PRELIMINARY SURVEY REPORT:

CONTROL TECHNOLOGY FOR MANUAL TRANSFER OF CHEMICAL POWDERS

AT

SCM Glidden Coatings and Resins
Division of SCM Corporation
Huron, Ohio

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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:	SCM Glidden Coatings and Resins 300 Sprowl Road Huron, Ohio 44839
SIC CODE:	2851 Paint Manufacturing
SURVEY DATE:	May 30, 1985
SURVEY CONDUCTED BY:	Frank W. Godbey and William A. Heitbrink
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EMPLOYEE REPRESENTATIVES CONTACTED:	No employee representative

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 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 facility, constructed in October, 1984, is a modern two-story, pre-engineered metal siding industrial building containing approximately 114,000 square feet of floor space. It is one of three company-operated plants located on this 110 acre site. Designed for flexibility in the manufacture of high-technology coatings, the plant produces high-solids, electrocoatings and other water-borne systems, as well as high-quality coil coatings. The products are used in the major home appliance, coil coating and metal fabricating industries and are shipped to these original equipment manufacturers in the Midwest area in 55 gallon drums or 5,000 gallon tanks.

PROCESS DESCRIPTION

The various high-technology coating products are made by mixing water and non-water soluble liquids and solid materials together to form a liquid material that has the solids thoroughly dispersed. Most of the liquids are pumped from bulk storage tanks through a completely enclosed piping/hose system into mixing tanks where the solids are added. Other liquids are added by mechanically emptying drums through an opened hatch on the top of the tank. The solid materials are manually added to the tank through the same opened hatch. This is accomplished by placing a portable platform fixture, part of which protrudes over the tank opening, on top of the tank and sliding an unopened paper bag across a foot-actuated slitting tool mounted in the fixture. This permits the solids to slide into the tank while the position of the bag over the solids helps to prevent the dust from escaping into the work atmosphere. As an additional precaution, the tank top is equipped with a side-slot low velocity local exhaust ventilation hood designed to capture any dust emissions. The top of the hood is also equipped with a high velocity bag disposal system. When the bag is empty, it is given a slight lift and released into the duct opening where it is carried by the excellent duct transport velocity to a bag compactor located outside the building. The bulk of the solid materials is delivered to the worksite by forklift trucks which place the pallets as close as practical to the mixing tank.

In the area of our primary interest, small batches are prepared in a Pigment Weigh Booth, equipped with local exhaust ventilation, and delivered to the worksite. The booth is approximately 4 feet wide, 8 feet long and 7 feet high. The scales are so placed in one end of the booth that the operator must position himself so that he faces the scales and the exhausted air is pulled across his face into slots on the side of the booth. Makeup air is provided through a slot near the scales on the opposite side of the room. The worker scoops small amounts of the dry solids from various containers and places them into a paper bag for weighing and transfer to the worksite.

POTENTIAL HAZARDS

The major dry ingredients in the area of interest are talc, clays, silica, titanium dioxide, calcium carbonate, chromates and lead.

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 good 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 means for providing feedback concerning effectiveness of the controls in use. Ongoing monitoring and maintenance of controls to ensure 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.

ENGINEERING CONTROLS

This original equipment market coatings manufacturing operation uses local and general exhaust ventilation to remove or dilute potential air contaminants generated during batching, loading and mixing operations. Specifically, the pre-batch area is equipped with a local exhaust ventilation hood; the mixing tanks are equipped with a combination local exhaust ventilation hood/bag disposal system; and other strategic locations throughout the manufacturing area are equipped with local exhaust ventilation/dilution systems.

The ventilation systems designs appear to be based on the American Conference of Governmental Industrial Hygienists Ventilation Manual. Additionally, they appear to be properly operated and well-maintained.

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. Incentive programs, such as an all-salaried workforce, are used to maintain a high level of motivation.

Monitoring

Employees are given pre-employment physicals and periodic medical examinations once hired. The Company's industrial hygiene staff and safety coordinator perform periodic atmospheric dust sampling.

Personal Protection

The only personal protective equipment required throughout the manufacturing area is safety glasses with sideshields. Since airborne dust levels are generally low (company sampling data indicates 20% of the Threshold Limit Value for sampled dusts), respirator use is not required. However, NIOSH/MSHA-approved dust masks are provided to workers who desire to use them.

IV. CONCLUSIONS AND RECOMMENDATIONS

This highly automated plant appeared to be a well-designed, well-operated coatings manufacturing operation marked by a good housekeeping program with ventilation and bag disposal systems. We recommend that an in-depth evaluation be conducted of the controls (ventilation, room design, layout, work practices) associated with the Pigment Weigh Booth.