Environmental Sciences Laboratory
Mount Sinai School of Medicine
of The City University of New York

INSULATION HYGIENE PROGRESS REPORTS

FROM THE INSULATION INDUSTRY HYGIENE RESEARCH PROGRAM
Irving J. Selikoff, M.D., Program Director
Vol. 7 No 2 Summer 1975

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Inadequate change and shower facilities can lead to extensive amounts of asbestos and other dusts being brought home to contaminate workers' households. Here, the only change facilities on this construction site is an open trailer.

Asbestos Disease Can Spread to Workers' Families

A widening spectrum of asbestos disease has been found by Dr. Henry Anderson and other scientists of the Mount Sinai School of Medicine. In a study just completed of 326 family contacts of former asbestos factory workers, it has been found that 35% had X-ray abnormalities characteristic of asbestos exposure. These data were presented by Dr. Anderson on March 24th to the Conference on Occupational Carcinogenesis held at the New York Academy of Sciences.

The family members potentially affected included all in the household; it was not simply the wife of the worker, who would shake dust from her husband's clothes before washing them. Affected were children, brothers, and sisters, as well as wives. It would appear that the dust had been present throughout the household, brought home on the clothes of the factory workers.

The workers were employed at a factory that manufactured amosite insulation material, often for use in Naval ships, but also widely used in power plants and industrial insulation. It operated from 1941 through 1954. Many of the workers whose families later developed signs of asbestos exposure were employed for relatively short periods of time.

The dust exposures to the family members, however, could have been longer. Asbestos, once in the house, is difficult to remove, and exposures could continue long after cessation of the husband's or father's employment. In other studies by Mount Sinai research workers, asbestos dust has been found still present in households of

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Identification System for Adhesives-Solvents

It is now possible to report that progress is being made on the development of an identification system for hazardous materials, including adhesive cement, sealants, and similar products used in applying insulation materials.

The Occupational Safety and Health Administration has an advisory committee which has developed the basic principles of an identification system. This committee, under the direction of Roy Resnick, has met with Roy Steinfurth, Administrator of the Insulators' Health Hazards Program, and Duncan A. Holaday, of the Mount Sinai School of Medicine, to review the special problems associated with the use of adhesives in the insulation industry.

Hazards Identified

The OSHA committee has decided on the basic principles of an identification system which will be applicable to a variety of industrial products. Signal words, such as "Danger," "Caution," and "Warning" will be used to show degree of hazard. The principal types of hazards will be identified by words such as "Flammable" or "Health Hazard" and statements listing additional information needed for protection will also be required.

Some identification of the principal component will also be given. Particularly hazardous substances, such as wood alcohol, benzene, xylene, and toluene will be required to be named if they compose more than stated percentages of the product. Altogether, this could mean that labels on industrial products would be as informative as those now required on products intended for household use.

This would indeed be an improvement over the present situation. Cur-

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Insulation Hygiene Progress Reports

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from the Insulation Industry Hygiene Research Program

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PURPOSES OF THE INSULATION INDUSTRY HYGIENE RESEARCH PROGRAM

1. To develop improved methods for minimizing exposure of insulation workers to dusts and fumes encountered in their work.
2. To disseminate knowledge of these improved methods of dust control wherever they may be applied advantageously and to offer cooperation, advice and assistance toward their universal adoption.

Self-Contained Supplied-Air Respirator Available

The removal of old asbestos-containing material continues to be a major source of exposure to insulation workers. While rip-out is only done occasionally, the dust concentrations during this procedure can be so high that special respiratory protection must be used. Often, asbestos fiber concentrations exceed 100 fibers per milliliter, 20 times the current standard.

According to the OSHA Asbestos Standard, employees engaged in the removal or demolition of pipes, structures, or equipment covered or insulated with asbestos must use type "C" continuous flow or pressure-demand supplied-air respirators. In addition, special coveralls, gloves, and shoe coverings are to be employed to prevent contamination of clothing by asbestos fibers.

On jobs where externally supplied air from tanks or compressors is available, a variety of hoods may be obtained for connection to the air source. Often, however, a supply of breathable air is not readily available, or the use of a long air hose may give rise to safety risks.

Battery-Powered Unit Available

Additionally, if air is supplied by compressors, provisions must be made to remove oil and water mists and to insure that carbon monoxide does not get into the system through improper placement of the air intake.

In such circumstances, a battery-powered air cleaner and hood have special utility. One model, available in the last year and manufactured by the 3-M Occupational Health and Safety Products Division, will operate for over four hours and provide protection in the dustiest of environments during removal of asbestos material. The respirator weighs only 10 pounds. There is no resistance to breathing, no condensation of moisture, and face fit is not of particular importance.

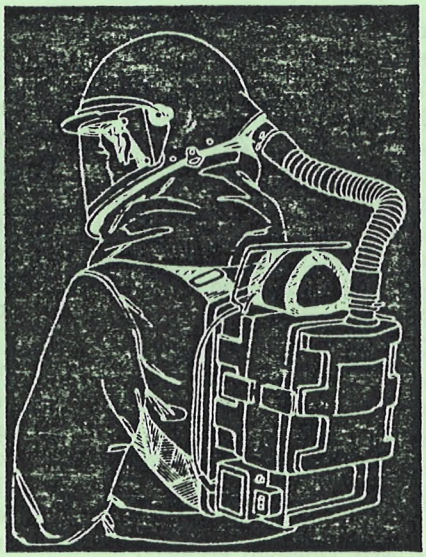
Maintenance Important

The respirator should, however, be checked periodically by personnel familiar with its operation. Any replacement parts required should be those of the manufacturer, and their instructions for servicing and repair should be followed carefully.

Other supplied-air breathing devices are available in which cylinders of oxygen or of compressed air are carried by the worker. Several approved types exist but they are more complicated to use and more cumbersome than the previously described battery-powered air filtering unit. Moreover, those using compressed air have a maximum use time of only 30 minutes before a new cylinder must be obtained. Those using oxygen have a longer operating time, but require chemical filtering of exhaled air.

The half-face dust respirators commonly available on job sites are not suitable for use during removal of asbestos insulation materials. The use of such respirators is limited to conditions in which dust concentrations are less than ten times the existing standard.

The face piece of a self-contained supplied-air respirator. It will operate for four hours using a rechargeable battery.



A diagram of the battery pack, fan motor, and filter of the respirator. It weighs 10 pounds.

Conference Held on Occupational Cancer

In the recently concluded New York Academy of Sciences Conference on Occupational Carcinogenesis, a variety of research studies were presented concerning the health of asbestos workers. Of prime importance was the presentation on the presence of asbestos disease in the family members of workers discussed in the lead article of this issue.

Asbestos -Like Exposure Studied

Among other studies were a report on the morbidity and mortality among hardrock miners exposed to an asbestiform mineral. Here, a study by the National Institute for Occupational Safety and Health investigated the health of underground metal miners with exposure to a fibrous mineral virtually identical to amosite asbestos, a material used extensively in marine insulation and also formerly in much pipe covering and asbestos block.

In an analysis of 70 deaths, a threefold increase in lung cancer was found. Additionally, a review of chest X-rays showed pulmonary fibrosis to be present in the group of workers, even though the fiber concentrations that were measured in the mine were only 0.24 fibers per milliliter, one-twentieth of the current U.S. Asbestos Standard.

Fibrous Glass Analysis

A second report by scientists from NIOSH also is of interest to insulation workers. David L. Bayliss presented data on deaths among fibrous glass production workers. No unusual mortality was found in the large majority of workers. This was to be expected, as these workers had been exposed predominantly to large diameter fibers which would not be carried into the deeper segments of the lungs.

However, it was suggested that one group of workers, exposed in the past to thinner fibers, could have an increased risk of respiratory cancer. This is of special importance as these small diameter fibers are now ofter used instead of asbestos in high temperature insulation material.

A paper by Dr. Robert Morgan, of the University of Toronto, related cancer of the larynx with asbestos exposure. This cancer, as lung cancer, is also strongly related to cigarette smoking. Similar data have been found among insulation workers, where a threefold increase in laryngeal cancer has been found in research of Dr. Irving J. Selikoff of the Mount Sinai School of Medicine.

Participants at the conference not only considered causes of occupational cancer, but some also offered suggestions for medical surveillance and treatment. Several researchers discussed the usefulness of sputum cytology, in which cells coughed up from the lung are screened for indications of possible cancer.

More Effective Surgery Possible

Studies of former asbestos workers and of uranium miners suggest that lung cancer can be detected in its very early stages, offering the hope for more effective surgery. Needless to say, however, the best prevention for asbestos cancer is to not breathe the fibers in the first place.

Finally, a review of the suitability of the current U.S. Asbestos Standard was presented by Dr. William Nicholson of the Insulation Hygiene Research Program. In his presentation, he discussed the factors that limited the current standard's effectiveness for protecting asbestos workers and urged that as technology is developed, it be immediately implemented in the asbestos industry to reduce asbestos exposure to the lowest feasible level, as rapidly as possible.

The conference marked the two hundredth anniversary of the first research paper published on occupational carcinogenesis, that by Percivall Pott on scrotal cancer in chimney sweeps. In his opening remarks, the conference co-chairman, Dr. Joseph K. Wagoner of NIOSH, decried the slow progress in controlling occupational cancers in modern industry.

Labels Necessary for Hazardous Materials

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rently, many labels give inadequate information, or none at all, on what hazards might be involved or what precautions should be followed.

Procedure Guides Necessary

The advisory committee has very important additional tasks. These include the preparation of use guides and training materials which will describe actions to be taken and procedures to be followed when certain statements appear on the labels.

For example, how should products labeled "Danger—Extremely Flammable" be stored and applied? What action is called for when the words "use only with adequate ventilation" appear on the label?

The Occupational Safety and Health Act places the responsibility on the employer for protecting his employees, but it is obvious that many small employers need assistance in deciding what protective measures are required for various situations. Workmen will also need instructions on how to translate labels into protective action.

No Serious Objections Expected

It is probable that the larger manufacturers will not have serious objections to an identification system; indeed, they now comply with similar regulations for household products. Small manufacturers may find preparing the Materials Hazards Data Sheets a large task and also may object to disclosure of the composition of their products.

As the system will probably not call for specific identification of low-hazard compounds but only a statement such as "Petroleum Distillate" or "Alcohols", it seems these objections could be resolved.

It is anticipated that the advisory committee report will be completed by

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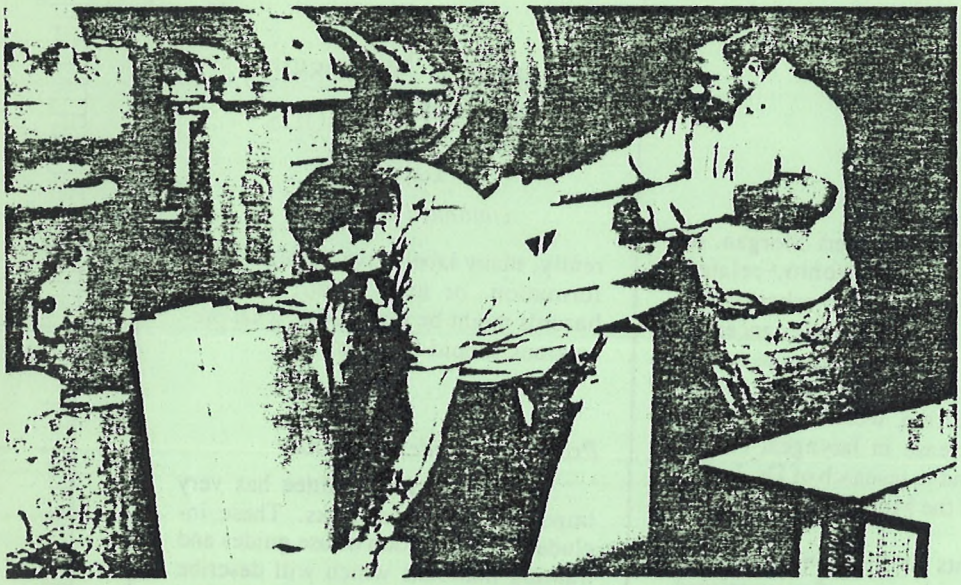
Dust Brought Home Can Affect Family



Two asbestos workers cutting block. Relatively little dust is dispersed into the air . . .

. . . but much is falling on their clothes and shoes and may be carried home.

Asbestos Disease Can Spread to Workers' Families

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these former factory workers 20 years after closure of the plant.

Mesothelioma, a cancer often linked to asbestos exposure, has also been found among these family members. Of 252 deaths so far identified among household contacts of these former workers, two have been from pleural mesothelioma. Additionally, two other mesothelioma cases have been identified in living members of this group.

These cases have the following histories:

A.C.: The 40-year-old son of a man who worked from 1945 through 1948 in the plant, when the son was 11 years old.

B.P.: The 41-year-old daughter of the plant's chief engineer.

I.Y.: The 42-year-old daughter of a man who had worked in the plant for five years. The family lived near the plant and the daughter used to bring her father lunch every day, when she was 10 years old.

L.N.: A 32-year-old woman who, at the age of 13, lived in the home of her brother-in-law while he worked at the plant for six months. Prior to that, she lived one-half mile from the plant and played frequently in the homes of friends whose fathers worked in the plant.

The results of this study dramatize the need for stringent dust control and cleanup in situations where asbestos is used. It also heightens the importance of individual worker hygiene and demonstrates the need for adequate changing facilities and showers. Under no circumstances should dusty clothes be brought into the home, even to be put into the washing machine. They should be washed separately, preferably by a commercial industrial laundry service equipped to handle asbestos contaminated work clothes.

For family contacts who suspect they have been exposed to considerable household contamination, medical surveillance is in order. The family physician should be told the exposure history so that X-ray and chest examinations and subsequent medical problems can be closely monitored for possible symptoms of past asbestos exposure at home.

This current report by Dr. Anderson is only the most recent in a series of scientific publications that show family and environmental asbestos risk. As early as 1960, scientists reported cases of mesothelioma in individuals who had had no prior occupational exposure to asbestos.

Later, mesothelioma cases were reported in individuals whose only identifiable asbestos exposure was associated with their having lived within one-half mile of an asbestos manufacturing facility or in households of asbestos workers. Dr. Anderson's findings show that such problems may turn out to be quite common and that more persons than suspected may be at risk from asbestos exposure, and require appropriate surveillance.

Label Report Available Soon

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June 15, 1975. Following this report, proposed regulations would be prepared, published in the Federal Register, comments received, revised regulations prepared, and hearings held. After the hearings, final regulations would be drawn up and promulgated. The full process could well take a year.

However, when the committee report becomes available, further discussions will be held between representatives of the insulators and OSHA, to determine which of the recommendations can be implemented without waiting for regulations to be promulgated.

This situation is not limited to products used by insulators, but is widespread throughout the construction industry. Members of the International Brotherhood of Painters and Allied Trades, especially, have need of adequate labeling of the products they use.

Progress is being made but much still needs to be done to insure that when regulations are adopted, they will be effective. Here, the Asbestos Workers, Painters, and other affected union members should review the published recommendations to verify that the proposed labeling is adequate for the materials they use and the instructional materials supplied for the use of hazardous materials are clearly written and understandable.