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. 4, No. 4 Winter 1972

## Convention Issue

## Insulators' Health Problem Worst in U.S.

The health of insulation workmen was a major topic of discussion at the 22nd Convention of the International Association of Heat and Frost Insulators and Asbestos Workers in Las Vegas on September 11-14.

The first presentation of the results of the mortality study of the entire membership of the Union was made by Dr. Irving J. Selikoff. The results substantiated the earlier experiences of Locals 12 and 32 and demonstrated that serious health problems still exist in the insulation industry and that the problems are nation wide.

The accompanying article by Duncan A. Holaday provides some details of this presentation and points to several unfulfilled needs in the insulation industry.

### *Union Reaffirms Commitment*

At the convention the officers and delegates of the Union reaffirmed their commitment to solving the health problems of the industry. General President Andrew Haas stated, "In view of the extreme importance and the health of our membership, not only now, but in the future, we cannot afford to drop our Health Hazard Program and we would be most negligent and remiss in our duties if we did not continue it. In fact we must intensify it until we have the industry cleaned up so that our members may work with the full knowledge that they are protected and safe from occupational disease."

In addition to presentations to the delegates by Dr. Selikoff, Dr. William J. Nicholson, and Duncan A. Holaday, a fourteen panel exhibit was installed describing the results of the IIHRP. Because of requests by many delegates that the material be more widely distributed, the exhibit is reproduced in its entirety in this issue.

# A Gloomy Picture

*by Duncan A. Holaday*

Insulation workmen have been, and now are, subjected to extremely serious risks of disability and death from diseases related to their occupation. Mortality studies have shown incontrovertibly that past exposures of these men to toxic substances constitute what is probably the most serious occupational health problem we have in our country, both in degree and in numbers of people exposed.

Data were presented by Dr. Irving J. Selikoff at the 22nd Convention of the International Insulation and Asbestos Workers on the mortality experience of the entire membership of the Union from January 1, 1967 through December 31, 1971. Some of the significant findings are:

1. Of the 17,800 members of record on January 1, 1967, 1,092 died in the ensuing five years whereas only 806 were expected to have died. 286 excess deaths occurred.
2. 459 deaths from cancer occurred during this period although only 144 were anticipated. *Cancer was the cause of 41% of all deaths.*
3. In this same group 78 or 7.1% of the deaths were due to asbestosis—a disease which has no cause other than exposure to asbestos.
4. 77 or 7.0% of the men died from pleural and peritoneal mesotheliomas. As these diseases are extremely rare in the general population, essentially all of these deaths can be ascribed to exposure to insulation dusts.
5. 213—one of every five—deaths were due to lung cancer, an excess of 167 over the number expected.

These data demonstrate the results of the exposures to insulation dusts to which insulators have been subjected. The picture is indeed a grim one. If only the deaths from asbestosis, lung cancer and mesotheliomas are considered 29.6% of all deaths were caused by occupational disease. Moreover, as time progresses, it is anticipated that the percentage of excess deaths will increase.

It is pertinent to speculate on the public reaction which would occur if those working with nuclear energy suffered a comparable incidence of radiation-induced deaths. While industrial radiation exposure may arouse greater public interest than do other hazardous conditions, official agencies must regard all causes of occupational diseases with equal concern.

The NIOSH Criteria for a Recommended Standard for Exposure to Asbestos estimates that there are about 40,000 field insulation workmen in the United States and perhaps another 20,000 are employed in maintenance and repair in the chemical, refining, electric power and other industries.

These numbers may be compared with those engaged in coal mining (about 95,000) and metal mining (about 60,000). Thus we see that insulators are a significantly large group to be exposed to such high risks of injury and death.

### *Asbestos Standard a Beginning*

Some first moves have been made by official agencies to improve conditions. A standard regulating exposures to asbestos was promulgated on June 7, 1972, containing provisions which theoretically should reduce exposures of insulators to asbestos dust.

This standard has several basic weaknesses which severely limit its effectiveness in reducing exposures in the construction industry. Almost all of the provisions of the standard require that OSHA must first prove that the stipulated atmospheric concentrations have been exceeded before dust control measures can be required. This means that first an inspection must be made and then there is a time lag of at least a week between the

*(Continued on second page)*

**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



**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.

# A Call For Action

*(Continued from first page)*

visit of an inspector and receipt of the laboratory report.

In the construction industry where conditions can change hourly, these procedures serve only to record exposures. OSHA has apparently recognized the futility of this mode of operation and is not even attempting to conduct industrial hygiene inspections of insulation work. With about 50 industrial hygienists to cover all industries it is understandable that OSHA has directed its efforts elsewhere. However, this does not alter the fact that the effect of official actions on reducing the hazards of insulators has been negligible.

## *Union and Company Action*

Such improvements in environmental conditions which have taken place are largely the result of actions by the Union and individual companies. The Union, along with the Johns-Manville Corporation, through the Insulation Industry Hygiene Research Program, has sponsored projects which have identified the most hazardous operations; developed some dust control procedures; assisted in development of more useful respirators, and a manual of recommended practices for shipyard work.

The Union has also conducted a vigorous educational program in *Industrial Hygiene Progress Reports* and in seminars for its members. Contractors have started to use substitute materials (hopefully of lower toxicity than asbestos) and a few have acquired such dust control equipment as is available.

The situation is that we know we have serious health problems; we have identified the largest sources of hazards and have some means of correcting them; we have regulations, and we still have unsafe working conditions. Unless a positive program is developed and carried out, these unsafe conditions will continue to exist indefinitely.

## *Accept Responsibilities*

Such a program cannot be conducted by the insulation industry and the Union alone.

Federal and State agencies must accept their responsibilities to assist the insulation workmen in alleviating all the adverse health consequences of insulation work. It is urgent that the appropriate government agencies consider implementation of the following programs:

1. Minimization of future insulation dust exposure, including development of the additional engineering control measures required.
2. Adequate compensation for dust related disabilities in all states including long term disability and family compensation.
3. Adequate medical surveillance of those workers exposed to insulation dusts. Lives can be saved in this way.
4. Adequate medical care, when required, of occupationally related disease.
5. Development of a cure for mesothelioma. This could be part of our country's new National Cancer Plan.
6. Development of methods to inactivate lung dusts in those workers already exposed. There is already evidence that this is possible.

# In Memoriam

The Insulation Industry Hygiene Research Program wishes to gratefully acknowledge additional contributions made in memory of Albert E. Hutchinson. Previous contributions were listed in Volume 4, Number 3.

*From locals of the International Association of Heat and Frost Insulators and Asbestos workers:*

| | | |
|---|---|---|
| 6 | 14 | 20 |
| 41 | 53 | 57 |
| 62 | 74 | 76 |
| 83 | 84 | 86 |
| 90 | 98 | 99 |

*From labor organizations:*

International Brotherhood of Painters and Allied Trades

State Building and Construction Trades Council of California

Norfolk Building Trades Council

Operative Plasterers' and Cement Masons'—International Association of the United States & Canada

Atomic Trades and Labor Council

*From individuals:*

Mr. Edward Sargawakian
Mr. Hoyt B. Gilley
Mrs. B. G. Scallon
Mr & Mrs. James Hauber

To date 92 groups and individuals have contributed over $5,900 to the Insulation Industry Hygiene Research Program in memory of Albert Hutchinson

# INSULATION INDUSTRY HYGIENE RESEARCH PROGRAM

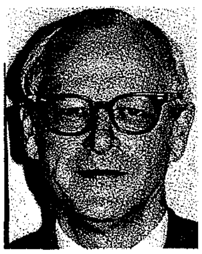
INT'L ASSOC. OF HEAT & FROST INSULATORS & ASBESTOS WORKERS

## A COOPERATIVE RESEARCH PROGRAM TO ELIMINATE HEALTH HAZARDS IN THE INSULATION INDUSTRY

MOUNT SINAI SCHOOL OF MEDICINE
OF THE CITY UNIVERSITY OF NEW YORK

# INSULATION HYGIENE PROGRESS REPORTS

## FROM THE INSULATION INDUSTRY HYGIENE RESEARCH PROGRAM



**E. Cuyler Hammond, Sc.D.** Director, Department of Statistics and Epidemiology, American Cancer Society, NYC. Statistical consultant.

**Harry Heimann, M.D.** Formerly, Director, Division of Occupational Health, United States Public Health Service, Washington, D.C. Epidemiological Research Staff.

**Duncan A. Holaday, M.A.** Came to the IIHRP after serving as Chief, Western Field Station, U.S. Public Health Service, Salt Lake City. Industrial hygiene and engineering.

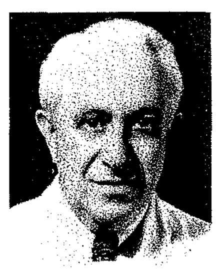
**Kingsley Kay, Ph.D.** Formerly Senior Scientific Consultant in Occupational Health to the Canadian government, Ottawa. Toxicology and industrial hygiene.

**William J. Nicholson, Ph.D.** Recruited to the IIHRP from the Watson Laboratory, Columbia University, where he was senior research biophysicist. Head of field studies of the program, and editor of the Insulation Industry Hygiene Reports.

**William Reitze, B.S.** Field investigator in industrial hygiene. Recently retired from the program after making important contributions. Mr. Reitze has rejoined Johns Manville as Manager of Accident Prevention and Industrial Health.

**Arthur Rohl, Ph.D.** Research mineralogist. Dr. Rohl comes to the IIHRP from the Department of Mineralogy of Columbia University. He is responsible for examination and analysis of dust samples.

**Robert J. Schnitzer, M.D.** Formerly, Head of Chemotherapy Laboratories of I.G. Farben and of Hoffmann-LaRoche. Heads Biological Laboratory research into techniques of dust inactivation.

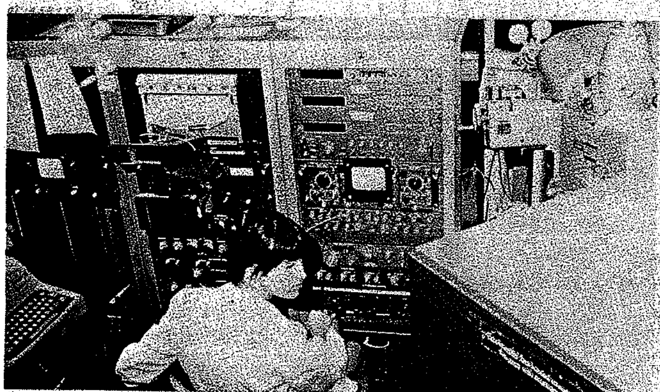


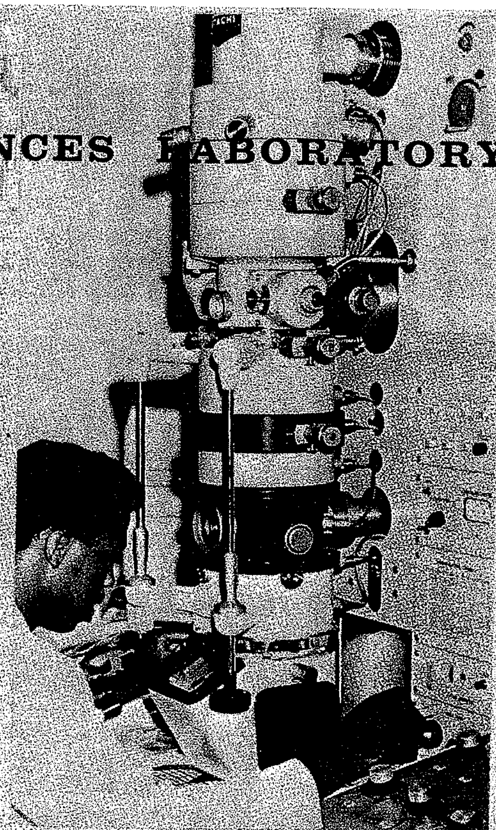
**Irving J. Selikoff, M.D.** Director, Environmental Sciences Laboratory and head of Medical School's Division of Environmental Medicine. Formerly, President, New York Academy of Sciences. Director of IIHRP.

# ENVIRONMENTAL SCIENCES LABORATORY

A wide variety of highly sophisticated electronic equipment is utilized by the staff of the IIHRP at the Environmental Sciences Laboratory of the Mount Sinai School of Medicine.

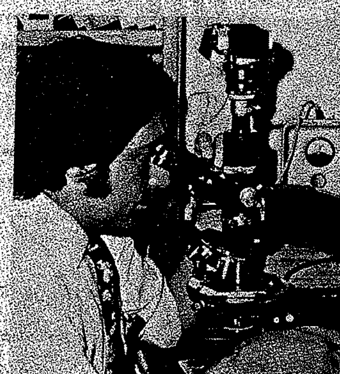
An electron microprobe analyzer will provide chemical analysis of material weighing only one trillionth of an ounce.



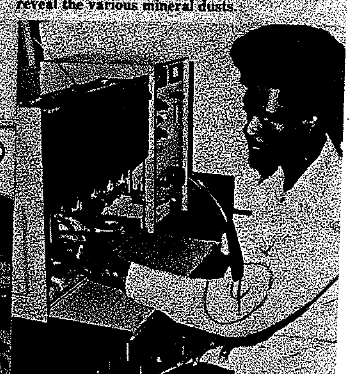


A high resolution electron microscope will reveal the presence of the tiniest particle. It is capable of magnifying images 480,000 times.

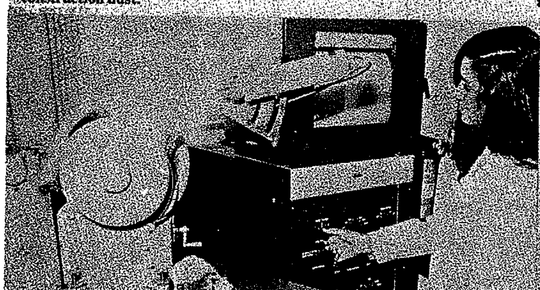
A polarizing light microscope can be used to identify some of the relatively large particles found in the air on construction sites and in lung tissues.



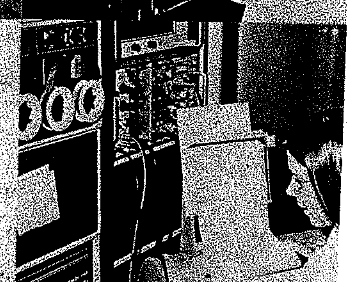
A low-temperature activated oxygen asher used in the processing of lung tissue prior to mineralogical analysis. The asher removes the tissue and organic material to reveal the various mineral dusts.



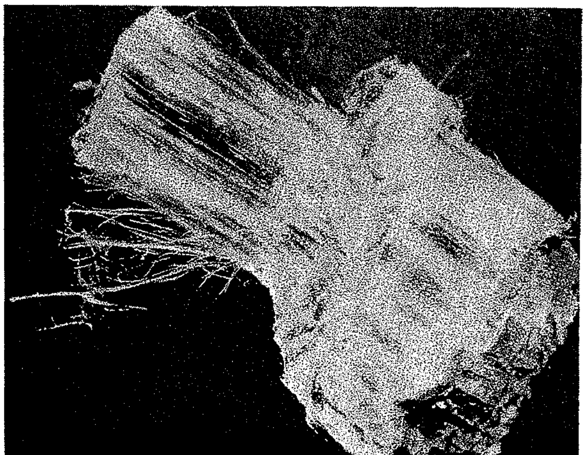
X-ray diffraction equipment provides information on the specific minerals present in samples of construction dust.



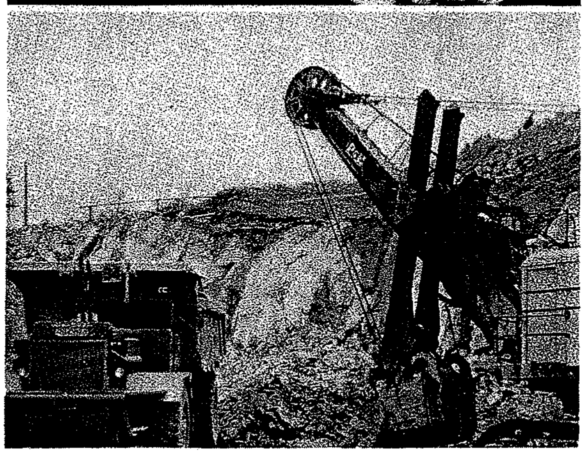
A high volume air sampler used to collect room or environmental airborne dust for analysis.



A high speed computer to assist scientists in the analysis of particles found in the lung and in air.



ASBESTOS ORE FROM A CANADIAN OPEN PIT CHRYSOTILE MINE.



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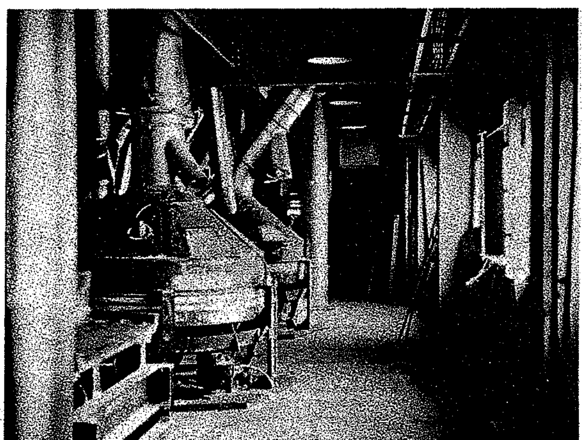
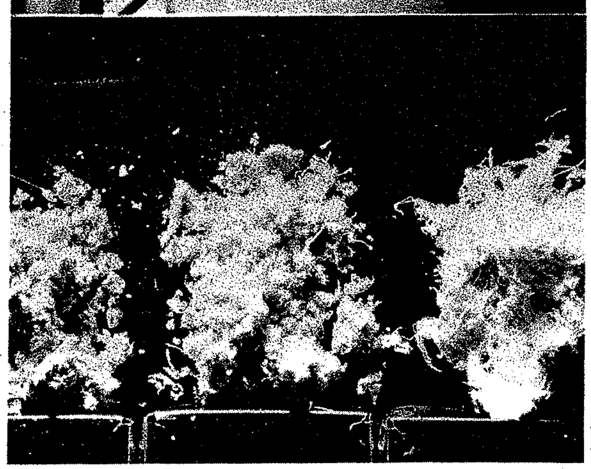


THE ORE IS CRUSHED AND THE ASBESTOS FIBERS ARE OBTAINED BY AIR SEPARATION, IN A MILL.



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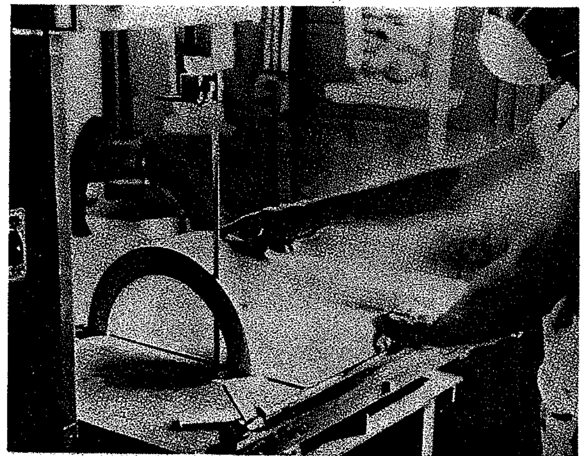


THE FIBERS ARE USED IN INSULATION MATERIAL AND DURING APPLICATION BECOME DIVIDED INTO THEIR INDIVIDUAL FIBRILS.

THE FIBERS AND FIBRILS CAN EASILY BECOME AIRBORNE.

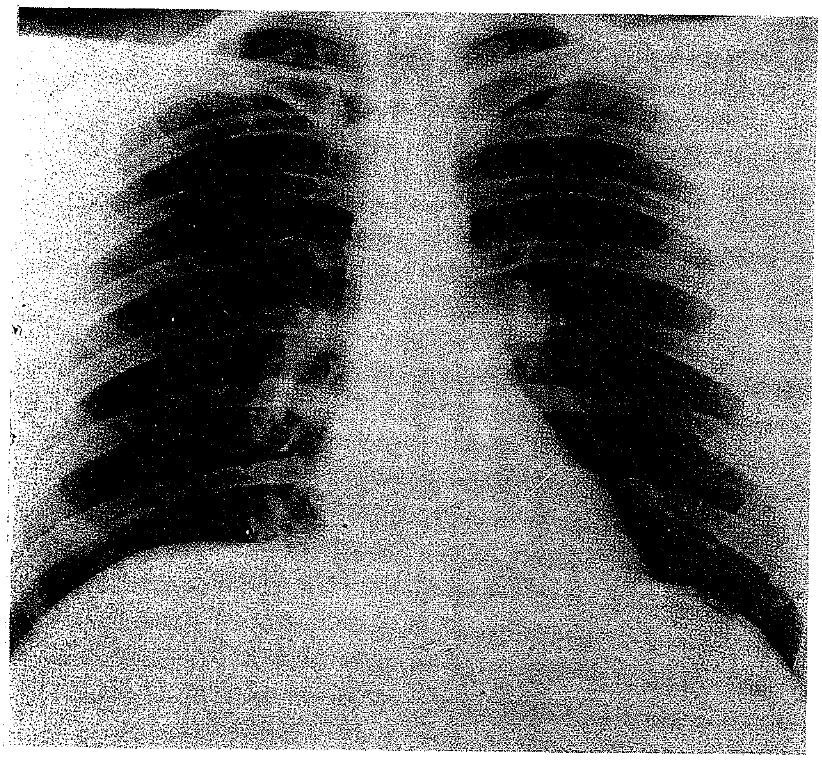
HERE THEY ARE SHOWN MAGNIFIED 15,000 TIMES.

6

7

WHEN INHALED THEY READILY ARE TRAPPED IN THE LUNG.

8



NORMAL CHEST X-RAY

NORMAL CHEST X-RAY

Most x-rays of pipecoverers appear normal for at least ten years, or longer. Indeed, one of 20 has a clear x-ray even after 40 years of work. We do not know why there are these differences among individuals. Cigarette smoking tends to result in somewhat more scarring than would otherwise be the case, but asbestosis may occur even in the absence of cigarette smoking.

A normal appearing film does not insure that there is no scarring; the x-ray sometimes does not show fine scars, especially the diffuse variety characteristic of asbestosis. In such instances, respiratory function tests may demonstrate some change, especially after exercise. However, by and large, a normal x-ray is a very satisfactory finding in an insulation worker and is a distinct advantage.

MINIMAL ASBESTOSIS

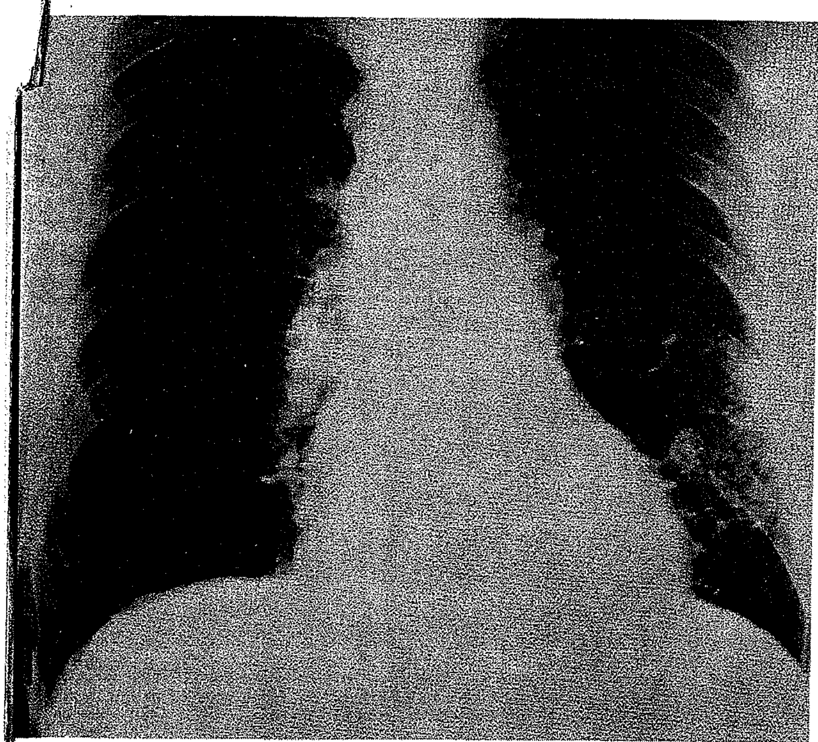
Fine lines, indicative of scarring, begin to appear. Often, as here, they are neither extensive nor very dense. The scars tend to appear in the lower portions of the lungs, on both sides, and are frequently irregular or reticular. As a rule, there is more to be found in the lung than can be seen on x-ray, which may "under-read" the situation. Sometimes, only the covering of the lung (the pleura) is involved and the lung itself is entirely or largely spared. When this happens "pleural plaques" are seen on the x-ray. These may become calcified.

The appearance of these x-rays is not absolutely specific: other diseases sometimes give similar findings. Yet when they occur in an asbestos worker, the diagnosis can usually be made with considerable confidence, especially by an experienced physician. Lung biopsy is rarely necessary and should not be undertaken lightly.

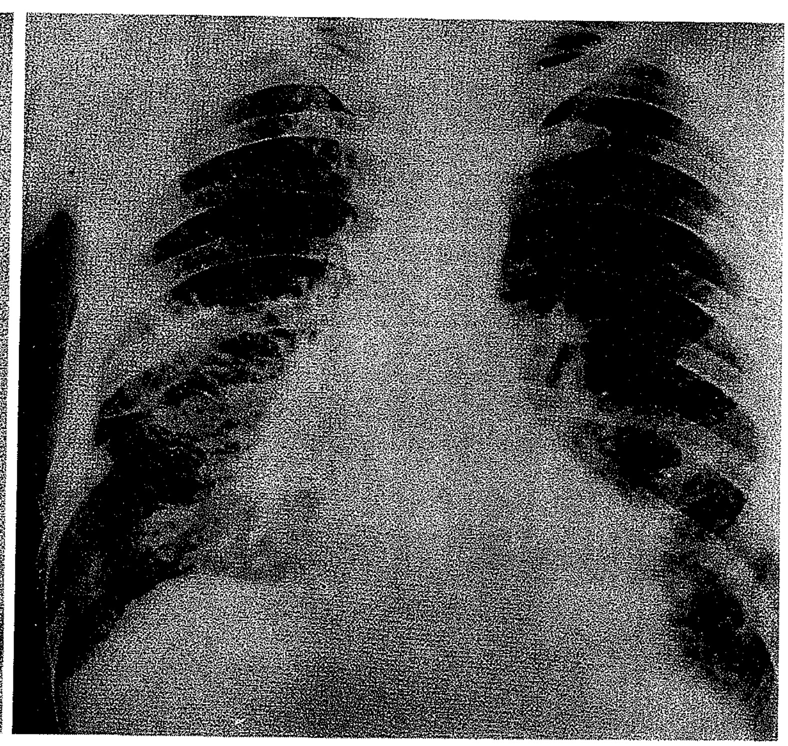
EXTENSIVE ASBESTOSIS

The scarring is much more intense and is present in much of the lung. The pleurae, too, are involved in many cases.

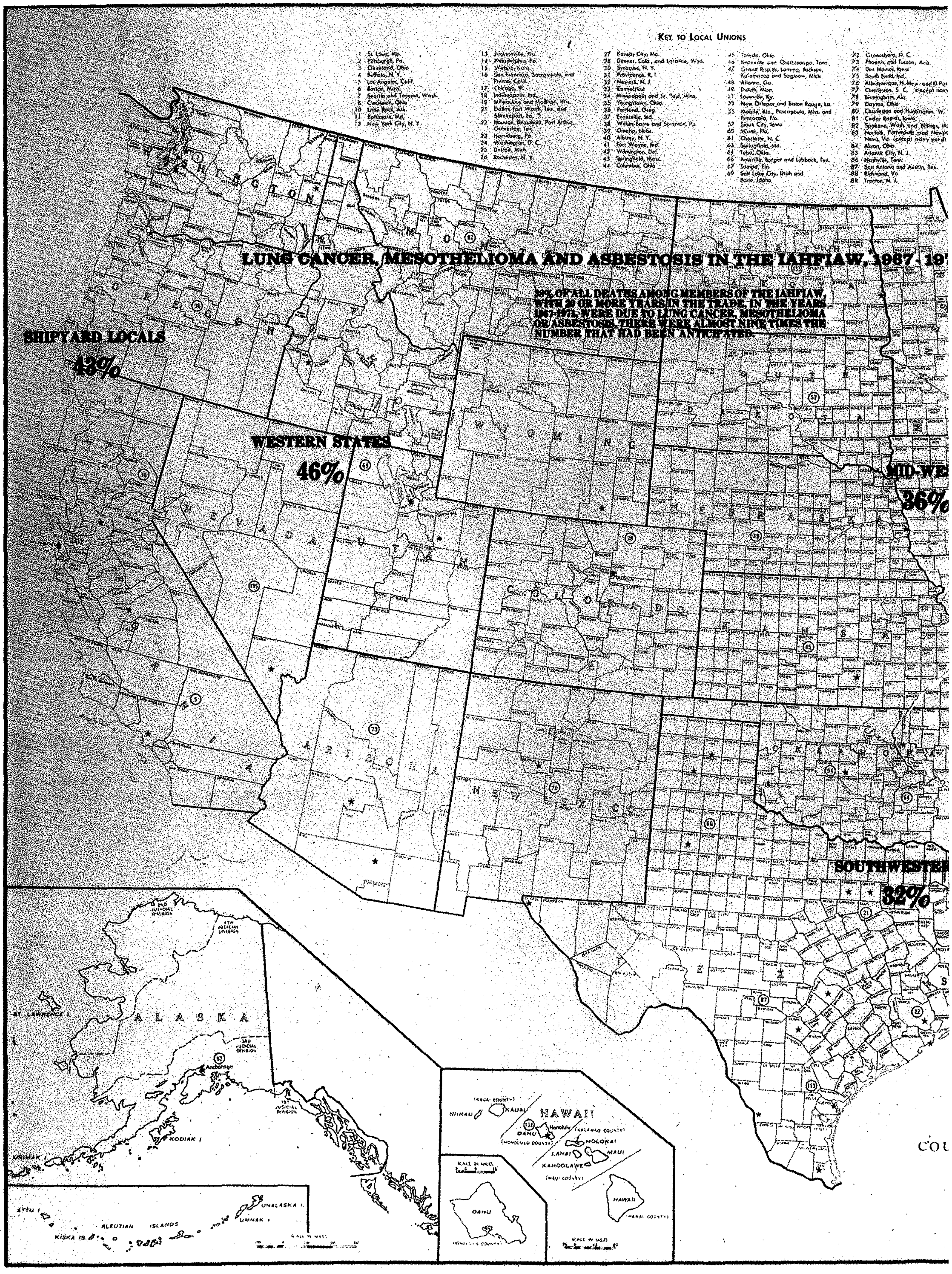
There is incomplete correlation between the amount of scarring seen on x-ray and the respiratory difficulty a person might have, or the extent of the abnormalities found on the pulmonary function tests. The x-ray may be grossly abnormal, yet the individual has no difficulty in breathing. Conversely, serious shortness of breath may be present without impressive changes in the chest x-ray. One cannot predict from the x-ray alone.

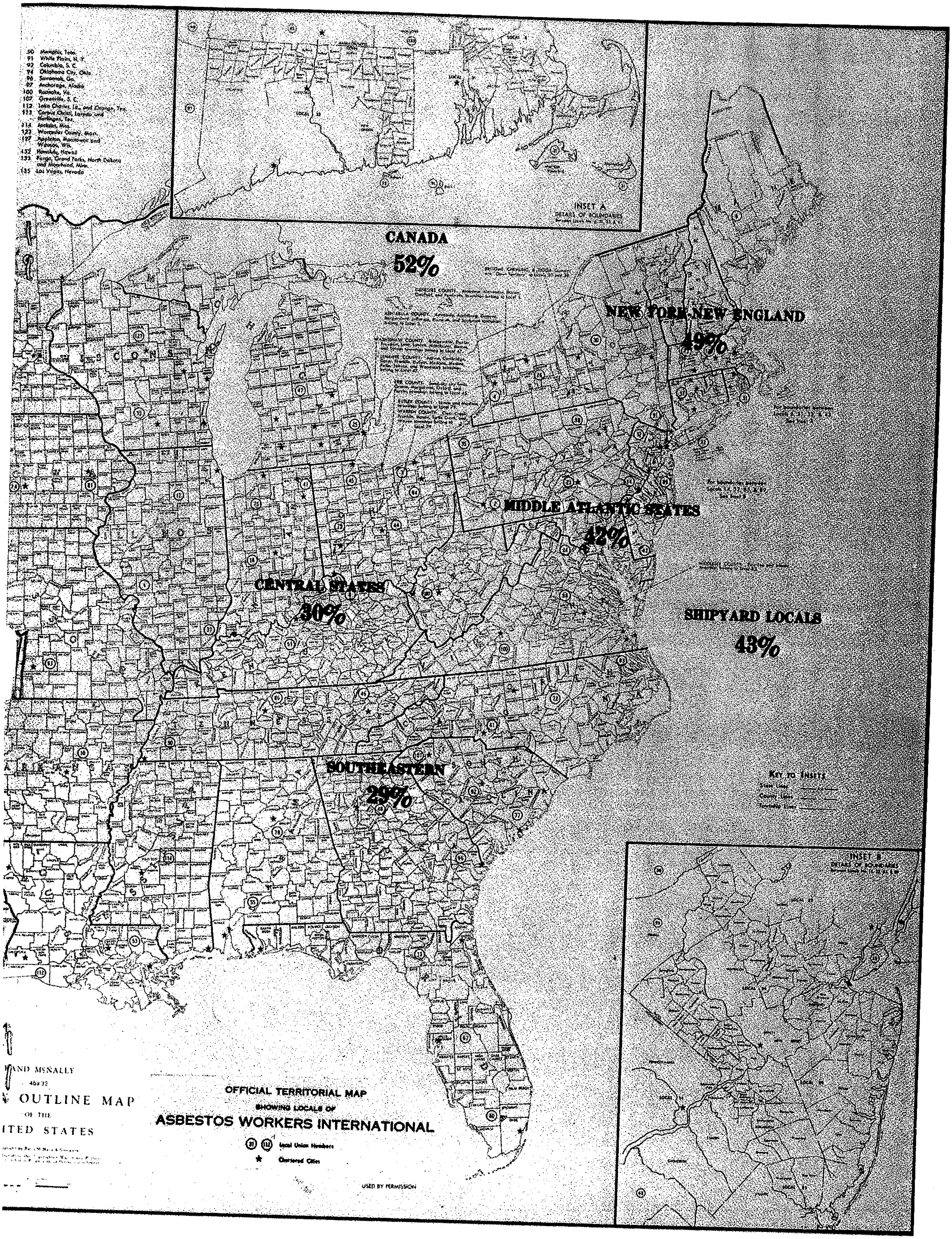


MINIMAL ASBESTOSIS



EXTENSIVE ASBESTOSIS


LUNG CANCER, MESOTHELIOMA AND ASBESTOSIS IN THE IAHFIAW, 1967 - 19
39% OF ALL DEATHS AMONG MEMBERS OF THE IAHFIAW, WITH 20 OR MORE YEARS IN THE TRADE, IN THE YEARS 1967-1971, WERE DUE TO LUNG CANCER, MESOTHELIOMA OR ASBESTOSIS. THERE WERE ALMOST NINE TIMES THE NUMBER THAT HAD BEEN ANTICIPATED.
SHIPYARD LOCALS
43%
WESTERN STATES
46%
MID-WE
36%
SOUTHWESTE
32%
KEY TO LOCAL UNIONS
1 St. Louis, Mo.
2 Pittsburgh, Pa.
3 Cleveland, Ohio
4 Buffalo, N. Y.
5 Los Angeles, Calif.
6 Boston, Mass.
7 Seattle and Tacoma, Wash.
8 Cincinnati, Ohio
10 Little Rock, Ark.
11 Baltimore, Md.
12 New York City, N. Y.
13 Jacksonville, Fla.
14 Philadelphia, Pa.
15 Wichita, Kans.
16 San Francisco, Sacramento, and Fresno, Calif.
17 Chicago, Ill.
18 Indianapolis, Ind.
19 Milwaukee and Madison, Wis.
21 Dallas, Fort Worth, Tex. and Shreveport, La.
22 Houston, Beaumont, Port Arthur, Galveston, Tex.
23 Harrisburg, Pa.
24 Washington, D. C.
25 Detroit, Mich.
26 Rochester, N. Y.
27 Kansas City, Mo.
28 Denver, Colo., and Laramie, Wyo.
30 Syracuse, N. Y.
31 Providence, R. I.
32 Newark, N. J.
33 Connecticut
34 Minneapolis and St. Paul, Minn.
35 Youngstown, Ohio
36 Portland, Oreg.
37 Evansville, Ind.
38 Wilkes-Barre and Scranton, Pa.
39 Omaha, Nebr.
40 Albany, N. Y.
41 Fort Wayne, Ind.
42 Wilmington, Del.
43 Springfield, Mass.
44 Columbus, Ohio
45 Toledo, Ohio
46 Knoxville and Chattanooga, Tenn.
47 Grand Rapids, Lansing, Jackson, Kalamazoo and Saginaw, Mich.
48 Atlanta, Ga.
49 Duluth, Minn.
51 Louisville, Ky.
53 New Orleans and Baton Rouge, La.
55 Mobile, Ala., Pascagoula, Miss. and Pensacola, Fla.
57 Sioux City, Iowa
60 Miami, Fla.
61 Charlotte, N. C.
63 Springfield, Mo.
64 Tulsa, Okla.
66 Amarillo, Borger and Lubbock, Tex.
67 Tampa, Fla.
69 Salt Lake City, Utah and Boise, Idaho
72 Greensboro, N. C.
73 Phoenix and Tucson, Ariz.
74 Des Moines, Iowa
75 South Bend, Ind.
76 Albuquerque, N. Mex., and El Pas
77 Charleston, S. C. (except navy
78 Birmingham, Ala.
79 Dayton, Ohio
80 Charleston and Huntington, W.
81 Cedar Rapids, Iowa
82 Spokane, Wash. and Billings, Mo
83 Norfolk, Portsmouth and Newpo News, Va. (except navy yard
84 Akron, Ohio
85 Atlantic City, N. J.
86 Nashville, Tenn.
87 San Antonio and Austin, Tex.
88 Richmond, Va.
89 Trenton, N. J.
ALASKA
Anchorage
KODIAK I.
ST. LAWRENCE I.
ALEUTIAN ISLANDS
KISKA IS.
UNALASKA I.
UMNAK I.
HAWAII
NIIHAU
KAUAI
OAHU
Honolulu
MOLOKAI
LANAI
MAUI
KAHOOLAWE
COU



90 Memphis, Tenn.
91 White Plains, N. Y.
92 Columbia, S. C.
94 Oklahoma City, Okla.
96 Savannah, Ga.
97 Anchorage, Alaska
100 Roanoke, Va.
107 Greenville, S. C.
112 Lake Charles, La., and Orange, Tex.
113 Corpus Christi, Laredo and Harlingen, Tex.
114 Jackson, Miss.
123 Worcester County, Mass.
127 Appleton, Manitowoc and Wausau, Wis.
132 Honolulu, Hawaii
133 Fargo, Grand Forks, North Dakota and Moorhead, Minn.
135 Las Vegas, Nevada
INSET A
DETAILS OF BOUNDARIES
CANADA
52%
NEW YORK-NEW ENGLAND
49%
MIDDLE ATLANTIC STATES
42%
CENTRAL STATES
30%
SHIPYARD LOCALS
43%
SOUTHEASTERN
29%
KEY TO INSETS
INSET B
DETAILS OF BOUNDARIES
RAND McNALLY
OUTLINE MAP
OF THE
ITED STATES
OFFICIAL TERRITORIAL MAP
SHOWING LOCALS OF
ASBESTOS WORKERS INTERNATIONAL
Local Union Numbers
Chartered Cities
USED BY PERMISSION

## LUNG CANCER

X-ray examination is at present the only efficient way to diagnose the presence of lung cancer, at least in time for successful treatment. However, such diagnosis may be somewhat more difficult in asbestos workers, since the lung scarring which is often also present, may obscure the cancer shadow.

A considerable advantage is to be able to compare the suspicious markings with the same area on previous x-rays, to see if there has been any change. Therefore, regular periodic x-rays are essential for pipe coverers. For those with more than twenty years in the trade, even once a year is sometimes not often enough, especially if there is a history of cigarette smoking. Every six months would be better. At most, there would be a little waste of time and money, but there could be the saving of a life.

The lung cancers in asbestos workers are, as a group, to a certain extent, different than the usual cancers. Two-thirds are in the lower portions of the lung (where more scarring is seen on x-ray, also); ordinarily, only one-third are found here. But, apart from such minor variations, they can be diagnosed and treated in the usual ways. The important thing is early diagnosis, if we are to hope for a cure.

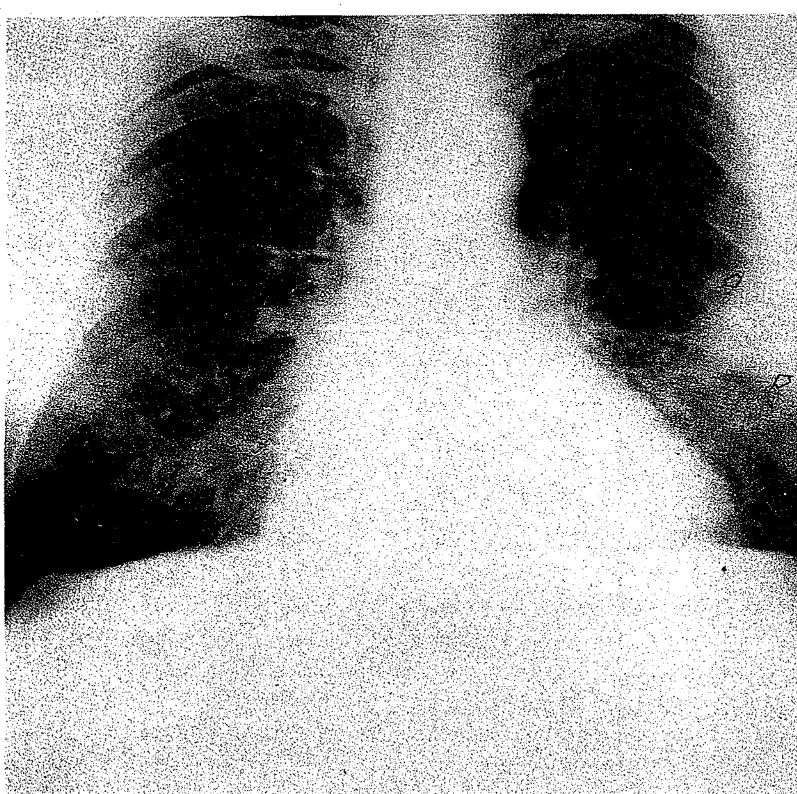
## MESOTHELIOMA

The lining of the chest and the lining of the abdomen is the "mesothelium". Therefore, when neoplasm affects this tissue, it is labeled "mesothelioma".

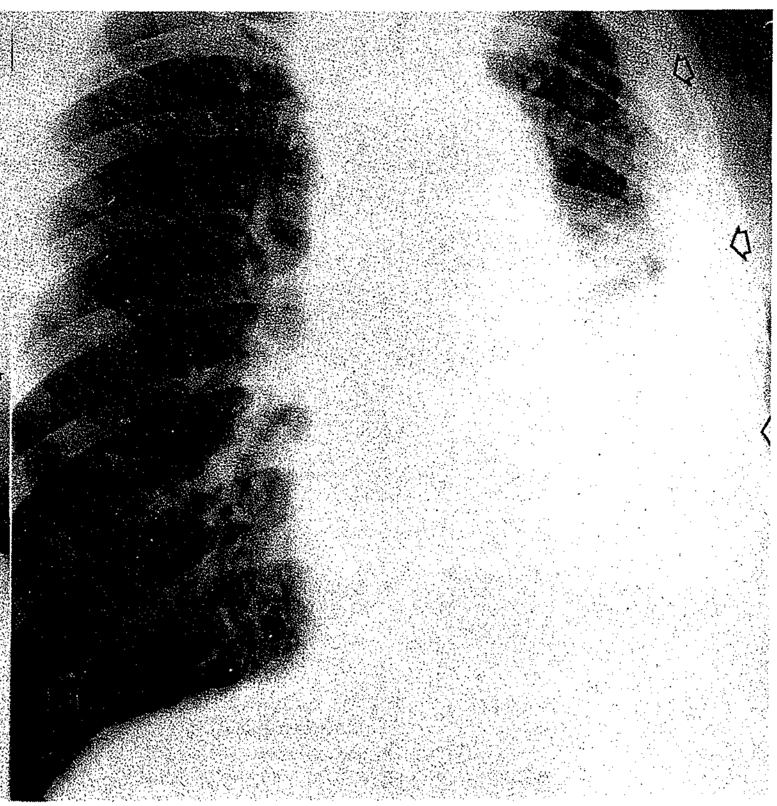
Such tumors generally spread across the whole lining surface. This fact determines their x-ray appearance — they show a diffuse shadow lining the whole chest, encasing the lung. Usually, they are on one side only, and may be accompanied by fluid in the chest ("pleurisy" or "pleural effusion"). When the lining of the abdomen is affected, fluid may again be found, causing swelling.

X-ray is very efficient in demonstrating the presence of mesothelioma in the chest (pleural). It is so far of little help in diagnosing abdominal (peritoneal) mesothelioma.

Early progress has been made in developing chemicals and drugs to treat these cancers and it is hoped that additional research will help provide a cure. Therefore, early x-ray diagnosis will be a great help in creating the best possible circumstances for treatment.



LUNG CANCER



MESOTHELIOMA

# STATISTICS

## MORTALITY STATISTICS OF INSULATION WORKERS, 1943-1971

Exposure to insulation dusts usually does not produce disease until many years after beginning work — 20, 30 or more years. The experience of members of Locals 12 and 32 is therefore of interest.

On January 1, 1943, there were 632 members in these locals. Seven died young, before reaching twenty years from onset of their work. The fate of the remaining 625 men has been studied, and is summarized in the following table:

**Expected and observed deaths among 625 members of Locals 12 and 32, Jan. 1, 1943 - Dec. 31, 1971**

| | Expected | Observed |
|---|---|---|
| **Total deaths** | 288.5 | 423 |
| **Cancer deaths** | 52.2 | 189 |
| Lung cancer | 11.4 | 84 |
| Pleural mesothelioma | * | 8 |
| Peritoneal mesothelioma | * | 24 |
| Cancer of stomach, colon, rectum | 12.5 | 41 |
| All other cancers | 28.3 | 32 |
| **Asbestosis** | * | 33 |
| **All other causes** | 236.3 | 234 |

The IIHRP is grateful to the Department of Statistics of the American Cancer Society for undertaking the extensive statistical analyses needed to provide these data. Expected deaths are based upon U.S. National Office of Vital Statistics annual rates for U.S. white males, taking age and year into account.

*U.S. death rates not available, since these are rare causes of death in the general population.

# STATISTICS

Six years ago it was not known whether the Locals 12 and 32 experience was unique or to be found throughout the country. Therefore, research was undertaken to investigate this question.

On January 1, 1967, there were 17,800 men registered in the International. By December 31, 1971, 1,092 had died.

**EXPECTED AND OBSERVED DEATHS AMONG 17,800 MEMBERS OF THE IAHFIAW IN THE UNITED STATES AND CANADA, JAN. 1, 1967 - DEC. 31, 1971**

| | (12,681 members) Before 20 years | | (5,119 members) After 20 years | |
|---|---|---|---|---|
| | Expected | Observed | Expected | Observed |
| **Total deaths** | 178.94 | 211 | 626.69 | 881 |
| **Cancer deaths** | 26.31 | 51 | 117.78 | 408 |
| Lung cancer | 7.03 | 22 | 37.39 | 191 |
| Pleural mesothelioma | * | 2 | * | 24 |
| Peritoneal mesothelioma | * | 3 | * | 48 |
| Cancer of stomach | 0.97 | 1 | 5.65 | 15 |
| Cancer of colon, rectum | 2.51 | 3 | 15.00 | 23 |
| Cancer of esophagus | 0.44 | 1 | 2.77 | 12 |
| All other cancers | 15.36 | 19 | 56.97 | 96 |
| **Asbestosis** | * | 3 | * | 73 |
| **All other causes** | 152.63 | 157 | 509.91 | 400 |

## COMMENTS

Lung cancer is the most serious health hazard of insulation workers. It may be responsible for one in five of all deaths among them. However, generally it does not occur until more than 20 years have passed from onset of work.

Mesothelioma of the chest or abdomen is very rare in the general population; approximately 1 death in 10,000. Among pipecoverers, it is increased more than 700 times, accounting for 7% of all deaths.

Gastro-intestinal cancer is also increased in frequency but not to the extent as lung cancer or mesothelioma. It is found two or three times as often as anticipated.

Asbestosis — scarred lungs — was responsible for approximately 7% of deaths. There is no cause for asbestosis other than the inhalation of asbestos dust. Each of these deaths was therefore work-related.

*U.S. death rates not available, since these are rare causes of death in the general population.

# CIGARETTE SMOKING

## CIGARETTE SMOKING

Cigarette smoking and insulation work do not mix.

Research has shown that lung cancer occurs against a background of cigarette smoking:

1. LOCALS 12 AND 32:

On Jan. 1, 1963, there were 370 members of Locals 12 and 32 who had entered the Union before 1943.

| | 87 never smoked cigarettes | 283 had a history of cigarette smoking |
|---|---|---|
| Total deaths by Dec. 31, 1971 | 35 | 133 |
| Expected deaths of lung cancer* | 1.26 | 3.31 |
| Deaths of lung cancer Jan. 1, 1963-Dec. 31, 1971 | 1 | 41 |

2. ALL LOCALS, U.S. AND CANADA:

There were 17,800 men registered in the International on Jan. 1, 1967. 11,656 completed questionnaires recording their smoking habits.

| | 2,066 never smoked cigarettes | 9,590 had smoked cigarettes |
|---|---|---|
| Total deaths by Dec. 31, 1971 | 73 | 596 |
| Expected deaths of lung cancer* | 5.98 | 25.09 |
| Deaths of lung cancer Jan. 1, 1967-Dec. 31, 1971 | 2 | 134 |

*Based on U.S. death rates, U.S. National Office of Vital Statistics.

Calculations indicate that asbestos workers who smoke cigarettes have eight times the chance of dying of lung cancer, compared to other cigarette smokers of the same age who do not work in this trade.

Asbestos workers who smoke cigarettes have 92 times the risk of dying of lung cancer, compared to similar men, who neither work with asbestos nor smoke cigarettes.

We have not found significant trouble with pipe or cigar smoking.

In the absence of cigarette smoking, we have not found lung cancer to be a very serious problem among asbestos workers.

Cigarette smoking is not the whole story, however. Mesothelioma and asbestosis occur even without smoking, as does cancer of the stomach, esophagus, colon or rectum. Therefore, dust control is essential.

Two things do not belong in pipe-coverers' lungs:

INSULATION DUSTS AND CIGARETTE SMOKE.

# DUST COUNTING

Asbestos dust levels in insulation work are determined by taking air samples during the different jobs of an asbestos worker. A small, battery operated pump draws air through a special filter mounted in a collecting unit worn on the collar of a workman. The collecting unit and filter which collects the fibers and particles in the air, are taken back to the laboratory for analysis. Because they are easier to measure, only those fibers longer than five microns (about 1/5000 of an inch) are counted; smaller ones are known to be present but are not counted.

The asbestos dust concentration allowed by the new asbestos standard is 5 fibers (longer than 5 microns) per milliliter of air averaged over an 8 hour day. (A milliliter of air is about a thimbleful). Since you breathe approximately 8,000,000 milliliters of air in a working day, the standard permits you to inhale 40,000,000 fibers daily. Moreover, there can be 100 fibers shorter than 5 microns for every one longer than 5 microns. Thus, one could say we have, at this time, a 4 billion fiber asbestos standard.

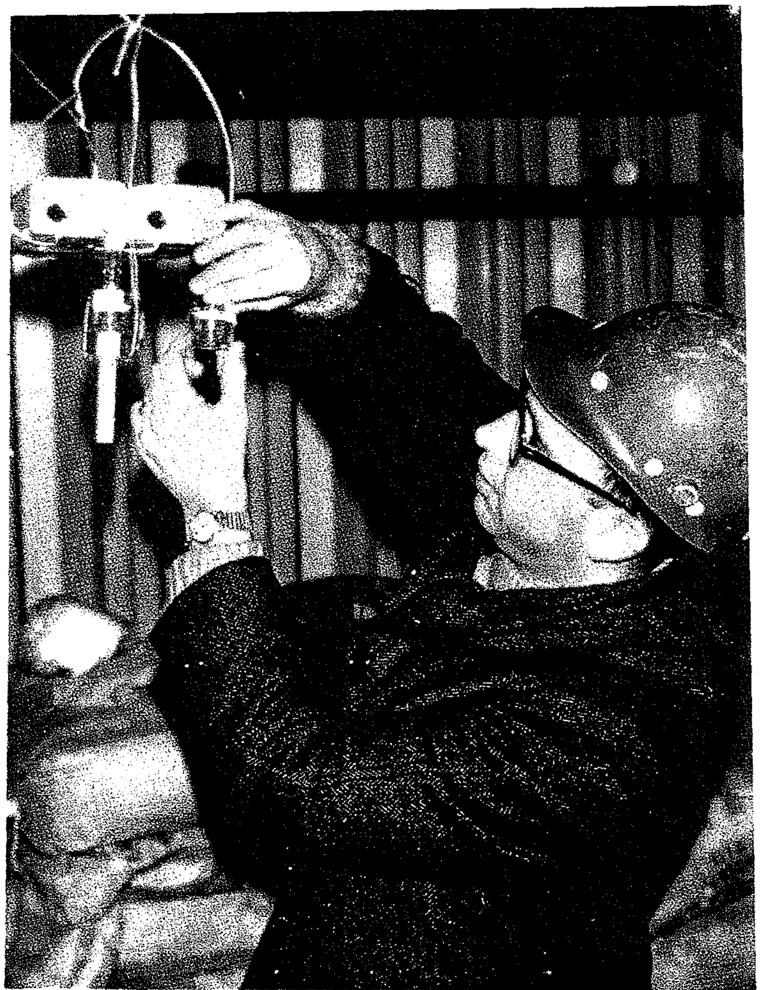
In actual fact, the numerical value of the standard is of limited value. To monitor dust levels in insulation work is an insurmountable task. For example, the Department of Labor has about 50 industrial hygienists to monitor over 4,000,000 workplaces for dust and toxic chemicals. Most State Departments of Health have even lesser capability for monitoring. The route to a safe work environment is not dust counting, but implementation of mandatory safe work practices and safe materials.

A An IHRP industrial hygienist collecting dust sample during insulation work in a power house.

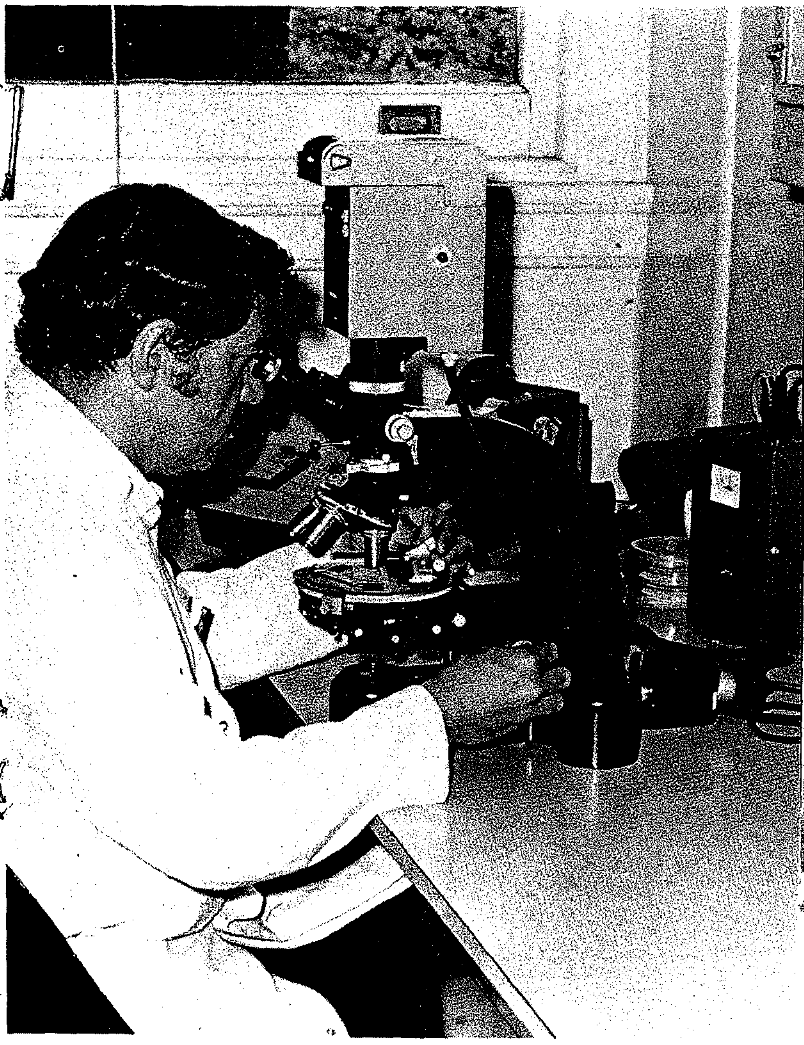
B Dust counting is performed in the Environmental Sciences Laboratory using a phase contrast microscope.

C A typical view, in the microscope, of airborne dust collected during insulation work.

A

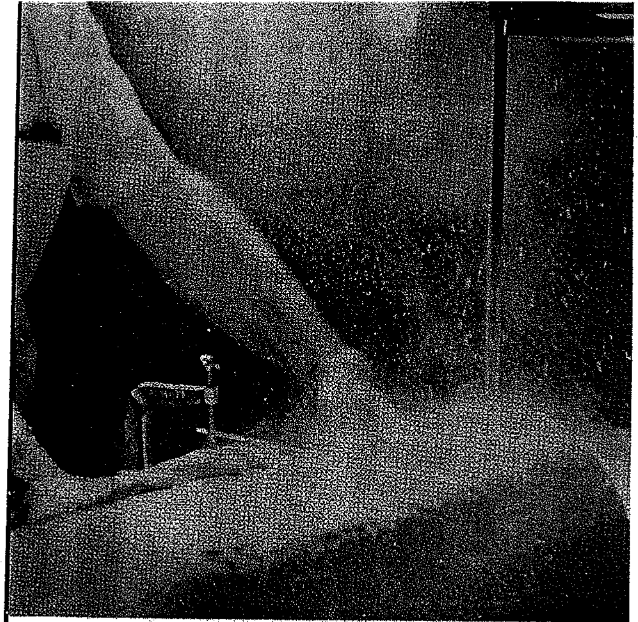


B

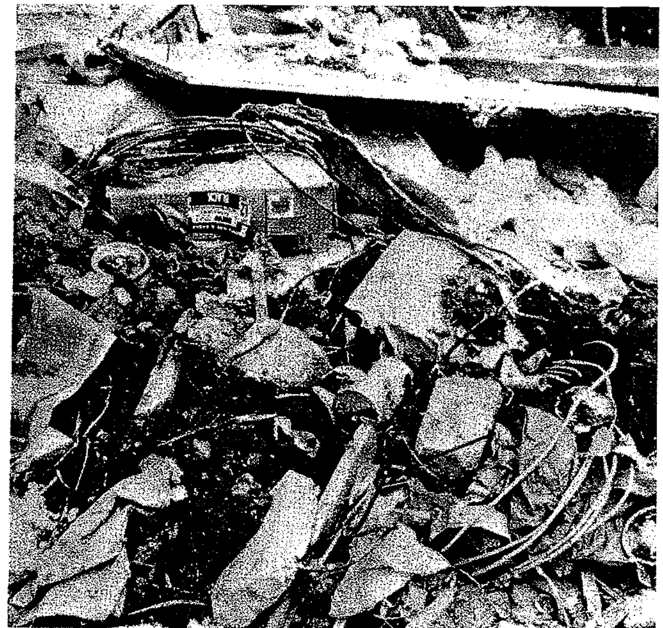


C

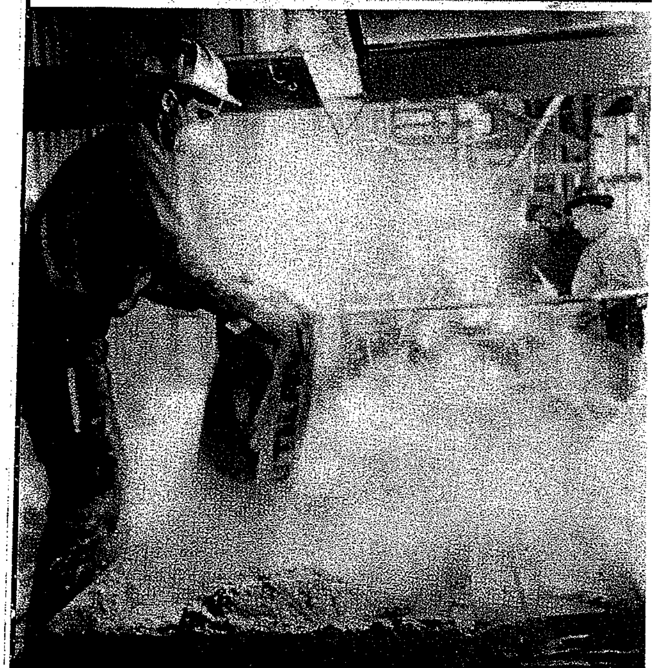
# POOR WORK PRACTICES PRODUCE DUST



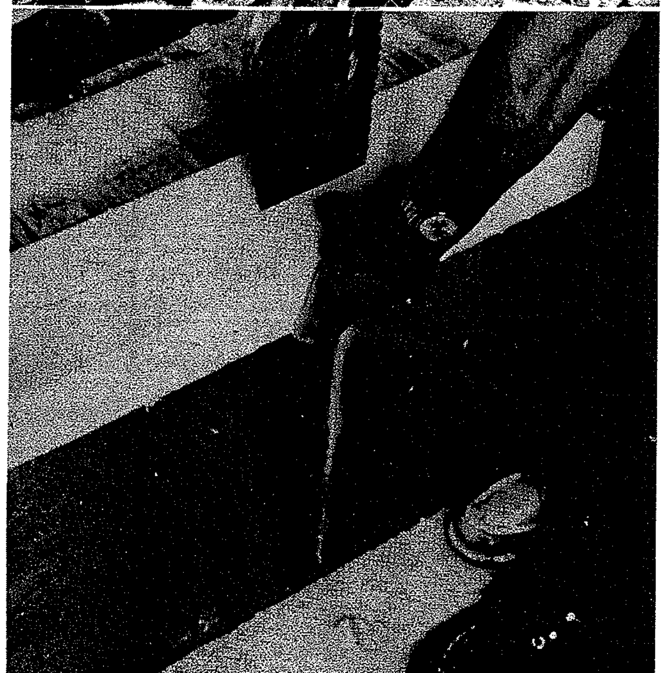
Cutting pipe covering with no dust control on a band saw.



Asbestos debris awaiting collection on job site.



Dumping dry asbestos cement into a trough prior to mixing with water.

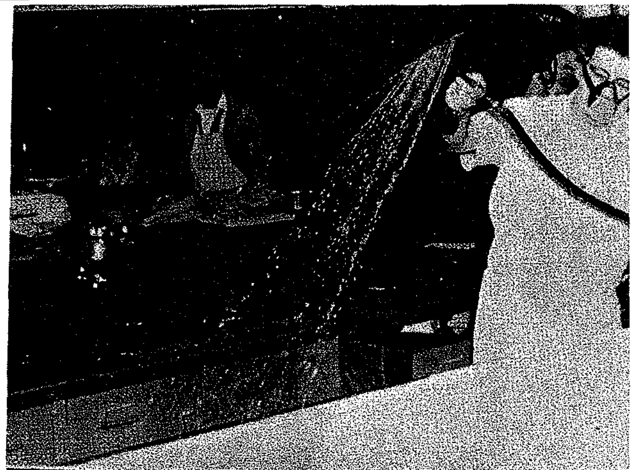


Dust generated by cutting with a hand saw. The dust on the workman's shoes can be brought from work to contaminate his home.

Hand mixing of dry asbestos cement.

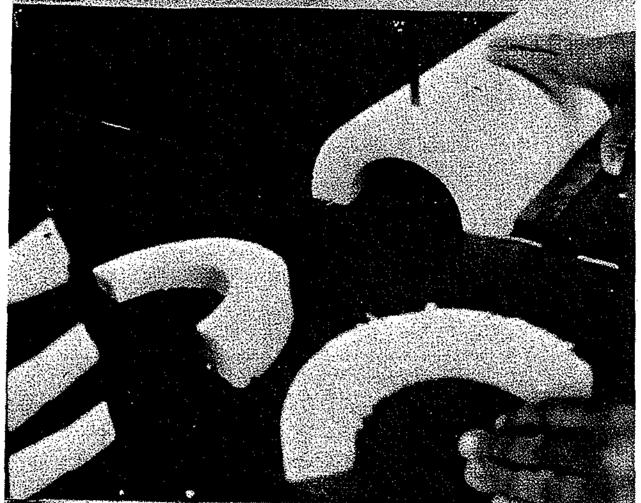
A broken bag of asbestos cement used as the bottom step of a ladder.

# GOOD WORK PRACTICES



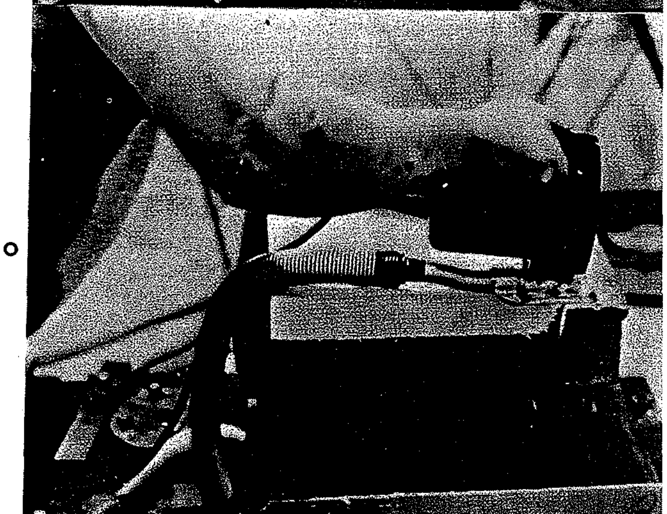
Wetting materials prior to cutting.

A portable vacuum cleaner with adequate dust filtration should be used to clean up loose dust.



The use of a high velocity collector on band saws virtually eliminates airborne dust.

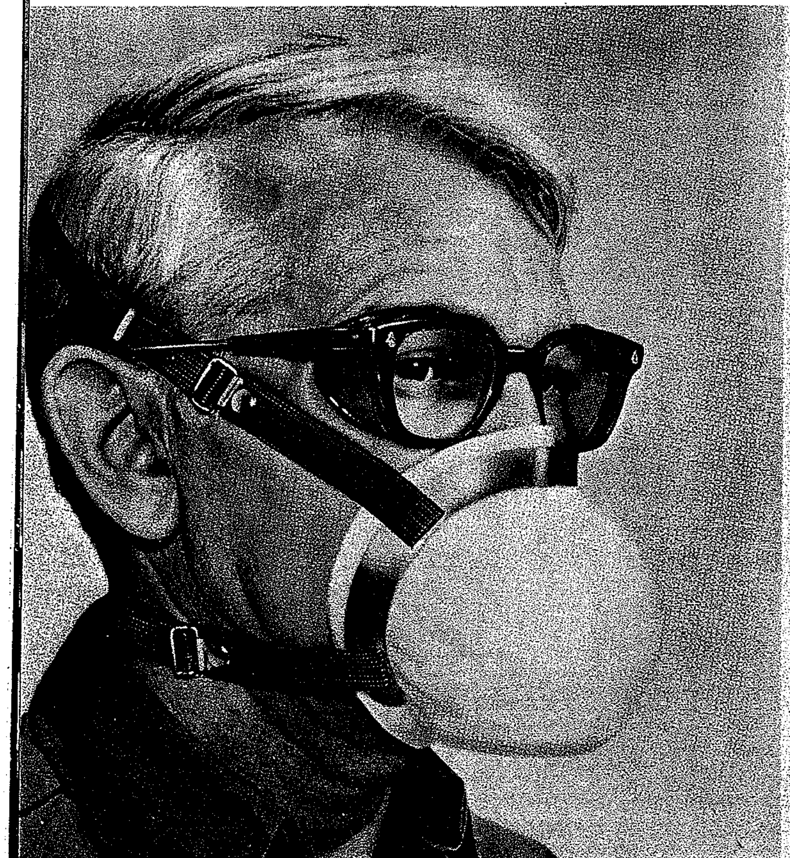
A downdraft cutting table for use during hand sawing. A portable vacuum cleaner provides the required air ventilation. Scrap material is disposed of in a plastic bag.

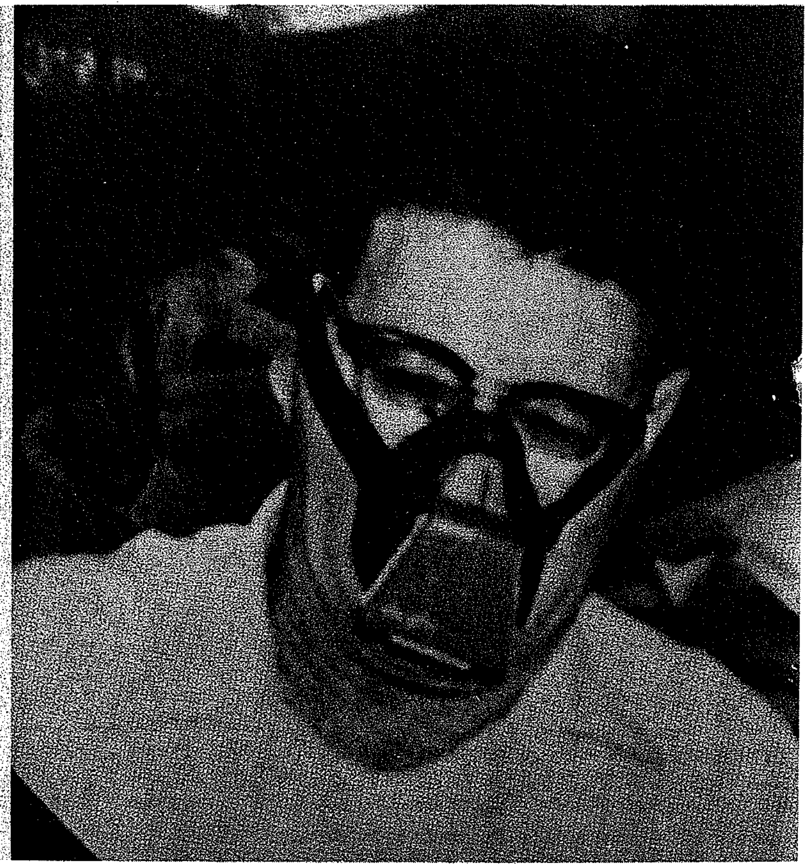


A high velocity dust collector for use on power hand saws.

Mixing of asbestos cement in plastic bags.

The bagging of waste material prior to disposal.





Single Use Respirators. These are suitable for use in asbestos concentrations up to 50 fibers/milliliter and should be used for the dustier jobs during installation of asbestos insulation materials. They should be worn during all blocking or hand cutting operations as excess dust is often generated.

Disposable Filter Respirators. These are suitable for the same conditions as single u respirators. They should not be used unless a respirator maintenance program is avai able on the work site.

# RESPIRATORS

NOTE: On July 1, 1976 the applicable level for whic respirators A and B are suitable drops to 20 fibers milliliter and that of C to 200 fibers/milliliter. At tha time respiratory protection should be provided at a concentrations above 2 fibers/milliliter.

Air Supplied Respirators. These must be used in asbestos dust concentrations above 500 fibers/milliliters. However, they would be required only in the most extreme conditions such as removal of old insulation in small shipboard compartments.

Powered Air Purifying Respirators. These are for use in asbestos concentrations up to 500 fibers/milliliter, and are suitable for the removal of old insulation material or the spraying of asbestos fiber.