U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE - CENTER FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45202

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 75-78-264

THE CELOTEX CORPORATION
CHARLESTON PLANT
CHARLESTON, ILLINOIS

FEBRUARY 1976

I. TOXICITY DETERMINATION

It has been determined, based upon a survey of the manufacturing operation at the Celotex Corporation plant, that no health hazard existed from airborne fibrous glass. This determination is based on observation of the manufacturing operation and personal, nondirected interviews with affected employees.

Skin irritation is the major potential health problem of fibrous glass handling. In view of the fact that no workers reported this type of health problem and observations in-plant indicated very little contamination from fibrous glass, and for the most part adequate ventilation, no health hazard was judged to exist as the product was used or found.

II. DISTRIBUTION - AVAILABILITY OF REPORT

Copies of this report are available upon request from the Hazard Evaluation Services Branch, NIOSH, U.S. Post Office Building, Room 508, Fifth and Walnut streets, Cincinnati, Ohio 45202. Copies have been sent to:

A. Celotex Corporation, Charleston, Illinois

B. Authorized Representative of Employees

C. U.S. Department of Labor, Region V

D. NIOSH Regional Consultant, Region V

For the purpose of informing the employees, the employer will promptly "post" the Determination Report in a prominant place in a location where the employees work for a period of 30 calendar days.

III. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29, U.S. Code 669(a)(6) authorizes the Secretary of Health, Education, and Welfare, following a written request by any employer or authorized representative of employees, to determine whether any substances normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The National Institute for Occupational Safety and Health (NIOSH) received such a request from a representative of employees regarding exposure to fiberglass dust during the manufacture of a fibrous glass reinforced, resin construction-insulation board. the request was submitted by the Business Agent of the International Association of Machinists and aerospace workers, Danville, Illinois, with no admitted knowledge of local union officers or members.

IV. HEALTH HAZARD EVALUATION

A. Evaluation Progress

The Celotex Corporation plant in Charleston, Illinois, was visited on 29 May 1975 by a NIOSH investigator. A preliminary meeting was held with management and labor representatives to obtain background information. The requester could not be present. Following this meeting the entire manufacturing and warehousing facilities were surveyed.

B. Description of the Process - Conditions of Use

The Celotex Corporation manufactures various types of construction-insulating board. Approximately 53 persons are involved in the various manufacturing processes, as well as packing, shipping and administrative duties. The work areas were not crowded, and housekeeping was good.

The sheets of construction-insulating board (Modi-Glas) are produced in 4-foot widths and in lengths of up to 20 feet. The urethane or isocyanate resin in catalyzed form and fibrous glass mat is placed between sheets of kraft paper or thin aluminum at the "distribution head" of the machine. The "foaming" material then passes through a curing oven. On exiting from the oven, it is cut to uniform width by small circular saws and sheared to length. Normally, 1 worker tends the "distribution head;" 1, the trim saws; 1, the (M-J) recut saw; and approximately 4 stacker-wrapper workers are required.

After the manufactured product is cut to finish size, stacked and

wrapped, if required, it passes through a door into the warehousing area. From this area materials are either warehoused or loaded onto semi-trailers or railcars for delivery.

V. EVALUATION CRITERIA

Emphasis was placed largely upon employee interviews inasmuch as there was little or no evidence of an airborne fibrous glass problem. The processes were operating at a continuous rate, and workers stated that a normal operational procedure was being followed during the visit.

A review of industrial experience by the Threshold Limit Value Committee (ACGIH) found no indication that fibrous glass produces lung irritation from fiber diameters which are respirable (less than 5 to 7u) . Fibers of larger diameter, however, result in skin irritation at appreciable air concentrations, as well as by direct skin contact from handling.[1]

Glass is a noncrystalline silicate and contains no free silica. Since fibrous glass munufacture began between 1920 and 1930, no evidence of pneumoconiosis has been found. Fibrous glass has been shown to produce irritation of the upper respiratory tract. Good local exhaust and general ventilation should, however, be provided where substantial quantities of dust are generated.

"Skin irritations are the major health problem of fibrous glass handling. Many of these are due to the associated resins, but comment here is restricted to the effects of glass fibers. Most people handling glass fiber for the first time or after temporary absence suffer from transient irritation of the exposed parts of skin. It usually passes off within a few days when hardening has taken place. If symptoms are severe or hardening is not established within 3 weeks, medical advice is necessary."[2]

Toxicological data concerning long-term human exposure to fibrous glass is very limited and nonconclusive. Recent animal studies in which small diameter glass fibers were introduced into the pleural cavity of rats have shown these fibers to be carcinogenic. A retrospective mortality study[4] conducted by the National Institute for Occupational Safety and Health (NIOSH) among a large cohort (1448 white males) of fibrous glass production workers followed from 1940 to 1969 did not reveal any excess risk of malignant lung disease. However, this study did demonstrate a significantly increased risk of nonmalignant respiratory disease (excluding influenza and pneumonia). In addition, a case-control study of the respiratory disease cases (malignant and nonmalignant) detected during this study demonstrated an association of borderline significance between respiratory disease and worker employment in pilot plant operations, some of which had produced small diameter glass fibers (1-3 micrometers) during the period 1941 through 1949.

VI. EVALUATION RESULTS

The evaluation on this survey consisted of visual observation of the manufacturing operations involved and personal interviews with all manufacturing employees on the day shift. A threshold limit value of 10 mg/M^3 is recommended for fibrous glass of respirable size (less than 5 to 7μ in diameter) by the Threshold Limit Value Committee(ACGIH), and is listed as a nuisance particulate. Past experience has indicated that this airborne concentration of fibrous glass would be quite visible.[3]

As reported in the previous section of this report, "Description of the Process," there was little visual evidence of fibrous glass contamination in the specific areas of heandling the mat or cutting or shearing the fibrous glass reinforced, resin construction-insulation board.

Fibrous glass could be expected to pose a problem at the "distribution head," width saws and resaw operations. However, very little accumulation of spicules were noted at the distribution head; the width saws are adequately ventilated (little or no visible accumulation of saw kerf material); saw kerf material was evident at the (M-J) resaw operation, indicating less than adequate collection (hooding too far from saw blades).

Personal interviews of manufacturing workers, of a nondirected nature, uncovered no complaints concerning fiberglass. When an inquiry was made relative to production rate, the workers indicated a normal rate was being maintained. Observation indicated a steady flow of material through the manufacturing process during the investigation.

VII. CONCLUSIONS AND RECOMMENDATIONS

It is concluded that no health hazard existed among the manufacturing employees of the Celotex Corporation during the manufacture of a fiberglass-reinforced, resin-type construction-insulation board. In view of the fact that no employees reported a health problem associated with fiberglass (and observations supported this fact), no health hazard is deemed to exist.

However, in view of the findings of the NIOSH mortality study, it is recommended that exposure to airborne glass fibers be kept at an absolute minimum, especially when long term exposures are expected. In this regard exhaust ventilation hooding at the resaw (M-J) operations should be improved.

VIII. REFERENCE

[1]Documentation of the Threshold Limit Values for Substances in Workroom Air, American Conference of Governmental Industrial Hygienists, Third Edition, 1971.

[2]Encyclopedia of Occupational Health and Safety, ILO, McGraw-Hill Book Co., New York, 1972, P. 612.

[3]Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment with Intended Changes for 1975.

[4]Mortality Patterns among Fibrous Glass Production Workers, D.L. Bayliss, et.al. Paper presented at N. Y. Academy of Science, March, 1975.

IX. AUTHORSHIP AND ACKNOWLEDGMENTS

Report Prepared by:

Charles H. Borcherding, Jr.
Regional Industrial Hygienist, Region V
Chicago, Illinois 60606

Originating Office:

Jerome P. Flesch
Chief, Hazard Evaluation Services Branch
Cincinnati, Ohio 45202