

PRELIMINARY SURVEY REPORT:
CONTROL TECHNOLOGY FOR MANUAL TRANSFER OF CHEMICAL POWDERS

AT

Porcelain Metals Corporation
Louisville, Kentucky

REPORT WRITTEN BY:
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NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
Division of Physical Sciences and Engineering
Engineering Control Technology Branch
4676 Columbia Parkway
Cincinnati, Ohio 45226

PLANT SURVEYED: Porcelain Metals Corporation
13th and Burnett Streets
Louisville, Kentucky 40210

SIC CODE: 3269

SURVEY DATE: May 23, 1984

SURVEY CONDUCTED BY: Frank W. Godbey

EMPLOYER REPRESENTATIVES CONTACTED: Floyd Williams, Manager of Enamel
Engineering, (502) 635-7421

EMPLOYEE REPRESENTATIVES CONTACTED: No Employee Representatives

I. INTRODUCTION

The National Institute for Occupational Safety and Health (NIOSH) is the primary Federal agency engaged in occupational safety and health research. Located in the Department of Health and Human Services (formerly DHEW), it was established by the Occupational Safety and Health Act of 1970. This legislation mandated NIOSH to conduct a number of research and education programs separate from the standard setting and enforcement functions carried out by the Occupational Safety and Health Administration (OSHA) in the Department of Labor. An important area of NIOSH research deals with methods for controlling occupational exposure to potential chemical and physical hazards. The Engineering Control Technology Branch (ECTB) of the Division of Physical Sciences and Engineering has been given the lead within NIOSH to study the engineering aspects of health hazard prevention and control.

Since 1976, ECTB has conducted a number of assessments of health hazard control technology on the basis of industry, common industrial process, or specific control techniques. Examples of these completed studies include the foundry industry; various chemical manufacturing or processing operations; spray painting; and the recirculation of exhaust air. The objective of each of these studies has been to document and evaluate effective control techniques for potential health hazards in the industry or process of interest, and to create a more general awareness of the need for or availability of an effective system of hazard control measures.

These studies involve a number of steps or phases. Initially, a series of walk-through surveys is conducted to select plants or processes with effective and potentially transferable control concepts or techniques. Next, in-depth surveys are conducted to determine both the control parameters and the effectiveness of these controls. The reports from these in-depth surveys are then used as a basis for preparing technical reports and journal articles on effective hazard control measures. Ultimately, the

information from these research activities builds the data base of publicly available information on hazard control techniques for use by health professionals who are responsible for preventing occupational illness and injury.

This plant was visited as part of a study of dust control during the manual handling of dry chemical powders and the manual transfer of those materials to some type of processing device, i.e., V-blender, Banbury mixer, etc. Ultimately, this project will result in a concise article describing dust control techniques during manual transfer of chemical powders.

II. PLANT AND PROCESS DESCRIPTION

PLANT DESCRIPTION

This locally owned facility consists of three one-story brick and concrete reinforced industrial buildings containing approximately 90,000 square feet of floor space. The plant employs 97 workers and operates one shift per day, five days a week, in the manufacture of porcelain and metal stampings.

PROCESS DESCRIPTION

The raw materials, in 50- and 100-pound bags, are brought to the weighing/milling area on pallets for temporary storage. The bags are opened, as needed, and dumped directly into a floor-level hopper where the material is discharged approximately five feet into a mill. Odd weights are dispensed by scoop into a pan for weighing. The weighed pan contents are then dumped into the hopper. The hopper is removed from the floor opening and the mill head attached. Water is added to the contents of the mill. After milling, the slurry mixture is pumped via hose to a storage tank for later use in the production process.

POTENTIAL HAZARDS

The major ingredients in the manufacture of porcelain is frit, silica, and clays.

III. CONTROLS

PRINCIPLES OF CONTROL

Occupational exposures can be controlled by the application of a number of well-known principles, including engineering measures, work practices, personal protection, and monitoring. These principles may be applied at or near the hazard source, to the general workplace environment, or at the point of occupational exposure to individuals. Controls applied at the source of the hazard, including engineering measures (material substitution, process/equipment modification, isolation or automation, local ventilation) and work practices, are generally the preferred and most effective means of control both in terms of occupational and environmental concerns. Controls which may be applied to hazards that have escaped into the workplace environment include dilution ventilation, dust suppression, and housekeeping. Control measures may also be applied near individual workers, including the use of remote control rooms, isolation booths, supplied-air cabs, work practices, and personal protective equipment.

In general, a system comprised of the above control measures is required to provide worker protection under normal operating conditions as well as under conditions of process upset, failure and/or maintenance. Process and workplace monitoring devices, personal exposure monitoring, and medical monitoring are important mechanisms for providing feedback concerning effectiveness of the controls in use. Ongoing monitoring and maintenance of controls to insure proper use and operating conditions, and the education and commitment of both workers and management to occupational health are also important ingredients of a complete, effective, and durable control system.

These principles of control apply to all situations, but their optimum application varies from case-to-case. The application of these principles are discussed below.

This porcelain manufacturing operation uses some general exhaust ventilation (two wall exhaust fans) to remove or dilute air contaminants generated during the processing of the dry materials. The ventilation designs do not appear to be based on the American Conference of Governmental Industrial Hygienist's Ventilation Manual.

WORK PRACTICES

Workers are encouraged to use good work practices. They are provided instruction when they start the job and receive updates and reinforcement as needed. Monthly inplant publications and health and safety posters are provided to encourage a sustained good work practices effort. A safety suggestion program provides additional motivation for this effort.

MONITORING

Employees are given preemployment physicals and annual hearing tests. The company's private insurance carrier performs periodic atmospheric dust sampling. A joint union/management safety committee meets monthly and inspects the plant.

PERSONAL PROTECTION

The company provides hearing protection, safety glasses, and hard hats for use throughout the plant and gloves and dust masks for use in specific areas or operations.

IV. CONCLUSIONS AND RECOMMENDATIONS

This plant represents a general type of manual batching operations and does not have sufficiently unique controls to warrant performing an in-depth study. Therefore, an indepth survey is not recommended.