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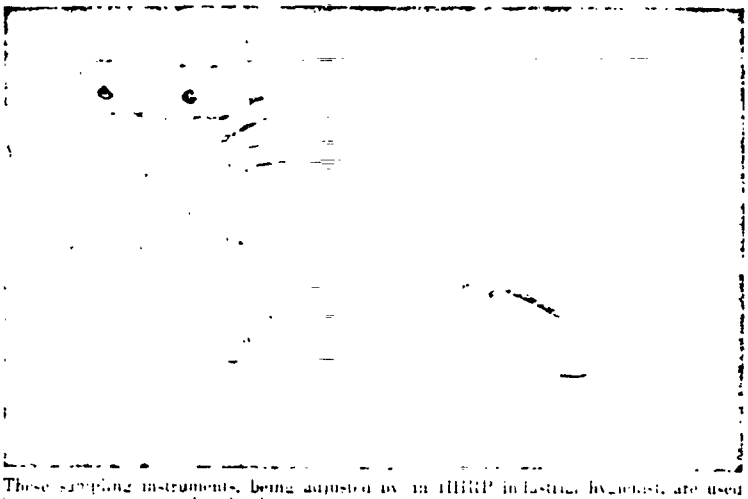
Environmental Sciences Laboratory
at The City University of New York

INSULATION HYGIENE PROGRESS REPORTS

FROM THE INSULATION INDUSTRY HYGIENE RESEARCH PROGRAM

Irving J. Selikoff, M.D., Program Director
Vol. 3 No 2 Summer 1971



These sampling instruments, being adjusted by an IHHRP industrial hygienist, are used in measuring asbestos dust levels.

Proposed Standard for Workers is Questioned

By William J. Nicholson, Ph.D.

Two years of work and 300 dust samples taken by IHHRP industrial hygienists in the construction industry clearly point to the existence of a major problem for insulation workers.

Doubts are expressed that the standard now proposed for asbestos dust concentrations will suffice to protect asbestos workers on construction sites.

Threshold Limits List

Recommended maximum concentrations of many toxic dusts or fumes to which workers may be exposed are incorporated in a list of Threshold Limit Values (TLVs) drawn up by the American Conference of Governmental Industrial Hygienists.

As the term implies, threshold limits were conceived on the premise that there is, for each toxic substance, a concentration below which no serious effects will result from exposure.

For insulation workers, the applicable proposed standard is five fibers longer than five microns per cubic centimeter (5f cc). A micron is 1/25000th of an inch. Increases to 10f cc for 15 minutes are permitted five times daily.

Many Dust Samples Taken

While this standard has been established in terms of cubic centimeters in volume about the size of one's fingertip, it is well to realize that it represents 140,000 fibers per cubic foot. If such a dust concentration were breathed for an 8-hour day, a worker could inhale 15 million fibers longer than five microns and very many more shorter ones (since shorter ones usually outnumber greatly those as long as five microns).

What does this mean in terms of the dust concentrations experienced by asbestos workers today?

To determine current exposures,

(Continued on third page)

Investigating The Problems in Adhesives

Dr. Kingsley Kay has been appointed by Dr. I. J. Selikoff, Director of the IHHRP, to conduct a thorough investigation of the potential toxicity of adhesives used in insulation work.

Dr. Kay was formerly Senior Scientific Consultant to the Department of National Health of Canada. For the past year, since appointment to the faculty of Mount Sinai School of Medicine, he has worked on occupational toxicology problems.

A Tip From Local 32

Health problems resulting from the use of adhesives, such as those used to glue fibrous glass insulation to ducts, were first brought to the attention of the IHHRP by members of Local 32, Newark, New Jersey. These workers reported nasal and eye irritation, as well as dizziness and numbness in their fingers.

"Some Glues May Irritate"

Local 12, New York City, workers also reported these symptoms; in addition, some experienced skin rashes after using certain glues.

Dr. Kay described the complexities of the problem. "Some glues and solvents," he said, "may cause direct irritation to the skin or their vapors may produce toxic effects when inhaled. Moreover, in some individuals, allergic reactions may occur from contact with these materials.

New Adhesives Developed

"New adhesives are continually being developed and, as these are introduced into insulation work, their toxicity must be determined. In addition, one must carefully assess the problem of inhaling combinations of materials. We know that

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Insulation Hygiene Progress Reports

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from the

Insulation Industry Hygiene Research Program

Editor: W. J. Nicholson, Ph.D., Published at the Environmental Sciences Laboratory (Irving J. Selikoff, M.D., Director), Mount Sinai School of Medicine of the City University of New York, New York, N.Y. 10029

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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.

Florida Scientists Join IIHRP, Study Dust Collection

Dr. Irving J. Selikoff has announced that scientists from Florida Institute of Technology will participate in the Insulation Industry Hygiene Research Program. With funds provided by the International Association of Heat and Frost Insulators and Asbestos Workers, they will conduct research into dust collection systems suitable for use in confined spaces such as aboard ship.

The research will be directed by Adjunct Professor Lee Webster. He will be assisted by Otto Fedor, currently a Branch Chief in the National Aeronautics and Space Administration's Apollo and Space Shuttle programs.

A New Dimension Added

Dr. Selikoff declared that this association will bring a new dimension to the IIHRP: "Much has been learned in our space program on compact power systems and effective means to obtain clean air. I am sure that this knowledge can now be converted to practical solutions of the problems of asbestos workers."

Send in Your Own Experience of Adhesives

(Continued from first page)

asbestos dust and cigarette smoke are particularly harmful together. We as yet have no knowledge of the effects on health of adhesive fumes in combination with either asbestos dust or fibrous glass.

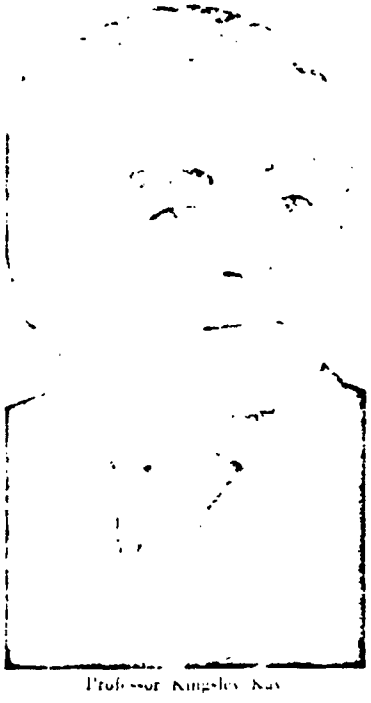
Information That Is Available

"The problem is compounded by the fact that no use is made of information easily available on the materials used. Most materials are identified by only a trade name or trade number. Information on their toxicity is just not available to the worker."

[Editor's note: It would be appreciated if users of glues and adhesives would write to Professor Kay concerning their experiences. Include, if possible, names of the particular adhesives concerned. Address: Professor Kingsley Kay, Ph.D., Mount Sinai School of Medicine, 100th Street and 5th Avenue, New York, N.Y. 10029.]



Professor Lee Webster



Professor Kingsley Kay

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New Standard Is Questioned For Asbestos Workers

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samples were taken under all work conditions by William R. Reitze, Coordinator of IIHRP Field Studies. Jobs studied included the blocking of boilers and breechings, covering pipes, insulating turbines (blocking, cementing and spraying), cutting with hand saws and power saws, and mixing cement.

Counts ranged from less than 0.1 f/cc to more than 100 f/cc. However, when averaged over the time workers spent on a given job using asbestos, the count was 6 f/cc. This average took into account the dustiest jobs in areas with poor ventilation as well as the clean ones in well ventilated areas.

Average Asbestos Exposure

If one considers that most asbestos workers spend more than half their working time with materials other than asbestos, the long term average asbestos exposure of insulation workers would be under 3 f/cc.

Such averaging is important in determining TLVs, but is not considered in job site monitoring where the threshold limit is not to be exceeded.



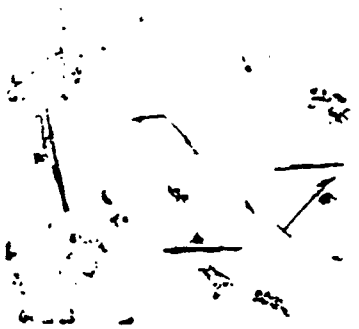
Besides asbestos dust, insulation workers inhale other mineral materials. Here, for instance, magnified 400 times in an optical microscope, is some insulation cement. Diatomaceous earth, Portland cement, asbestos, and other fibers are present.

What does this mean in terms of workers' health? In comparing exposure levels with disease experience, it is well to remember that today's disease may be the result of exposures 20, 30, or even 40 years ago.

Changes in Recent Years

Some changes have taken place in insulation practices and insulation products during these years. Fibrous glass is now used extensively. Cork and felt are in little use today. But, even with the changes, it appears that dust concentrations during past years have often not exceeded 5 f/cc.

At the average level of past exposure, the health experience of asbestos workers has been very bad. More than 80% of them show some



These asbestos fibers, collected while asbestos block was being cut, are seen magnified 10,000 times with an electron microscope. They are invisible in the optical microscope used in the standard measurement of asbestos dust concentration. Moreover (See lower L) some fibers are obscured by other dust material.

X-ray evidence of asbestosis after working 30 years in the industry.

An analysis of the causes of death of insulation workers points to other serious consequences. Of one group who have died in recent years, one in five died of lung cancer, one in 10 of cancer of the gastro-intestinal tract, one in 10 of mesothelioma (a cancer of the lining of the chest or abdomen, virtually nonexistent in the general population), and one in 10 of abestosis.

40% of Deaths "Occupational"

Thus more than 40 per cent of all deaths among insulation workers can be associated with an occupational exposure to asbestos. To continue insulation workers' exposure at anything like current levels would only perpetuate this unhappy health experience.

The tragedy of the proposed TLV is that it is far higher than those dust concentrations that can be obtained in the construction industry today. The use of dust collectors, plastic bags, vinyl coated block, and the application of good housekeeping procedures can significantly reduce high peak dust levels.

Exposure Can Be Reduced

These high exposures, even for relatively short times, provide the greatest part of an asbestos worker's exposure. Their elimination can reduce the insulation workers exposure significantly. This can be done with existing technology and with little increase in cost.

(Continued on fourth page)

Average of Dust Concentrations in Insulation Work

Type of work	Fiber Concentration with Present Practices (fibers/cc)	Fiber Concentration with Improved Industrial Hygiene Practices (fibers/cc)	Fiber Concentration with Improved Practices and use of Approved Disposable Respirator (fibers/cc)
Mixing and Applying Cement and Cloth Covering to Insulation Material			
Good Ventilation	2.5	0.5	0.05
Poor Ventilation	4.6	1.0	0.10
Cutting and Applying Insulation Block or Sections of Pipe Covering			
Good Ventilation	5.2	2.5**	0.30
Poor Ventilation	11.5	50.**	0.50
At least 75% of an asbestos worker's time, when using asbestos materials, is spent on the above jobs.			
Cutting Materials for later use	7.6	1.5	0.20
Spraying Turbines with Asbestos Fiber			
Spray man	67 (7)*	0.7	
Hopper man	10.5 (1)*	0.1	

* During the occasional jobs of spraying asbestos fiber, asbestos workers typically have worn half-mask respirators. The fiber concentration in parenthesis represents the dust concentration breathed by the worker [illegible] levels shown in column 2 are possible with the use of a [illegible] respirator. Similar dust reductions can be made during the removal of old insulation material, another extremely dusty job.

** The use of an approved disposable respirator is highly recommended for this work.

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