOSURE TO ASBESTOS

Friction materials, such as brake linings and clutch fac often contain asbestos. Millions of asbestos fibers car released during brake and clutch servicing (1-8). Grinding bevelling friction products can cause even higher exposures Like germs, asbestos fibers are small enough to be invisible they can remain and accumulate in the lungs. When you see a cloud during brake work, you are seeing clumps conta thousands of fibers. Most of the smaller fibers will not sho with the methods commonly used for measuring asbestos leve the air, such as the method used to determine compliance witl OSHA asbestos standard, since most asbestos fibers in brake are too small to be measured by these methods (1-3,5-8).

Asbestos released into the air lingers around a garage after a brake job is done and can be breathed in by ever inside a garage, including customers. While lowering expc lowers risk, there is no known level of exposure to asb below which health effects do not occur (9-12) The EPA proposed phasing out the use of asbestos products. In situa where asbestos exposures cannot be eliminated entirely, should be reduced to the lowest possible level (9,13)

Asbestos can be carried on work clothing, contamin the family car and home. This can cause asbestos disease ar family members. An ordinary house vacuum cleaner ca collect these asbestos fibers, since its filter is not enough to trap them In fact, an ordinary house vacuum cle is likely to stir these fibers up and and scatter them into air

Asbestos can also get on a mechanic's hands and swallowed when eating or smoking a cigarette. This particularly difficult problem for mechanics, since they get grease on their hands and asbestos fibers can stick to grease.

II. HEALTH EFFECTS OF ASBESTOS EXPOSURE

Until the use of asbestos products is phased out, the best of limiting health damage to workers exposed to asbestos

use proper controls It is not possible to predict whether an individual person exposed to asbestos will later develop asbestos-related disease. But studies of disease patterns among large groups of workers exposed to asbestos make general observations possible The following can be the consequences of inadequate prevention:

Asbestosis

Asbestos exposure can cause scar tissue to form in the lungs. This is a very gradual process that usually takes many years before its effects are noticed. This scarring is called asbestosis. It causes gradually increasing shortness of breath. A person with this disease must breathe harder and deeper to get his or her breath because the scar tissue makes it harder for oxygen to get into the blood stream. This scarring is caused by repeated exposures to asbestos and is permanent. Nearly one half of mechanics who work for many years without proper control measures can develop this scarring (7,14).

Cancer

1. Mesothelioma

Mesothelioma is a type of fatal cancer of the lining of the chest or abdominal cavity. It can be caused by very low exposures to asbestos. This cancer has occurred among brake mechanics (15-20), their wives (20), and their children (21).

2. Lung Cancer

Lung cancer is currently responsible for the largest number of deaths from exposure to asbestos (22). Even short-term occupational exposures have been shown to increase the risk of lung cancer (22-24). Each added exposure increases the risk of cancer. Like asbestos, smoking can independently cause lung cancer, increasing the risk by about 10 times. When smokers are exposed to asbestos, the risks do more than add together; they actually multiply. For example, asbestos insulators who smoke have a lung cancer risk over fifty times higher than nonsmokers without asbestos exposure. However, stopping smoking greatly reduces this risk, even if a person has smoked for many years. Smokers who have been exposed to asbestos should be especially encouraged to stop smoking. The extent of risk of lung cancer among mechanics is not now known; but, given the known lung cancer risk among other groups exposed to asbestos, caution is necessary.

3. Other Cancers

Other cancers which appear to be caused by asbestos includ of the voice box (25,26) and of the stomach and large (27, especially page 315).

Latency Period

It usually takes 15 to 30 years or more for cancer or a lung scarring to show up after exposure. (Scientists c the latency period.) Until then, the victim often feel This gives a false sense of security. For example, touches a hot stove, one gets burned right away. With as the damage isn't obvious until many years later. Thi sense of security can easily lead a worker and/or superv follow work practices which can cause harmful exposures they are not aware that disease may develop later.

III. MEDICAL TESTS

Medical tests only discover asbestos-related disease a has developed. In some cases, where the condition n curable, especially with asbestos-related cancers of the intestine and voice box, early detection can be very important.

Asbestosis

Asbestosis, or lung scarring from asbestos, is permanent and be treated. It is diagnosed by chest x-rays, breathing tests lung or pulmonary function tests), and/or listening to the together with a history of exposure to asbestos. Very asbestosis may be missed by these techniques. Early asbes difficult to see on a chest x-ray and is best evaluated by a who has experience and/or specialized training with asb (This type of specialist is called a "B reader" of x-rays.)

Lung Cancer

Very often lung cancer from asbestos has already spread time it can be seen on a chest x-ray or by tests of the This is why more frequent tests for lung cancer do not h average person who develops this cancer to live longer. Lung is thus a condition needing prevention more than early detection and cu

Intestinal Cancer

Cancer of the large intestine can often be detected early by yearly exams of the rectum and sigmoid area, with a hemoccult test for blood in the stool. Early detection and treatment of this condition can result in cure.

Voice Box Cancer

Voice box cancer can often be discovered at a curable stage by a medical exam. It may show up as hoarseness that does not go away in a few weeks.

IV. EXTENT OF EXPOSURE DURING BRAKE AND CLUTCH MAINTENANCE

Using a compressed air hose to clean drum brakes can release up to 16 million asbestos fibers in the cubic meter of air around a mechanic's face (1).* Even hitting a brake drum with a hammer can release over a million asbestos fibers (4). Much less dust from asbestos-lined disc brake pads will settle on disc brakes, but some dust can get on a mechanic's hands and into the garage air during maintenance. The asbestos fibers released from brake and clutch work can be scattered throughout a garage, where they can present a hazard for months or years.

Because of this, many garages are now turning to newer methods for brake cleaning. However, some of these newer methods may actually contribute to the problem. For example, millions of asbestos fibers can be released from drum brakes with these methods:

Wiping with a dry rag or brush (1-3)

Wiping with a wet rag or brush (2,3). The water doesn't prevent scattering of much of the asbestos, and when the rag dries or is shaken, asbestos is spread around the garage.

Liquid squirt bottles or solvent sprays (3). The water or solvent under pressure scatters much of the asbestos, and when it dries the asbestos is still all over the surrounding work surfaces. Brake cleaning equipment using these methods with a brush or squirt gun is likely to have the same problems. In fact, measurements from one manufacturer using a liquid spray system showed that over a million fibers can be released near a mechanic's face (28) Using a specially designed low-pressure spray

**These are the larger fibers measured by common methods for counting asbestos fibers. The very small ones are far more numerous, but can be only be seen with the electron microscope.*

and properly collecting and disposing of contaminated may prevent some asbestos from spreading around the Some recirculating wet method equipment uses a solve collect brake dust into a tray. If the solvent evaporates fro tray, normal air currents easily lift the asbestos fibers into the air.

Using a garden hose may prevent some brake dust becoming airborne, but this can easily contaminate the floor or other work areas by scattering the asbestos.

Using a standard shop vacuum cleaner. A shop vacuum can spread asbestos about a garage as much as does a comp air hose (6: using a shop vacuum cleaner raised as concentrations in adjacent bays to levels greater than found using a compressed air hose). A shop vacuum filter is not fine enough to collect asbestos

All of these brake cleaning methods can release ei asbestos into a garage (6,29) so that an average of over million of the larger fibers could be breathed each da workers in that garage. These brake cleaning methods can cause customers to be exposed, since asbestos from brake wor be spread 75 feet away from the mechanic (1).

When grinding is done to renew used brake block lir concentrations of up to seven million asbestos fibers per meter can be released. Bevelling new linings can re concentrations of up to 72 million fibers and light grindir new linings of up to 4.8 million fibers (7).

V. CONTROLLING EXPOSURES

NIOSH, OSHA, and EPA recommend that where asbestos expo cannot be eliminated, they must be controlled to the lowest possible (9,13). Effective containment prevents prol associated with housekeeping and with stirring up settled (13). The best approach is to contain brake dust and preve release into a garage.

Brake Cleaning

Enclosure equipment for brake cleaning is available, slips easily over the brake assembly and forms a tight against the backing plate. A compressed air system can the used inside this type of enclosure system for good brake cle without exposing the brake mechanic or others. Clear p

walls or windows allow easy visibility of the work being done. Brake dust is sucked into a vacuum cleaner equipped with a special filter called a HEPA or "high-efficiency particulate air" filter. Only this type of filter can capture the small, invisible asbestos fibers. Non-permeable glove attachments on some equipment allow a mechanic to do work inside the enclosure without getting asbestos on the hands. If glove attachments are available only as an option, this option should be selected.

How to Use Enclosure Equipment for Cleaning Drum Brakes

Steps for using this type of equipment on drum brakes are simple:

1. Check that the hose is securely fastened to the HEPA vacuum container and to the brake enclosure. Also check that the vacuum container seals and clips are in proper functioning order according to the manufacturer's instructions.
2. Remove the wheel.
3. Turn on the asbestos vacuum cleaner.
4. Place the enclosure over the drum, making sure it forms a tight seal behind the backing plate.
5. Place hands into the attached rubber gloves.
6. Remove the brake drum. Some equipment allows use of a hammer or other tools inside the enclosure for drums that are hard to remove.
7. Blow dust off the drum and brake assembly using the air gun attachment inside the enclosure.
8. Blow dust off all inside surfaces of the enclosure towards the vacuum exit using the air gun attachment inside the enclosure.
9. Remove the enclosure and turn off the vacuum cleaner

If grease accumulates on the inside surfaces of the enclosure, clean according to the manufacturer's instructions with a soft cloth and with the vacuum running. Dispose of the cloth according to OSHA regulations (30). This cloth should not be handled with bare hands.

Disc Brakes

For disc brakes, vacuum the pads, rotor, and caliper directly with a crevice attachment and avoid handling them before vacuuming.

Filter Change and Waste Disposal

Asbestos vacuum cleaners have several filters. Cha filters and disposing of asbestos waste can release dang concentrations of asbestos unless done properly. Some equi allows for filter or collection bag change while the vacuum is running. This draws loose brake dust into the va collector and away from the mechanic, reducing the ri exposure. Some equipment has a renewable main filter that c cleaned repeatedly without opening the vacuum cleaner. Ic all vacuum equipment should be designed to prevent openin vacuum chamber when the vacuum motor is turned off, since op the chamber can cause release of collected asbestos into the air.

Always follow the manufacturer's instructions for filte collection bag change. Request a demonstration and pr session from the manufacturer to go through all steps equipment use and filter or collection bag change, until person who is to use this equipment is completely familiar these procedures. Place the filter or collection bag di into a 6 mil (heavy) plastic bag and double tie. Place the directly into a 55-gallon drum or similar leakproof, air container designated for asbestos waste according to regulations (30) and mark it as follows:

CAUTION
Contains Asbestos Fibers
Avoid Breathing Dust
Breathing Asbestos Dust Can Cause Lung Disease and Cancer

Keep this drum for asbestos waste locked between filt collection bag changes. Transport and disposal of asbestos should be done only by individuals familiar with procedure handling asbestos waste in accordance with EPA's asb disposal guidance (31).

Clutch Repair

Significant exposure can also occur during clutch r Since a mechanic's head is typically under the clutch asse during clutch repair, asbestos often falls on a mechanic's and clothing. Enclosure equipment with a HEPA vacuum clear prevent this exposure is under development.

Non-Asbestos Brake Linings

The use of non-asbestos friction materials is increasing. Available information suggests that none of these substitute materials is as dangerous as asbestos. Unless a mechanic is certain before brake work starts that a particular vehicle's brakes are not lined with asbestos, it should be assumed for the sake of caution that there is asbestos in the brake dust. In addition, friction materials often contain adhesives, toxic metals, and other hazardous chemicals which can harm the body (2). Thus, even for non-asbestos friction products, an enclosure system can control exposures to materials which may be harmful.

What to Look for in Enclosure Equipment for Brake Cleaning

Recommended features to look for in selecting enclosure equipment include:

1. Features which prevent hand contact with asbestos, including rubber (or other non-permeable) gloves to cover both hands. Look for attached gloves with no spaces for leakage. If attached gloves are not standard with the equipment, they should be selected as an option.

2. Enclosures large enough to fit around the biggest size brake drums likely to be encountered to prevent exposure during drum removal.

3. Reports of air sampling with analysis by transmission electron microscopy that show no release of asbestos fibers when using this equipment during brake maintenance. This helps ensure against design defects.

4. A sturdy seal behind the backing plate to prevent leakage during blow out.

5. A pressure gauge or manometer indicating when vacuum filter change or cleaning of renewable filter is needed This helps ensure effective suction during use

6 Safety of filter change or renewable filter cleaning. Ideally, future models of these devices will have a feature that prevents opening the filter housing while the vacuum motor is switched off.

Enclosure system manufacturer information is discussed in references 32-35.

Machining and Bevelling

Whenever possible, pre-ground, installation-ready linings and clutch facings should be used. If friction m must be arced, this should be done by lathe-turning at low rather than by grinding. Linings should not be ground brake systems for which they were not designed. Where materials must be machined, bevelled, or lathe-turned, ac local exhaust ventilation equipment connected to a HEPA collector should be used to prevent mechanic exposure an contamination. Such equipment should be designed and set u professional ventilation engineer, using specifications su those found in the American Conference of Governmental Inc Hygienists' ventilation manual (36) as a minimum design sta There must be a comprehensive asbestos control and mon program where machining, bevelling, or lathe-turning is (30).

Special Areas for Brake Work

Eating, drinking, and smoking should not be done in ar where brake work is done. Mechanics should wash their hanc face before eating and wash all exposed skin and change c before going home. If possible, work clothes should be laur at special facilities equipped to wash clothing contaminatec asbestos. Smokers should be urged to quit and, if necessa provided assistance in entering a smoking cessation pr Accidental spillage of brake dust should be promptly vac with a HEPA vacuum.

VI. RESPIRATORS

The National Institute for Occupational Safety and (NIOSH) recommends the use of engineering controls and gooc practices as the primary means of reducing exposures Proper use of a respirator specially recommended for asl (37) when using the brake cleaning methods described in P of this guidance can only protect a mechanic while the resp is being worn. Since any of the brake cleaning methods des in Part IV could contaminate a garage with brake dust, mec and other employees would have to wear such a respirator a to be protected. In addition, effective respirator use re a complete respiratory protection program, including training, medical evaluations, proper respirator selection maintenance, fit testing, and periodic inspections. Furthe NIOSH and EPA recommend only certain air-supplied respirato asbestos exposure (37). These respirators could be cumbersome in a garage setting.

Air-purifying respirators with HEPA cartridges may be appropriate for secondary protection during floor cleaning, filter or collection bag changing, and waste disposal. Air-purifying respirators with HEPA cartridges should be used only as a precaution against the accidental disturbance of asbestos, and not as a substitute for effective engineering controls. It should be noted that, while NIOSH and EPA do not recommend the use of air-purifying respirators with HEPA cartridges in asbestos environments, various existing regulations currently allow their use.

Additional Information

This guidance was prepared to support technical mat being developed by the Federal Brake Mechanic Education Prc under EPA's Asbestos Action Program. The following are addi sources of information on asbestos:

EPA Regional Asbestos Coordinators

(CT, MA, ME, NH, RI, VT)
EPA Region I
JFK Federal Building
Boston, Mass. 02203
(617) 223-0585

(NJ, NY, PR, VI)
EPA Region II
Woodbridge Avenue
Edison, N.J. 08837
(201) 321-6668

(DE, MD, PA, VA, WV)
EPA Region III
Curtis Building
6th and Walnut Streets
Phila., Penna 19106
(215) 597-9859

(AL, FL, GA, KY,
MS, NC, SC, TN,)
EPA Region IV
345 Courtland St., N.E.
Atlanta, Georgia 30365
(404) 881-3864

(IL, IN, MI, MN, OH, WI)
EPA Region V
230 S. Dearborn St.
Chicago, Ill. 60604
(312) 886-6003

(AR, LA, NM, OK, TX)
EPA Region VI
Internfirst II Bldg.
1201 Elm Street
Dallas, Texas 75270
(214) 767-2734

(IA, KA, MO, NE)
EPA Region VII
726 Minnesota Ave.
Kansas City,
Kansas 66101
(913) 236-2835

(CO, MT, ND, SD, UT, WY)
EPA Region VIII
One Denver Place
999 18th St., Suite 1300
Denver, Colorado 80202
(303) 293-1730

(AZ, CA, HI, NV, CM,
American Samoa, G
EPA Region IX
215 Fremont Street
San Francisco, CA 94
(415) 974-8588

(AK, ID, OR, WA)
EPA Region X
1200 6th Avenue
Seattle, Wash. 98101
(206) 442-2870

EPA TSCA Assistance Office

(202) 554-1404

Consumer Product Safety Commission

For information on asbestos in consumer products or homes
(800) 638-2772

NIOSH

National Institute for
Occupational Safety and Health
4676 Columbia Parkway
Cincinnati, Ohio 45226
(513) 533-8323

U.S. Occupational Safety and Health Administration

OSHA Office of Information and
Consumer Affairs, Room N-3637
200 Constitution Avenue, N.W.
Washington, D.C. 20210
(202) 523-8151

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Washington, DC 20460

AUTHENTICATION

I, Paul Cestone, attest that I am the Document Control Officer for the National Program Chemicals Division, Office of Pollution Prevention and Toxics of the United States Environmental Protection Agency (EPA or Agency) and that the attached document is a true, correct, and compared copy of the file copies in my legal custody, consisting of:

EPA's poster "It's Your Health... Don't Blow It"

Subscribed under the penalty of perjury on this 06 day of June, 2017.

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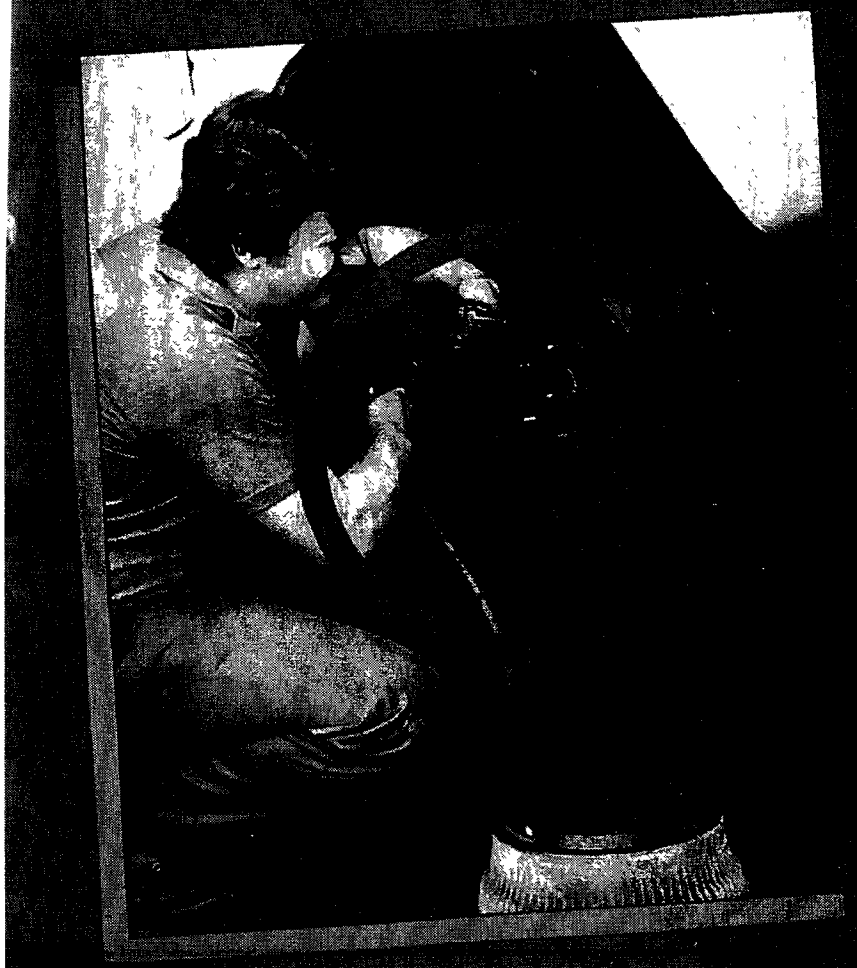
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I, Wendy Blake, certify that I am the Associate General Counsel, General Law Office, Office of General Counsel, of the United States Environmental Protection Agency; that I am the designee of the General Counsel for the purpose of executing certifications under 40 C.F.R. sec. 2.406; that I have duties in Washington, District of Columbia; and that the official whose signature appears above has legal custody pursuant to 40 C.F.R. sec. 2.406 of the original documents, copies of which are attached, as witnessed by my signature and the official seal of the United States Environmental Protection Agency.

Wendy L. Blake
Associate General Counsel
General Law Office
Office of General Counsel

Date: 6/12/17

IT'S YOUR HEALTH...



Breathing brake dust particles can damage your health. Most of these particles are so small that you can't see them.

These dust particles contain asbestos or other substances which may be harmful.

Many years later, they may cause shortness of breath, lung disease, or cancer.

The only sure protection is to prevent brake dust from getting into the air and on your food and clothing.

DO's

Do clean brakes and drums with special "HEPA" vacuum cleaners.

Do use pre-ground, ready-to-install parts when possible.

Do lathe-turn brake blocks at a low speed with proper "HEPA"-equipped exhaust ventilation.

Do dispose of asbestos waste according to Federal and local regulations.

Do wash thoroughly before eating or going home.

Do change into clean clothes before going home.

Do stop smoking.

DON'Ts

Don't clean with:

- air hose
- dry brush or rag
- wet brush or rag
- garden hose
- liquid squirt bottle
- solvent spray
- ordinary shop-vac

Don't grind brake blocks.

Don't lathe, bevel, drill, or cut brake blocks without proper exhaust ventilation.

Don't take work clothing home.

Don't eat, drink, or smoke in work areas.

DON'T BLOW IT!

For further information, write:
U.S. EPA
TSCA Assistance Office (TS-799)
401 M Street, S.W.
Washington, D.C. 20460
Telephone: 202-554-1404

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