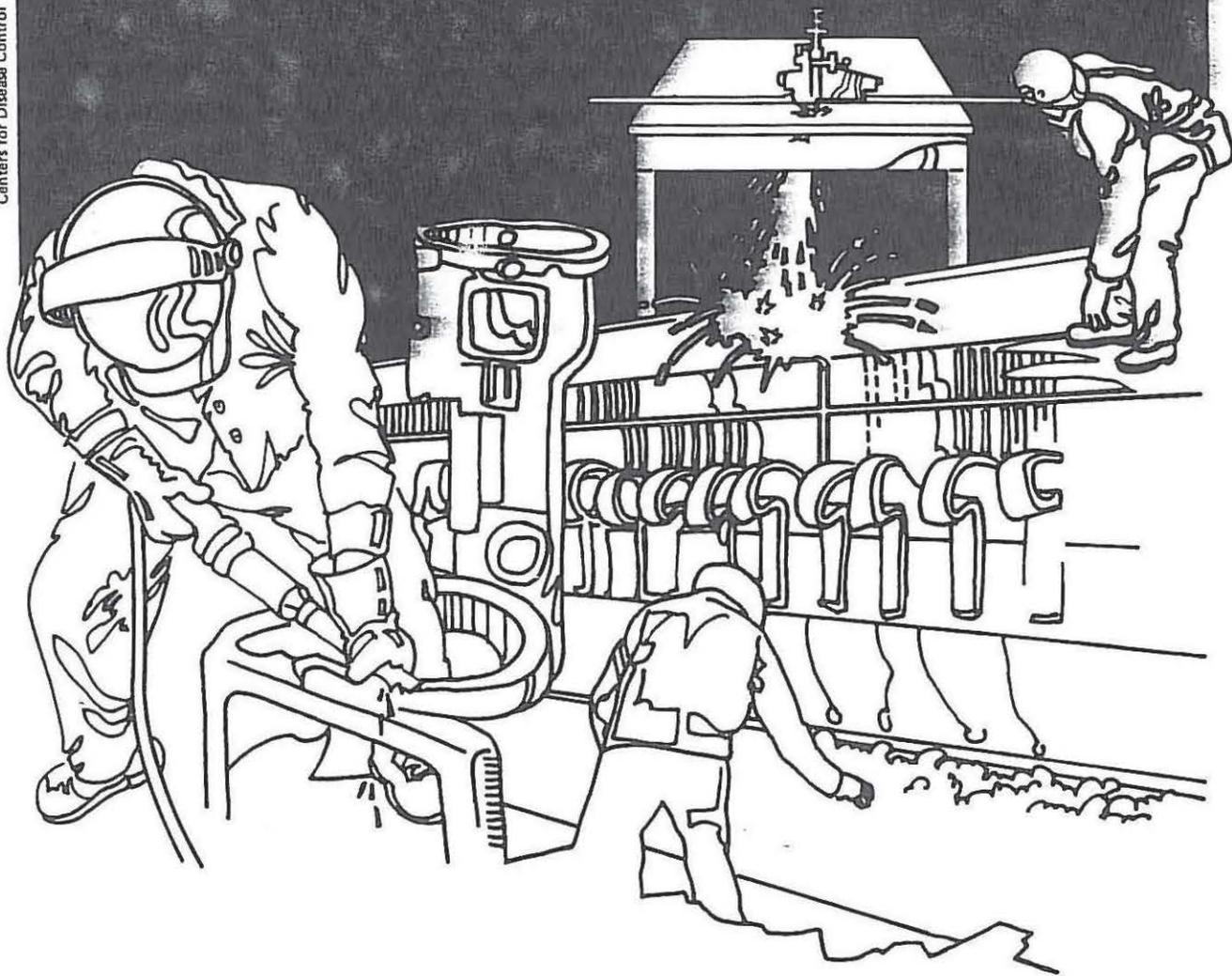


# NIOSH



## Health Hazard Evaluation Report

HETA 81-309-936  
U.S. AIR FORCE  
RECRUITING STATION  
BRIDGEPORT, CONNECTICUT

## PREFACE

The Hazard Evaluations and Technical Assistance Branch of NIOSH conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The Hazard Evaluations and Technical Assistance Branch also provides, upon request, medical, nursing, and industrial hygiene technical and consultative assistance (TA) to Federal, state, and local agencies; labor; industry and other groups or individuals to control occupational health hazards and to prevent related trauma and disease.

Mention of company names or products does not constitute endorsement by the National Institute for Occupational Safety and Health.

HEA 81-309-936  
August 1981  
U.S. Air Force  
Recruiting Station  
Bridgeport, Connecticut

NIOSH Investigator:  
Kevin P. McManus, I.H.

## I. SUMMARY

On May 5, 1981, The National Institute for Occupational Safety and Health (NIOSH) received a request for assistance in conducting an environmental survey, from the United States Air Force Recruiting Station in Bridgeport, Connecticut. The request stated that employees were potentially exposed to asbestos fibers coming from the ceiling area and the ventilation system.

On March 6, 1981, The Connecticut Department of Health Services reported laboratory analysis results of bulk sprayed-on insulation material. Microscopic examination revealed the presence of 30-60% chrysotile asbestos, coated with fine granular material, mixed with mineral wool. Occasional fibers of amosite were also seen.

On June 17, 1981 NIOSH conducted an environmental survey. Area air samples were collected in the office and wipe samples were collected from the surfaces of the room. Analysis of the wipe samples showed no evidence of asbestos on the filter paper. Asbestos was not detected in area air samples (lower limit of detection is 4500 fibers/filter, or 0.02 fibers per cubic centimeter).

A visual inspection of the basement area, where records used to be stored, but has not been used for over 3 months, revealed friable asbestos insulation within reach and with signs of damage.

As a result of this investigation NIOSH determined that a health hazard does not currently exist in the office of the Armed Forces Recruiting Station. However, based on the visual inspection of the basement area, where the sprayed on insulation was within reach and visibly friable and deteriorated, recommendations are made in the body of this report to avoid use of this area. These recommendations are in keeping with EPA's guidelines<sup>3</sup> for prevention of exposure to asbestos in buildings.

Keywords: SIC 9711, Asbestos, Office Environment, Insulation

## II. INTRODUCTION/BACKGROUND STATEMENT OF REQUEST

In March, 1981, the State of Connecticut, Department of Health Services reported that the insulation material sprayed on the structural steel members of the building located at 1211-1213 Main Street, Bridgeport, Connecticut, contained asbestos. The U.S. Air Force Recruiting Station, which presently occupies space in this building, requested that NIOSH provide Technical Assistance by conducting an environmental evaluation of the office area to determine if a health hazard exists. The request described the building as one story with a parking garage on the roof. There was concern that the vibration from moving cars may be causing the asbestos to break off the structure and become airborne. NIOSH received this request on May 5, 1981 and conducted an evaluation on June 17, 1981.

## III. EVALUATION DESIGN AND METHODS

A NIOSH industrial hygienist collected environmental air samples using MSA Model G sampling pumps operating at a flow rate of 2 liters per minute (lpm). Samples were collected on AA filters and analyzed according to NIOSH Method P&CAM 239<sup>4</sup> utilizing Phase Contrast Microscopy. The limit of detection has been determined to be 0.03 fibers per field or 4500 fibers per filter.

Wipe samples were collected on the surfaces of the room using dry Whatman filter paper. A wedge from each filter was removed and particulate was lifted from each wedge to a microscopic slide using a refractive index liquid. The slides were examined for the presence of asbestos utilizing polarized light microscopy and dispersion staining techniques. No quantitative analysis was performed on these samples.

## IV. EVALUATION CRITERIA

The NIOSH Criteria for a Recommended Standard<sup>1</sup> - Occupational Exposure to Asbestos, Revised July 1, 1976, lists an 8 hour time weighted average exposure limit of 0.1 fibers per cubic centimeter ( $f/cm^3$ ), or 100,000 fibers per cubic meter ( $f/M^3$ ) of air. A 15 minute ceiling limit of 0.5  $f/cm^3$ , or 500,000  $f/M^3$ , is also recommended. This criteria is based on reliable limits of sampling and analytical detection, and does not necessarily represent a "safe" level, since asbestos is a recognized carcinogen<sup>2</sup>.

The United States Environmental Protection Agency<sup>3</sup> (EPA) has issued guidelines to help in assessing asbestos hazards in buildings. The following is excerpted from the EPA document:

### ASBESTOS CONTAMINATION IN BUILDINGS

#### Basic Concepts

Asbestos fiber contamination of a building interior occurs by three general modes: fallout, contact or impact, and reentrainment. Consideration of each mode of contaminant entry and fiber aerodynamics is useful in exposure risk evaluation and the selection of solutions.

Fiber fallout is in great part a consequence of the characteristics of the ceiling material itself, while contact (impact) and reentrainment (secondary dispersal) result from activity within the structure. Each of the three modes has a characteristic rate of fiber dispersal.

#### Fallout

The rate of fiber dispersal in fallout is continuous, low level and long lived. Fallout may occur without actual physical disruption of the fiber-bearing material and may simply be a function of degradation of the adhesive. Variations in the fallout rate are due to structure vibration, humidity variations, air movement from heating and ventilating equipment, and air turbulence and vibration caused by human activity. This rate may also gradually increase due to aging of the adhesive component of the materials ranging from nearly zero for cementitious mixes in good repair to roughly  $100 \text{ ng/m}^3$  for deteriorating dry mix applications.

#### Contact

Friable sprayed asbestos surfaces have low impact resistance and are easily damaged. Even minor physical contact can result in fiber release into the environment. Such contact may be intentional and unavoidable during maintenance activities, accidental during routine activity, or deliberate through vandalism. Contact contamination depends rather simply upon accessibility and the probability of contact, the function of the structure, and the activities of the users.

The contact mode of fiber dispersal produces the highest release rates. The fiber contamination level during even routine maintenance and repair activities may exceed  $20 \text{ f/cm}^3$ , and removal of dry sprayed asbestos material can yield fiber contaminations of over  $100 \text{ f/cm}^3$ .

#### Reentrainment

The reentrainment of fibers that have already fallen onto interior surfaces repeatedly causes contamination of the environment, as disturbance of these settled fibers causes resuspension in the atmosphere.

It is possible to have fiber counts as high as  $5.0 \text{ f/cm}^3$  in activities such as custodial work. In a university library with a deteriorating sprayed asbestos ceiling, custodians were continuously dusting over a mile of shelving and generating an average of  $4.0 \text{ f/cm}^3$  contamination level for themselves and  $0.3 \text{ f/cm}^3$  for nearby library users.

### V. RESULTS AND DISCUSSION

<u>Sample Location</u>	<u>Volume(liters)</u>	<u>Results(fibers/filter)</u>
Rear Left	285	less than 4500
Rear Right	330	less than 4500
Front Left	285	less than 4500
Front Right	225	less than 4500

Asbestos levels were below the limit of detection (4500 f/filter) on all air samples.

No asbestos was detected on any of the four wipe samples.

The Connecticut Department of Health Services, Laboratory Division, collected a bulk insulation sample on March 2, 1981 for microscopic analysis. The results indicated the presence of 30-60% chrysotile asbestos.

These results are consistent with the expected levels in office buildings where the sprayed on insulation is not disturbed, and the insulation is separated from the room by a suspended ceiling.

During the investigation, the NIOSH industrial hygienist toured the basement area where records used to be stored. The ceiling insulation material was within reach and appeared extremely friable. There were signs of water damage due to a leaking roof. It was learned through discussions with the Air Force personnel that when lifting materials in the basement, contact with the ceiling was commonplace. There were visible signs of disturbance (chunks of insulation missing) and there appeared to be insulation material on the floor.

#### VI. CONCLUSION

As a result of the data generated in this investigation, NIOSH has determined that: (1) the office area of the U.S. Armed Forces Recruiting Station does not expose employees to an airborne asbestos hazard; (2) the condition of the insulation material in the basement (friable, deteriorated, water damaged, etc.) presents a potential health hazard should employees use this area again for storage, or any other purpose.

#### VII. RECOMMENDATIONS

Careful consideration should be given to avoiding the use of the basement area and preventing storage in that part of the building.

Elimination of asbestos hazards can be achieved by either encapsulation or removal of the asbestos insulation. In this case, the condition of the insulation material in the basement would place it on a high priority for removal before any work activity is performed in that area. Since the Air Force may have no control over the repairs to the building, precautions should be taken in the event that any removal takes place, so as to insure that the operation is contained.

Additional information as to the guidelines to be used during asbestos removal can be found in the EPA document referenced above.

VIII. REFERENCES

1. "Revised Recommended Asbestos Standard" DHEW (NIOSH) Publication No. 77-169 December 1976.
2. Workplace Exposure to Asbestos, DHHS (NIOSH) Publication No. 81-103, November, 1980.
3. "Sprayed Asbestos-Containing Materials In Buildings: A Guidance Document" Part I and II, EPA-450/2-78-014, March 1978
4. NIOSH Manual of Analytical Methods, 2nd Ed., Vol. 1, DHEW (NIOSH) Pub. No. 77-157-A, April, 1977.

IX. AUTHORSHIP AND ACKNOWLEDGEMENTS

Report Prepared By: Kevin P. Mc Manus, I.H.  
U.S. Public Health Service  
NIOSH - Region 1  
Boston, Massachusetts

Originating Office: Hazard Evaluations and  
Technical Assistance Branch  
Division of Surveillance  
Hazard Evaluations and  
Field Studies  
Cincinnati, Ohio

Laboratory Analyses: Utah Biomedical Test Labs  
Salt Lake City, Utah

Report Typed By: Mary Ellen Trask  
U.S. Public Health Service  
NIOSH - Region 1  
Boston, Massachusetts

X. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this report are currently available, upon request, from NIOSH, Division of Technical Services, Publications Dissemination, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days, this report will be available through the National Technical Information Service (NTIS), Springfield, Virginia 22161.

Copies of this report have been sent to:

United States Air Force Recruiting Station  
1211-1213 Main Street  
Bridgeport, Connecticut 06604

U.S. Department of Labor-OSHA- Region 1

NIOSH- Region 1

Connecticut Department of Health Services  
PO Box 1689, 10 Clinton Street  
Hartford Connecticut 06101

Connbridge Corporation  
855 Main Street  
Bridgeport, Connecticut 06604