WALK-THROUGH SURVEY REPORT

CONTROL TECHNOLOGY FOR GENERAL MOTORS

at

General Motors - Inland Division
Vandalia, Ohio

REPORT WRITTEN BY:

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16. Abstract (Limit: 200 words)

A walk through survey was conducted to assess methods used to control occupational exposure to asbestos (1332214) at the General Motors Inland Division (SIC-3714) at Vandalia, Ohio, in May 1983. The facility relied on engineering controls, housekeeping, and monitoring of employees to control exposure when bags of asbestos were opened and emptied into a hopper. Local exhaust ventilation was the primary engineering control. The exhaust system was designed into the hopper. Continuous monitoring of airborne asbestos concentrations was performed. The usual worker exposure was less than 0.5 fibers per cubic centimeter according to the factory's hygienist. The workers were taught to use practices that minimized asbestos emissions and exposures. Potential emission sources could result from broken bags and emptying the bag hopper. The bag supplier had made the bags stronger, and each pallet of bags was shrink wrapped to minimize breaking. The author concludes that monitoring the ambient air serves a feedback function as it provides the basis for corrective action. Controls to reduce asbestos exposures are effective. It is recommended that NIOSH conduct a detailed survey of this operation.

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PLANT SURVEYED:	General Motors - Inland Division Vandalia, Ohio
SIC CODE:	3714 - Motor Vehicle Parts and Accessories
SURVEY DATE:	May 10, 1983
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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 dust control during bag opening, dumping, and disposal. Significant dust exposures can occur during these operations. Although dust can be controlled during bag opening and dumping, bag disposal is a significant source of worker exposure. Ultimately this project will result in a concise 10-15 page report describing dust control techniques during bag opening, emptying, and disposal. This report should provide valuable information for those who are responsible for controlling the workers' dust exposure.

II. PLANT AND PROCESS DESCRIPTION

Plant Description

The plant is over 20 years old and typically employs 1,800 people. This plant is part of General Motors' Mechanical Components Group. Brake shoes are manufactured here using asbestos.

The area where bags of asbestos are opened, emptied and discarded is the subject of this study. This area employs one full-time worker. Two dry floor vacuum cleaners are present in this area of the plant.

Process Description

The plant has three machines to open bags of asbestos. The process to open, empty and dispose of bags which contain asbestos is as follows:

1. The worker drops a 45 Kg bag of compressed asbestos on a conveyor.
2. The conveyor feeds the bags into a bag opening, emptying and disposing machine.
3. The machine has a reciprocating knife to slit the bags and rollers to separate the empty bags from the bales of asbestos.
4. The bags fall into a hopper fitted with a big plastic bag.
5. The asbestos received further undisclosed handling in the enclosure.

Once a day, the asbestos bag hoppers are emptied. The process is:

1. Wear respirator.
2. Place bag around inlet of vacuum cleaner and suck the air out of bag.
3. Pull hopper out from under bag opening and emptying machine.
4. Tie the bag off and drop down a chute into trash recepticles.
5. Vacuum the inside of hopper.
6. Line hopper with a clean, plastic bag.
7. Place hopper back under machine.

Potential Hazards

Airborne asbestos and manual handling of the 45 Kg asbestos bales are potential hazards at this site. The bags are dropped onto the charging conveyor and this avoids any lifting.

Handling asbestos in bags involves a number of potential emission sources:

1. Broken bags. It once was a problem, however, the supplier has made the bag stronger and each pallet of bags is shrink wrapped to provide additional protection. If the bag is ripped, tape is used to secure the opening.

2. Opening, emptying, and disposing of bags. This creates airborne asbestos which the machine is designed to control.

3. Emptying the bag hopper.

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 at this plant is discussed below.

Engineering Controls

Equipment design and local exhaust ventilation are the primary control for airborne asbestos. The equipment is designed to isolate workers from the airborne asbestos generated by opening and emptying bags of asbestos. This machine is ventilated. The local exhaust ventilation is designed into the machine. Face velocities at the machine's inlet and between the hopper and the walls of the machine were between 100-200 fpm.

Housekeeping

Periodically, floor sweepers are used in this area of the plant to keep floors clean. This is done to prevent the floor from becoming a source of asbestos emissions.

Monitoring

Typically the worker's exposure is below 0.5 fibers/cc according to plant industrial hygienist. However, when the worker empties the hopper below the bag opening and emptying machine, peak asbestos exposures as high as 2 fibers/cc may occur. Sampling results suggest that this latter operation is sensitive to individual work practices.

Personal Protection

Respirators may be used when the worker empties the hopper of the Little Ford Mixer. This operation was not observed during this survey.

Other Unique Practices

Twice a year, the workers in this area of the plant get routine one-on-one training sessions with an industrial hygienist. The safety program is reviewed and sampling results are discussed with the workers.

Other Observations

The industrial hygienist and the Union Safety Representative were pleased with this operation.

Conclusions and Recommendations

The control of airborne asbestos at this plant appears to be accomplished using a comprehensive program. Engineering controls are in place which appear to control asbestos exposures during bag opening, emptying, and disposal. The workers are taught to use practices which minimize asbestos emissions and asbestos exposure. Because monitoring appears to be the basis for corrective action, air monitoring fills a feedback function in this comprehensive air contaminant control system. It is recommended that NIOSH conduct a detailed study of this operation. That study will document the factors required to achieve low asbestos concentrations.