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Environmental Sciences Laboratory

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

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Dust produced by use of an unventilated band saw. Without the back lighting used here, much of the dust would not be visible.

Cutting pipe with band saw equipped with high-velocity, low-volume exhaust system. Compare absence of any airborne dust with that shown in uncontrolled cutting (picture left.)

Shipyard Procedures Guide Helps All Insulation Men

The Winter 1970 issue of Insulation Hygiene Progress Reports announced a joint effort by the Insulation Industry Hygiene Research Program, the U.S. Navy, the Department of Labor, and insulation manufacturers and contractors to control shipyard asbestos dust exposures.

As part of that effort, Duncan A. Holaday and William B. Reitze of the IIHRP prepared a procedures guide for shipyard insulation application and removal. Because of its relevance to all insulation work, portions of it are given in this issue of Insulation Hygiene Progress Reports.

A complete report was presented by the authors at the International Symposium on Safety and Health in Shipbuilding and Ship Repairing, at Helsinki, Finland, on August 30, 1971.

by Duncan A. Holaday and William B. Reitze

The general goal in all insulation work should be to maintain a clean environment.

Measurements of concentrations of asbestos fibers ("dust counts") in the atmosphere can be used to identify sources of contamination and to point out deficiencies in control methods. Primary reliance for control of exposures, however, must be placed on *faithful observance of operating rules.*

Control of Asbestos-Containing Dusts by Use of Substitute Materials

Substitution of materials containing reduced proportions of asbestos or no asbestos at all, is becoming more common in ship construction. Before a material is substituted for asbestos, however, two questions must be carefully considered:

a. Has the substitute material been tested? If not, it may turn out to be of the same or greater hazard than the material of known hazard. This sort of thing has happened in other environmental situations.

b. Does the new material meet engineering specifications and will it perform adequately under conditions of use?

Here Are Some of Many Ways to Reduce Dust

Materials containing reduced amounts of asbestos have been used in the following applications:

a. *Blanket and pad filling*

Substitution of the proper types of other pad fillers not only reduces asbestos dust during fabrication and installation but also tends to lessen the problems during subsequent "rip-out". Additionally, asbestos cloth which has been treated with a dust suppressant is available and its use should also be encouraged. There are reports that much less dust will be produced.

b. *Pipe covering and block*

Serious consideration should be given to those products containing lower amounts of asbestos fiber. Several British firms have introduced asbestos-free calcium silicate block and pipe covering. To date, however, this material has not been adequately evaluated in the United States to determine how it will perform in use.

Reduction of Dust by Changes in Work Methods

a. *Mixing Asbestos Mortar*

This operation has usually been done at the job site. While the time spent in mixing is quite short, considerable dust is produced. A tested method of control is to mix the mortar dockside under controlled conditions and package the mixed mortar in several containers for transportation to the job site.

Mortar is also available packaged

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pipe coverers. Asbestos and glass fibers were found.

Pete Alphano: JM has a cement that contains no asbestos. I think Carey also has one. Is there any problem with these cements?

Dr. Selikoff: We don't really know. They all contain mineral material that has no business being in a man's lungs. You should use the same care with them as with the asbestos cements.

Non-Asbestos Cement in Plastic

Mix them in plastic bags. I know of two manufacturers, Johns-Manville and Ruber Industries of Dallas, who sell non-asbestos cement in plastic bags.

George Semonovich: To summarize today's meeting, it is clear that we need

1. good housekeeping.
2. dustproof materials.
3. muscle to demand that action be taken.

It remains for us now to get this done. Will we get any help from the Occupational Safety and Health Act?

Dr. Harry Heimann: The new Occupational Safety and Health Act is a good one and, if adequate money is appropriated by Congress for the law's implementation, all workers, including asbestos workers, could expect to benefit from it by a marked reduction in accident and sickness resulting from their occupations.

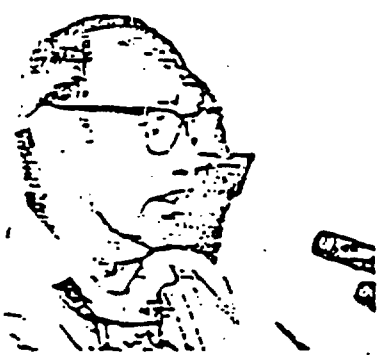
First Come, First Served

However, it looks as if funds appropriated will be much less than are needed for proper implementation. As a result, it will be a matter of first come, first served.

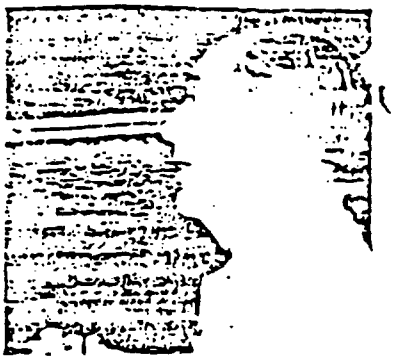
For this reason, the union rank and file must begin to exert pressure in the right places, so that the funds are used to benefit their own safety and health.

Incidentally, Senator Williams and Representative Daniels, who introduced and strongly promoted the Bill, are from New Jersey. They, and the congressmen and senators who supported them, deserve much credit.

The bill contains the provision that standards for harmful physical agents, such as asbestos will assure "that no employee will suffer material impairment of health or functional capacity even if such employee has regular exposure to the hazard dealt with by such standard for the period of his working life."



Jack Novak: "The workplace must be made safe for pipe coverers."



Rudy Perpich: "Problems with respirators."

"Each employer shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees."

Whether this will come true or not will depend on how Labor and Industry meet their responsibilities, on what you do.

Jack Novak: It was interesting to hear the data on the number of state inspections. Asbestos workers have had to take care of themselves in the past and, if necessary, we will in the future.

Now We Need Action!

The Occupational Safety and Health Act and the Safety and Health Regulations for Construction can give us some of the muscle we need.

But if these new acts are not properly enforced, we ourselves will see that the results of the IHRP research get into the workplace.

One thing is certain—the workplace must be made safe for pipe coverers.

Andy Haas, General Secretary-Treasurer: You all know President Hutcheson's view on health and safety and how he has done so much, as has the entire Executive Board, to eliminate the severe hazards from our industry. Research is under way and much has been discovered. It is now necessary to have action to get a safe workplace.

The asbestos industry National Health and Safety Fund has been slow in getting off the ground, but I can assure you that we will see that action on health and safety proceeds, and rapidly.

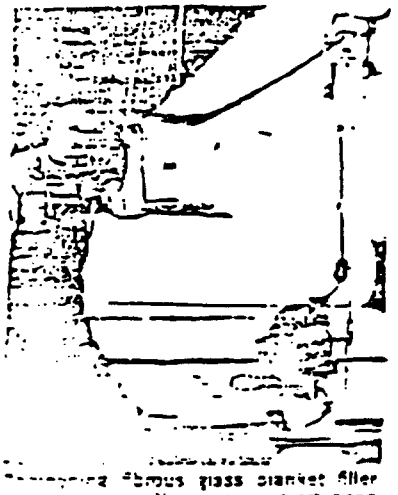
It's just too important to our members for it to stop.

SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION

The following regulation is applicable to all federally financed construction (Federal Register, Vol. 36, page 7349, April 17, 1971) — "1518.55 Gases, vapors, fumes, dusts, and mists.

(a) Exposure of employees to inhalation, ingestion, skin absorption, or contact with any material or substance at a concentration above those specified in the "Threshold Limit Values of Airborne Contaminants for 1970" of the American Conference of Governmental Industrial Hygienists, shall be avoided.

(b) When engineering or administrative controls cannot be employed to reduce or eliminate the exposure protective equipment, as required in Subpart E of this part, shall be used."



...fibrous glass blanket filler ... cutting. Note lateral draft hood ... fabrication is done.

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dropcloth is placed on the deck under the equipment.

f. Fabrication of Pads and Blankets

Pads for valves and machinery should be fabricated in the shop ... possible. Amosite has been largely replaced by fibrous glass filling with covers of an asbestos cloth which has been treated with dust suppressants. As an effective means for suppressing dust dispersion and collection, the fibrous glass blanket is uncoiled, ... and recoiled. This procedure insures that all the blanket will be dampened. The blanket and asbestos cloth shapes are cut in the lateral draft booth.

g. Housekeeping and Clean-up

Essential parts of a dust control program are housekeeping and clean-up procedures. Meticulous attention must be given to minimizing the spread of dust and larger wastes. Use of a dropcloth under a work area vividly illustrates how much waste would be distributed over the general area or to lower decks if one were not used.

Areas should be cleaned up at the lunch break and the end of each shift, using an industrial vacuum cleaner to collect dust and small scrap.

In all possible instances, workmen should clean up their own areas. Where work rules prohibit this, the clean-up crew should be under the direction and supervision of the insulation foreman to insure that proper attention is given to this important subject.

Reduction of Dusts by Use of Local Exhaust Ventilation

a. Ventilation of Large Power Tools—Band Saws

Extensive use of band saws both in dockside fabrication shops and on board larger ships such as aircraft carriers make emissions from band saws a major source of asbestos dust. Control devices for such saws have been known for years and are relatively simple. Conventional low-velocity, high-volume systems, using a negative pressure baghouse for air cleaning, are practical in a fixed installation fabrication shop.

Because some degree of portability is desirable in a temporary shipboard fabrication area, a high-velocity, low-volume dust collection unit is desirable for

Portable down-draft table developed by Puget Sound Naval Shipyard for use shipboard. Lightweight industrial vacuum cleaner is used as the air mover. Note plastic bag for scrap and dropcloth on deck.

such use; it may also be suitable for fixed installations. The air mover is an industrial vacuum cleaner which pulls about 50 cubic feet of air per minute past the saw blade at velocity of more than 10,000 feet per minute. This system is a very efficient dust collector. Units such as this can also be designed to control dusts produced by table saws and gang saws.

b. Ventilation of Hand Power Tools

High-velocity, low-volume collection systems control dust emissions from most small power tools adequately. Saber saws for cutting pipe covering and rotary saws for cutting asbestos cement board are well controlled with these systems.

Control of Number of Workmen Exposed

a. Scheduling of Insulation Work

Standard industrial hygiene practices call for insolating operations which contaminate the atmosphere with toxic materials. Areas where insulation work is being done under conditions in which dust might be created should be isolated by non-flammable curtains or other means. Whenever possible, work should be scheduled to minimize the numbers of other tradesmen in the area. Ship construction operations are more readily scheduled than are ship repair or ship-breaking jobs. However, every effort should be made to keep the number of men exposed at a minimum. In particular, rip-out of old insulation should always be isolated and, if necessary, performed on an off-shift. Trained workmen supplied with proper protective equipment should always be used for rip-out work and it should be scheduled for rapid completion.

Personal Protective Equipment

In addition to dust suppression and dust control procedures, personal protective equipment is often necessary to reduce exposure and limit the spread of contamination. The equipment described below is used in control programs.

a. Protective Clothing

Protective clothing is required to keep contamination confined to the work areas. One method is to issue disposable coveralls which can be removed when leaving the

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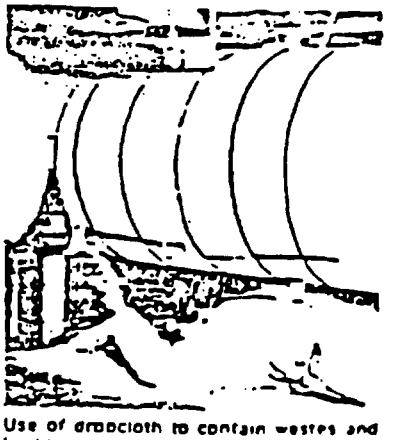

Use of dropcloth to contain wastes and facilitate clean-up.

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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.

Procedures Used at Puget Sound Naval Shipyard

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in several sizes of plastic bags which have a spout through which water is introduced. Sufficient water is added to moisten the mortar; after premixing, the bag is opened and the remaining water added. The carton in which the bag is packaged may serve as a mixing box and waste container.

b. *Pre-cutting pipe covering and block in the fabrication shop*

Hand-cutting of pipe covering and block should be kept to an absolute minimum. Bend sections, pipe cover lengths, and blocks, should be cut in the fabrication shop on exhaust-ventilated equipment.

How the Navy Does It

At the Puget Sound Naval Shipyard, cut sections are dipped in water and then packed in plastic bags which are labeled to identify the location where they are to be used. The cut sections are still damp and relatively dust-free when they are applied and the plastic bags are available for use in collecting wastes.

c. *Pre-scoring blocks*

Insulation blocks should not be scored at the job site. Blocks which have been pre-scored by the manufacturer can be purchased, or standard blocks can be scored in the fabrication shop by using an exhaust-ventilated gang saw.

d. *Insulating pipe assemblies in the shop*

Some pipe assemblies are quite intricate and are troublesome to lag while in place. A satisfactory method of doing these jobs, particularly during ship repair, which is employed by the Puget Sound Naval Shipyard, is to remove the assembly in conveniently sized sections and transport them to the shop. Here the old insulation is removed, any necessary repair of the pipes performed, and the assembled section re-lagged.

Relag in the Shop

Not only is dust dispersion reduced, but it is much more convenient to re-lag the section in the shop than when it is in place shipboard. Any insulation which is damaged during transport and fitting is repaired after the sections are in place.

e. *Hand-cutting at job sites*

Some hand-cutting at job sites is unavoidable. However, dispersion of dusts by these operations can be minimized. A portable down-draft table is used by the Puget Sound Naval Shipyard. This table has folding legs so that it can be carried down companionways and set up conveniently to the work. A small industrial vacuum cleaner is the source of exhaust. Scrap is dropped into a plastic bag and a

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High temperature mortar packed in plastic bag. Water is added to bag through spout and mortar moistened before opening. The moistened mortar is removed as required and mixing completed in shipping container. All wastes are placed in container and sent to disposal at end of shift.

Procedure used at Puget Sound Naval Shipyard for handling bend sections. Sections are cut in fabrication shop, dipped in water and placed in plastic bag. The bag is then labeled with the job-site description