110-15

WALK-THRU SURVEY REPORT

OF THE

HAMMOND LEAD PRODUCTS, INC.
LEAD PIGMENTS AND CHEMICALS

AT

HAMMOND, INDIANA

Survey Conducted By:

Thomas C. Cooper
Frank W. Godbey

Date of Survey:
April 28, 1982

Report Written By:
Thomas C. Cooper

Date of Report:
June, 1982

Mining and Minerals Section
Engineering Control Technology Branch
Division of Physical Sciences and Engineering
National Institute for Occupational Safety and Health

Cincinnati, Ohio

ABSTRACT

NIOSH studies have demonstrated a need to examine the packaging processes used for dry chemicals. A large number of workers in a variety of industries are involved in packaging processes. The monitoring, work practices, and personal protective equipment used by Hammond Lead Products, Inc. shows a potential for reducing the lead exposure to workers until improved engineering controls can be implemented. An in-depth study in the bagging area is a possibility.

Purpose of Survey: To perform a preliminary survey of the lead chemical bagging operations at Hammond Lead Products, Inc.

Employer Representatives: W. Peter Wilke IV, Vice President of Engineering Manufacturing; Lou Warren, Plant Manager; Ed Hedge, General Foreman of Maintenance; Earl Goldberg, Engineer; and Dennis J. Byron, Design Engineer from Halstab (a division of Hammond Lead Products, Inc.).

Employee Representatives: None

Standard Industrial Classification of Plant: SIC 2816

Analytical Work Performed by: None

I. INTRODUCTION

The Engineering Control Technology Branch of the Division of Physical Sciences and Engineering, NIOSH, is conducting a research study to assess and document the exemplary technology available for the control of airborne dust in dry chemical bagging and filling operations. The control technology studies will be described in sufficient detail to allow the information to be used to prevent or reduce the generation and transmission of the dust in similar industrial operations. The results of the assessment will be disseminated in a manner that will maximize the application of demonstrated control technologies in the workplace.

Hammond Lead Chemicals produces a variety of lead chemicals including litharge, red lead, and lead silicate. Some engineering controls exist at each of the three packer stations such as exhaust ventilation around each packer spout and an exhaust hood at the lead silicate bag weighing station. Hammond Lead has also developed a personal protective equipment program, work practices, and employee monitoring that appears to be very effective. This operation is considered to be a potential site for an indepth study.

II. PLANT DESCRIPTION

Hammond Lead Products, Inc. is located southeast of Chicago, Illinois in an industrial subdivision of Hammond, Indiana. The facility occupies 40,000 square feet and is located in several buildings on both sides of 165th Street. The two buildings of interest (those housing the bag packaging operations) are 52-year old metal structures and substructures with corrugated metal siding and concrete floors. These adjacent buildings are separated by a track where railroad box cars can load and off load. Neither of these buildings have basement.

This non-union operation produces a variety of lead chemicals, 85% of which are shipped in bulk. The remainder is shipped in approximately 25 different types and sizes of containers (bags, boxes, drums, semi-bulk containers, and tote bins). The area of primary interest in this survey was the three bag packaging operations for powdered lead chemicals.

The plant is limited for area and all three packer stations are located in cramped quarters. The lithrage and red lead operations are located in the one building and the lead silicate in the adjacent building. A total of 32 employees are involved in the bagging operations (one man at each packer and the remainder being supervisory or involved in related processes).

III. PROCESS DESCRIPTION

The company uses the Barton Process to produce the various lead chemicals. Lead, either as ingots or pigs, are melted in a Barton Kettle

at 800°F. Air is injected to agitate the molten lead and produce small particles. The finer particles are removed by exhaust ventilation and the heavier particles fall out yielding the various lead chemical products.

During our site visit, the company demonstrated the packaging of the powdered lead chemicals at their three packer stations. The products being packaged were lithrage (PbO), read lead (Pb_3O_4) and lead silicate ($PbSiO_3$). All three products are similar in character; average particle size of 3 to 5 microns, dry, and a density of 180 to 240 pounds per cubic foot. Each packer station is set up to package only one product (e.g., station 1 packages only lithrage, etc.).

The packers are similar in design, two of which were designed by and built for the company. The third packer, for lead silicate, was manufactured by Coddington Manufacturing Company in Pittsburgh, PA. The material from the main hopper drops through a slide gate into a weight packer hopper. These weigh hoppers are designed to keep the 50 pounds of product fluidized until it is fed into the bag. The manually operated packers are single spout auger-feed units designed to load the first 45 pounds rapidly and dribble feed the remaining 5 pounds into bags. The four ply bags, manufactured by St. Regis Company, are hand-tucked valve, reinforced paper bags (measuring approximately 1 ft x 1 1/2 ft. x 1/3 ft. when filled).

The manual bag filling and palletizing operations are similar at all three packer stations. The operator slides the bag onto a bag valve opener (a pipe the same size as the packer spout). The bag is removed, placed on the packer spout, and the next bag is placed on the bag valve opener. As the bag fills, its sides are tapped to help settle the contents. The filled bag is removed, set on a scale (for a weight check), and the next bag placed on the packer spout. The bag valve is hand tucked and the bag set on a pallet. Except for the lead silicate packer, these operations are in the open work area. At the lead silicate packer, the weigh scale is inside an exhaust hood. Valve hand tucking is performed at the face of the hood, thereby capturing the lead dust escaping from the bag during closure. When the packers are not in operation, an empty bag is left on the packer spout to capture any material that may escape.

The company also had two other bag packer stations for pelletized products as well as packer stations for drum filling. These areas were not observed.

IV. DESCRIPTION OF PROGRAMS

All employees are required to have pre-placement, periodic, and post-employment physicals. The employees are provided hard hats, safety glasses, respirators, safety shoes, and in some areas work clothes such

as cover-alls and disposable work gloves. The company has a written hands-on training program for new employees and for employees changing jobs. There are weekly safety meetings as well as monthly safety tours. Respirator fit test and maintenance is performed by the company. Blood samples are taken every two months on all employees unless the blood analysis exceeds 50 ug, then they are taken monthly. Housekeeping is done routinely in all areas, including rafters and tops of tanks.

V. SAMPLE DATA FROM PRELIMINARY PLANT SURVEY

No samples were taken during the survey.

VI. DESCRIPTION OF CONTROL STRATEGY FOR THE BAGGING OPERATIONS

With its present engineering controls in the bag packaging area, Hammond Lead Products cannot meet OSHA's 50 ug/m^3 lead standard. As a result, they have been under OSHA citation for nearly five years. However, the company has made an effort to protect the health of their employees through comprehensive programs in monitoring, work practices, and personal protective equipment. These programs appear to be effective while the engineering controls are effective to a lesser degree.

Monitoring is used not only on the ventilation system but also for the individual employees. Magnehelic gauges, checked two to three times daily, monitor the ventilation system. Both dust sampling (area and personal) and blood samples, but not urine samples, are routinely taken for lead analysis. Work practices are exemplary both in training and cleanup. On-hands training of all new employees and employees changing jobs within the company is considered to be very important. Written instructions are provided at the time of training as well as being posted in the work areas.

Cleanup involves both the work area and the individual. Wet washing and vacuum sweeping is routinely performed in the work areas. This includes cleaning of remote areas such as the tops of rafters and tanks. Also, each employee is required to change clothes and shower before leaving work.

General maintenance of equipment is performed on an as-needed basis.

Personal protective equipment for bag packaging operators includes coveralls, disposal work gloves, and a variety of respirators. Two types of respirators in use are; Racal "Airstream" are purifying helmet Type AH5 and disposable 3M dust-fume-mist mask. Respirator use is mandatory in posted areas and bag packaging operators can wear either the helmet, or the disposal mask, or both (most prefering the helmet). All respirators are fit-tested by the company. The disposal masks are worn a maximum of one day. The air-helmets are charged after each 8-hours of operation and their filtering systems tested daily.

The company has tested the effectiveness of the air-helmet in reducing lead exposures to the worker. Air samples, both from inside the helmet while being woren and outside of the helmet show an average reduction in lead exposures of 115 fold (the results of eight air samples between 12/14/79 and 2/05/80). The outside air averaged 570 ug/m^3 (ranging from 123 to 1104 ug/m^3) and the operator's breathing zone inside the helmet averaged 5 ug/m^3 (ranging from 3 to 9 ug/m^3).

The company has also been experimenting with communication systems for the operators wearing the air helmets. The goal is to obtain vocal communication without having to raise the visor. Presently, they have installed a microphone inside the helmet which is connected to a button activated speaker attached to the belt. The employee acceptance of the air helmet and speaker system has been very good. The one draw back to the air helmet is its use in the furnace area where hot air is recirculated.

VII CONCLUSIONS AND RECOMMENDATIONS

Even though the engineering controls for the packers may not be considered to be exemplary, the work practices, monitoring program, and the personal protective equipment would be considered exemplary. The company knows the problem areas and are working to correct them.