

PRELIMINARY SURVEY REPORT:
EVALUATION OF BRAKE DRUM SERVICE CONTROLS

AT

U.S. Army Armor Center
Fort Knox, Kentucky

REPORT WRITTEN BY:
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NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
Division of Physical Sciences and Engineering
Engineering Control Technology Branch
4676 Columbia Parkway
Cincinnati, Ohio 45226

PLANT SURVEYED: U.S. Army Armor Center
Fort Knox, Kentucky 40121-5000

SIC CODE: 9711

SURVEY DATE: October 15, 1985

SURVEY CONDUCTED BY: Frank W. Godbey

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I. INTRODUCTION

The National Institute for Occupational Safety and Health (NIOSH) is the primary Federal agency engaged in occupational safety and health research. Located in the Department of Health and Human Services (formerly DHEW), it was established by the Occupational Safety and Health Act of 1970. This legislation mandated NIOSH to conduct a number of research and education programs separate from the standard setting and enforcement functions carried out by the Occupational Safety and Health Administration (OSHA) in the Department of Labor. An important area of NIOSH research deals with methods for controlling occupational exposure to potential chemical and physical hazards. The Engineering Control Technology Branch (ECTB) of the Division of Physical Sciences and Engineering has been given the lead within NIOSH to study the engineering aspects of health hazard prevention and control.

Since 1976, ECTB has conducted a number of assessments of health hazard control technology on the basis of industry, common industrial process, or specific control techniques. Examples of these completed studies include the foundry industry; various chemical manufacturing or processing operations; spray painting; and the recirculation of exhaust air. The objective of each of these studies has been to document and evaluate effective control techniques for potential health hazards in the industry or process of interest, and to create a more general awareness of the need for or availability of an effective system of hazard control measures.

These studies involve a number of steps or phases. Initially, a series of walk-through surveys is conducted to select plants or processes with effective and potentially transferable control concepts or techniques. Next, in-depth surveys are conducted to determine both the control parameters and the effectiveness of these controls. The reports from these in-depth surveys are then used as a basis for preparing technical reports and journal articles on effective hazard control measures. Ultimately, the information from these research activities builds the data base of publicly available information on hazard control techniques for use by health professionals who are responsible for preventing occupational illness and injury.

This plant was visited as part of a study of asbestos control during the maintenance and repair of vehicular brakes. The study will evaluate the effectiveness of various control technologies designed to reduce asbestos exposure to brake mechanics. Ultimately, this project will result in a proposed journal article describing the effectiveness of such controls.

II. PLANT AND PROCESS DESCRIPTION

PLANT DESCRIPTION

This U.S. Army Armor Center annually services approximately 800 vehicles, including automobiles, jeeps, trucks, trailers, and buses. Approximately 100 brake repair jobs are performed each year on these vehicles.

PROCESS DESCRIPTION

Vehicular brakes are serviced at this facility utilizing a H.B. Fuller Multi-Clean wet and dry power vacuum cleaner supplemented by wet bristle brushing. Once the wheel has been removed, the hub is vacuumed prior to any attempt to remove it. If force is needed, the back of the hub is vacuumed several times during the removal process. Once the hub is removed, it is placed gently on the floor and the hub and surrounding areas vacuumed. The brake shoe area is vacuumed in conjunction with wet bristle brushing and water rinsing. Once the brake area is free of all accumulated dust, the brakes are serviced.

POTENTIAL HAZARDS

Available evidence indicates that exposure to asbestos can occur during the cleaning, maintenance, and repair of vehicular brakes. The human toxicological significance for the inhalation of asbestos fibers is well documented; and instances of mesothelioma in auto repair workers have been identified.

III. CONTROLS

PRINCIPLES OF CONTROL

Occupational exposures can be controlled by the application of a number of well-known principles, including engineering measures, work practices, personal protection, and monitoring. These principles may be applied at or near the hazard source, to the general workplace environment, or at the point of occupational exposure to individuals. Controls applied at the source of the hazard, including engineering measures (material substitution, process/equipment modification, isolation or automation, local ventilation) and work practices, are generally the preferred and most effective means of control both in terms of occupational and environmental concerns. Controls which may be applied to hazards that have escaped into the workplace environment include dilution ventilation, dust suppression, and housekeeping. Control measures may also be applied near individual workers, including the use of remote control rooms, isolation booths, supplied-air cabs, work practices, and personal protective equipment.

In general, a system comprised of the above control measures is required to provide worker protection under normal operating conditions as well as under conditions of process upset, failure, and/or maintenance. Process and workplace monitoring devices, personal exposure monitoring, and medical monitoring are important mechanisms for providing feedback concerning effectiveness of the controls in use. Ongoing monitoring and maintenance of controls to insure proper use and operating conditions, and the education and commitment of both workers and management to occupational health are also important ingredients of a complete, effective, and durable control system.

These principles of control apply to all situations, but their optimum application varies from case to case. The application of these principles are discussed below.

ENGINEERING CONTROLS

This U.S. Army Armor Center uses a H.B. Fuller Multi-Clean wet and dry power vacuum cleaner supplemented by wet bristle brushing and water rinsing in an attempt to control asbestos fibers generated during the servicing of vehicular brakes. The vacuum cleaner is not equipped with a HEPA filter which is necessary to entrap the asbestos dust inside the collector and prevent re-entry into the working environment. The wet bristle brushing and water rinsing may control asbestos dust not already disseminated into the working environment by the vacuuming action.

WORK PRACTICES

Workers are encouraged to use good work practices, e.g. complete water rinsing and wet bristle brushing of all exposed parts prior to handling, gently removing and handling of all parts, consistent use of all required personal protective equipment, and following of the employer's instructions for use of asbestos control devices. They are provided instruction when they start the job and receive updates and reinforcement as needed.

MONITORING

Workers performing vehicular brake repair service are provided annual physical examinations.

PERSONAL PROTECTION

NIOSH/MSHA-approved asbestos dust masks are provided and their use required during brake servicing (see Attachment A).

IV. CONCLUSIONS AND RECOMMENDATIONS

This major U.S. Army Armor Center's vehicular brake servicing facility did not appear to have asbestos controls sufficient to control asbestos dust emanating from the vehicular brake service operation. To preclude potentially hazardous exposures, periodic environmental monitoring should be conducted in the brake service operational area. A decision on the advisability of conducting an in-depth evaluation of the controls at this facility will be made following completion of all preliminary surveys and finalization of the project protocol.

Attachment A

NIOSH Position Statement on the Use of Respirators in Occupational Exposure to Asbestos

Respirators can effectively reduce employee exposures to asbestos. However, a number of problems must be overcome before any confidence can be given to using respirators as a solution to preventing excessive exposures. Some of the problems include:

- o Whether or not single-use or dust and mist respirators can provide adequate protection for cancer-causing agents such as asbestos.
- o Discomfort associated with wearing respirators including dermatitis, heat, difficulty in breathing, calluses, and feelings of claustrophobia.
- o Need for adequate fit testing and addressing fit problems with workers who are not clean-shaven.
- o Physiologic stress and drying of breathing passages and sinuses associated with wearing respiratory protective devices.

These problems can exist when the proper respirator has been selected and an adequate respiratory protection program including training is in place. If a respirator training program does not exist, the chances of respirators providing adequate protection are much less.

NIOSH has stressed that worker exposures to airborne contaminants should be controlled through permanent engineering controls. However, prior to the installation of or during the malfunction or maintenance of engineering controls, for certain short-term intermittent exposures, and for certain operations that are performed at constantly changing locations, a need for respirators does exist. Because respirators are and will be selected and used in industry, NIOSH wants to ensure that the respirators will be used correctly and that the quality of each respirator produced will meet certain criteria. Proposed blanket exemptions for intermittent exposures without regard to feasibility of engineering controls are also not consistent with source containment.

The position of the Institute with respect to the following specific concerns is as follows:

- o Use of single-use or dust and mist respirators for protection against asbestos

Under Title 30, Code of Federal Regulations, Part 11 (30 CFR 11), NIOSH is required to test and certify respirators within the categories specified therein when such devices are submitted to NIOSH by applicants. Currently, 30 CFR 11, Subpart K defines a number of dust, fume, and mist respirators which may be used for protection

against certain hazardous particulate atmospheres. Among the respirators defined in Subpart K are single-use dust respirators designed as respiratory protection against pneumoconiosis - producing and fibrosis-producing dusts, or dusts and mists. The Subpart goes on to list asbestos as one of the dusts against which the single-use dust respirator is designed to protect [Subpart K, sec. 11.130(h)]. Though at the time of the promulgation of Subpart K, it may have been assumed appropriate to list asbestos as a fibrosis-producing particulate against which the single-use disposable respirator could be reasonably expected to provide adequate protection, NIOSH is no longer confident that such an assumption is reasonable because asbestos is also a potent carcinogen. The current requirements of 30 CFR 11 for approval of a single-use dust respirator or dust and mist respirator do not include any tests with a fibrous challenge.

NIOSH is currently in the process of undertaking a comprehensive revision of 30 CFR 11 and intends to address the issue of appropriate respiratory protection for use against asbestos and to require that any respirator for which such approval is sought be proven to provide effective protection against asbestos. NIOSH may change the regulations included in 30 CFR 11 only in accordance with procedures set forth in the Administrative Procedures Act. In the interim, NIOSH will continue to approve single-use and replaceable dust/mist respirators for use against asbestos when such approvals are applied for only because of the legal requirement in the current approval regulations. However, NIOSH does not recommend the use of such respirators where exposures to asbestos may occur on the basis that such is not a prudent occupational health risk.

Finally, we want to reiterate our position that we recommend a quantitative respirator fit testing program as previously stated in comments on the proposed lead standard.