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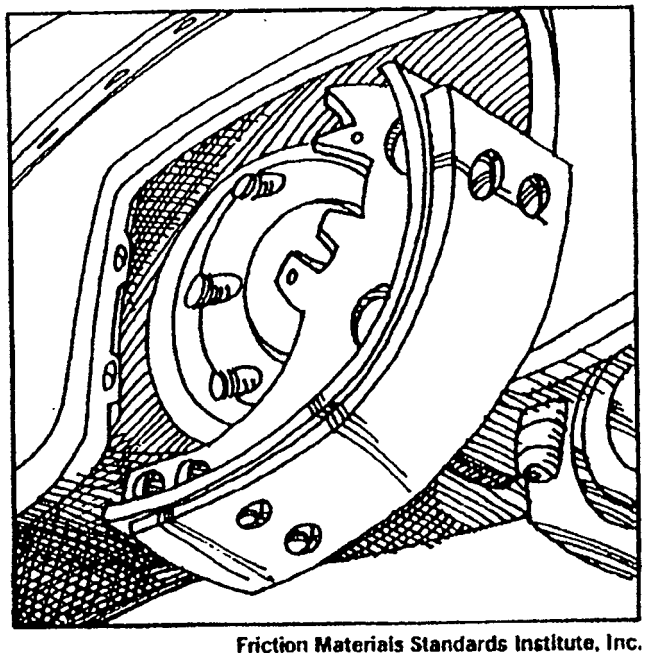
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October 1978

FRICTION MATERIALS WORK PRACTICES GUIDE



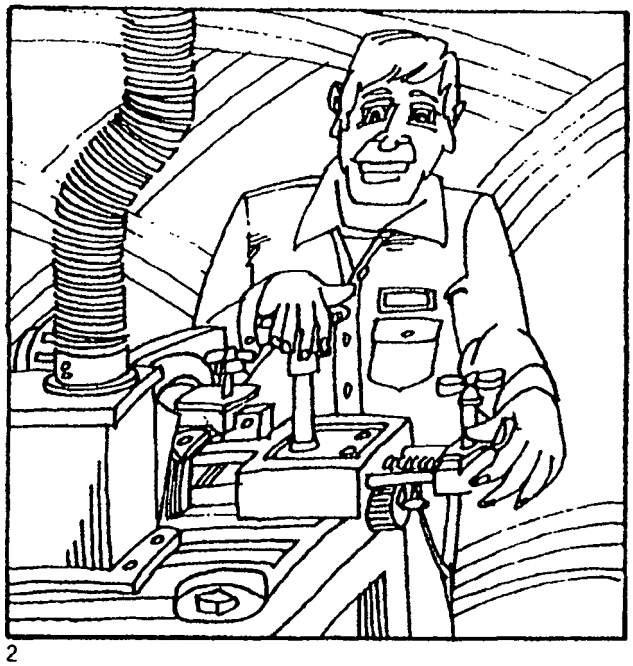
Friction Materials Standards Institute, Inc.

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USE DUST COLLECTION EQUIPMENT WHEN MACHINING



2

FMSI 03486

INTRODUCTION

The purpose of this booklet is to provide practical guidelines for brake and clutch service mechanics in the handling and processing of asbestos containing friction materials and in the maintenance and repair of brake and clutch assemblies on which the materials are installed.

Adherence to the recommended work practices will reduce employee exposure to airborne concentrations of asbestos dust and will assist employers in complying with government regulations.

This area is regulated by federal, state and local authorities. We caution that you may not rely on strict adherence to the work practices recommended herein as assuring compliance with these regulations, because (a) they are subject to amendment; (b) there are on-going administrative interpretations of these regulations; and (c) particular field conditions may vary. You should direct all questions relating to compliance with regulations to the appropriate regulatory agencies.

ASBESTOS AND FRICTION MATERIALS

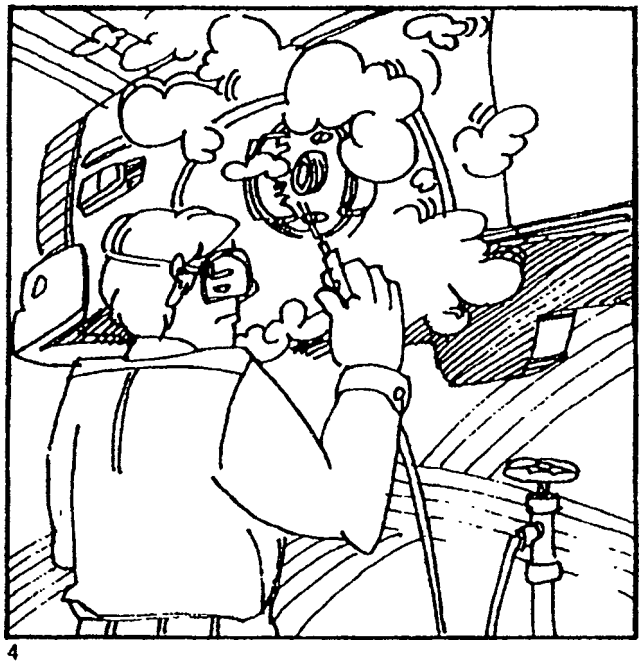
Most molded friction materials contain about 50% asbestos - some woven materials over 90%. In molded materials, resin binders prevent the release of asbestos fibers during normal handling. Woven friction materials, normally used only in construction and industrial applications, must be handled with care to avoid creating dust as the asbestos fibers are less firmly bound into the product.

Potentially hazardous airborne concentrations of asbestos dust can be created by improper cleaning and handling of worn brake and clutch assemblies, uncontrolled machining operations and poor housekeeping.

Breathing excessive quantities of asbestos fiber can cause respiratory disease and cancer. Smoking greatly increases the risk of lung cancer among asbestos workers. Prevention of asbestos dust exposure is the only known method of eliminating asbestos-related disease among those working with asbestos containing products.

Proper work practices offer the best assurance of providing exposure safeguards for workers removing, installing and machining asbestos containing friction materials.

DO NOT USE AN AIR HOSE FOR CLEANING



4

FMSI 03488

WHY?

SUMMARY OF OSHA ASBESTOS STANDARD EFFECTIVE JULY 1, 1976

Under the current standard, it is the employer's responsibility to assure that exposure of employees does not exceed the following permissible exposure levels.

a. Eight-hour time-weighted average: Two fibers, longer than five micrometers, per cubic centimeter.

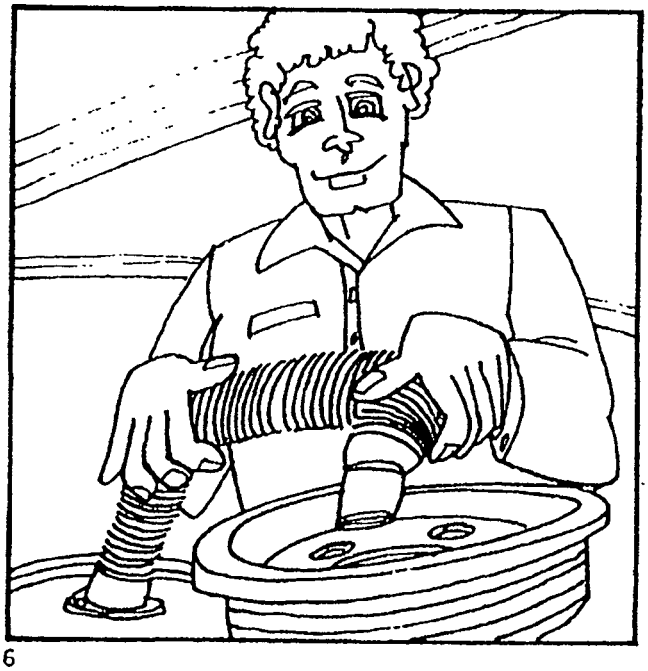
b. Ceiling (Peak) concentrations: Ten fibers, longer than five micrometers, per cubic centimeter.

Engineering controls such as isolation, enclosure, exhaust ventilation and dust collection are the preferred methods for meeting the prescribed exposure limits. All external surfaces must be maintained free of asbestos fiber accumulation.

Respiratory protection is required whenever airborne fiber concentrations exceed either the permissible time weighted average level or the permissible ceiling concentration. Protective clothing is required whenever airborne fiber concentrations exceed the permissible ceiling level. Caution signs, change rooms and employee notification are required where asbestos fiber concentrations exceed permissible exposure limits. The standard requires that all workplaces where asbestos fibers may be released shall be monitored to determine exposure levels, and regular monitoring is required where exposure levels are expected to exceed permissible limits. Employers must maintain records of monitoring required by the standard. They must also provide or make available medical examinations for employees exposed to airborne concentrations of asbestos fibers.

FMSI 03489

USE VACUUM OR WET METHODS FOR CLEANING



6

FMSI 03490

HANDLING NEW FRICTION MATERIALS

Handling new disc brake assemblies, lined brake shoes, clutch facings and brake blocks purchased in individual boxed sets is unlikely to create significant airborne concentrations of asbestos dust. If the parts are purchased in bulk quantities, abrasion during shipment may result in the accumulation of dust in shipping containers. Dust should be removed by vacuuming or cleaning with a damp cloth.

Whenever possible, purchase friction materials preground and ready for installation. This may keep dust levels below OSHA maximums and eliminate the need for respiratory protection, restricted areas, regular monitoring, special clothing, change rooms and employee notification.

REMOVING WORN FRICTION MATERIALS

Asbestos fibers in disc brake linings, drum brake linings, blocks and dry clutch facings are locked into the product with resin binders which prevent the release of asbestos fiber during normal installation. Heat and abrasion during normal use may generate dust containing asbestos. Some dust will accumulate in brake and clutch assemblies.

When removing worn friction materials, remove the accumulated dust in the assemblies with an industrial vacuum cleaner equipped with a high efficiency filter system. If such equipment is not available, dust can be removed with a damp cloth. Do not use compressed air or dry brushing for cleaning.

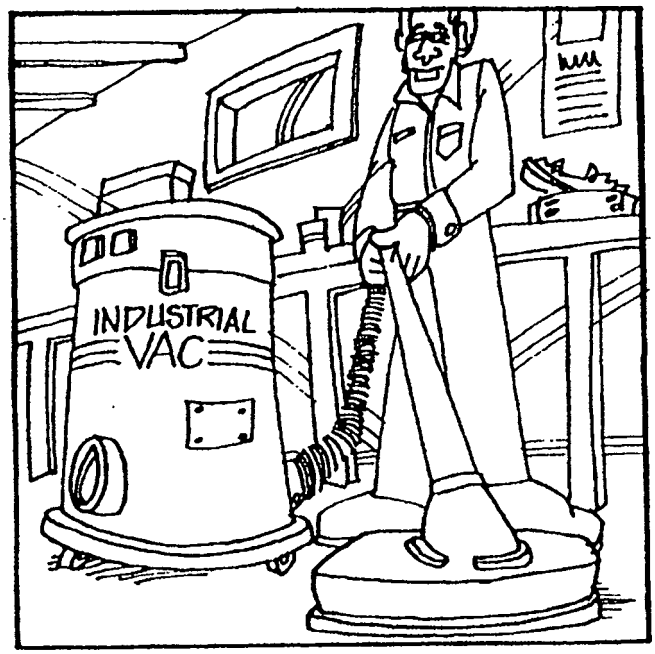
Use a NIOSH approved respirator when removing worn friction materials, or cleaning brake or clutch assemblies.

MACHINING FRICTION MATERIALS

There is an increasing trend for manufacturers and rebuilders to provide brake lining and clutch facings pre-drilled and pre-ground in final assembly form. In the case of truck brake blocks, various oversize thicknesses are available. However, there are some instances where field machining is necessary. This is particularly true for construction and industrial equipment applications which may require machining of blocks, slab stock or roll lining.

Dust generation can be minimized or eliminated during arcing of brake blocks by lathe turning at low speed rather than grinding. Whenever possible friction materials should be cut to length with a shear rather than a saw or abrasive cut-off wheel.

DO NOT SWEEP IN WORK AREA - USE VACUUM METHOD



8

FMSI 03492

DUST COLLECTION METHODS

When asbestos-containing friction materials are machined, i.e., drilled, ground, grooved, cut or beveled, the dust created contains asbestos fibers which may become airborne unless adequate dust controls are employed. The preferred method for minimizing airborne dust from machining operations is local exhaust ventilation. A local exhaust ventilation system consists of dust collection hoods or enclosures connected by duct work or piping to a dust collection filter and a suction source.

The two operations that offer the greatest potential for generation of excessive amounts of airborne asbestos fiber are arc grinding and beveling of lined brake shoes and linings or brake blocks. Grinding machines used for these operations must be provided with exhaust ventilation to maintain worker exposures within permissible levels.

If a central exhaust system is not available, NIOSH (National Institute for Occupational Safety and Health) has stated that, at a miminum, the dust bag of the arcing machine shall be removed and replaced with the hose from a high efficiency industrial vacuum.

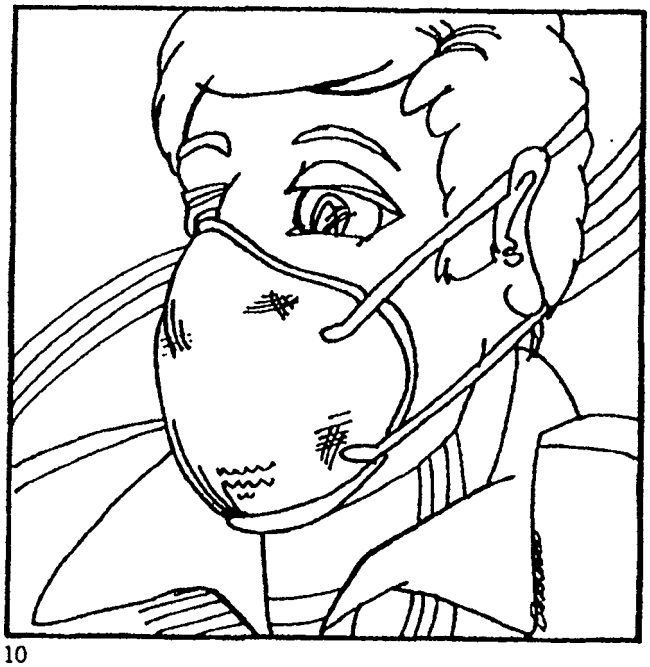
For large volume machining operations that operate on a continuous basis, the preferred dust collection device is a fabric filter or baghouse, with a heavy-duty exhaust fan as the suction source. The dust collector must meet the air-cleaning requirements of the Federal Environmental Protection Agency Emission Standard for Asbestos. Approval must be obtained from EPA for installation and operation of each system.

OTHER METHODS OF MINIMIZING DUST EXPOSURE

Whenever possible machining and repair operations should be isolated from other work areas in a restricted area to prevent unnecessary exposure of other workers. Entrances to restricted areas shall be posted with asbestos exposure warning signs as follows:

Asbestos
Dust Hazard
Avoid Breathing Dust
Wear Assigned Protective Equipment
Do Not Remain In Area Unless Your Work Requires It
Breathing Asbestos Dust
May Be Hazardous To Your Health

WEAR AN APPROVED RESPIRATOR IF UNABLE TO AVOID DUST



10

FMSI 03494

Good housekeeping is essential in a workplace where asbestos containing materials are handled. Industrial vacuum cleaners equipped with multiple stage high efficiency filters should be used for removing accumulations of asbestos dust and waste.

Never use compressed air or dry sweeping for cleaning. Water or other dust suppressants should be applied if brooms are used.

Good personal hygiene practices are important in minimizing asbestos dust exposure. Do not smoke. Wash before eating. Shower after work. Change to work clothes upon arrival at work and change from work clothes at conclusion of work. Work clothing should not be taken home. Laundering of asbestos contaminated clothing shall be done so as to prevent the release of airborne asbestos fibers in excess of the exposure limits.

DISPOSAL OF FRICTION MATERIAL DUST AND WASTE

Dispose of vacuum cleaner waste and asbestos containing cleaning materials in plastic bags or other sealed containers, with the following warning label printed on the container:

Caution
Contains Asbestos Fibers
Avoid Creating Dust
Breathing Asbestos Dust May Cause Serious Bodily Harm

Use a NIOSH approved respirator when servicing vacuum cleaners, dust collectors, or handling any asbestos-containing waste materials.

Asbestos-containing waste materials must be collected, processed, packaged, transported and deposited in such fashion that no visible emissions are generated to the atmosphere. All wastes must be disposed of at sites operated in accordance with applicable laws and regulations.

FMSI 03495

SOURCES OF ADDITIONAL INFORMATION

"Standard for Exposure to Asbestos Dust" (Code of Federal Regulations, Title 29, 1910.1001)—OSHA

"National Emissions Standards for Hazardous Air Pollutants—Asbestos and Mercury" (Code of Federal Regulations Title 40, Chapter 1, Subchapter C, Part 61, Subparts A, B)—EPA

"Fundamentals Governing the Design and Operation of Local Exhaust Systems," ANSI Z9.2-1971 ($7.00) and **"Practices for Respiratory Protection,"** ANSI Z88.2-1969 ($5.50)—ANSI

"Industrial Ventilation Manual" ($8.00)—ACGIH

For other information, a user may contact the manufacturer supplying his friction materials, the Asbestos Information Association or the Friction Materials Standards Institute.

ACGIH
American Conference of Governmental Industrial Hygienists
Committee on Industrial Ventilation
P.O. Box 16153
Lansing, MI 48901

ANSI
American National Standards Institute
1430 Broadway
New York, NY 10018

AIA
Asbestos Information Association
1745 Jefferson Davis Highway
Arlington, VA 22202

EPA
Environmental Protection Agency
Public Information Center
401 M Street SW
Washington, DC 20460

FMSI
Friction Materials Standards Institute
East 210 Route 4
Paramus, NJ 07652

OSHA
Occupational Safety and Health Administration
Office of Information
Washington, DC 20210

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