

WALK-THROUGH SURVEY REPORT:

HVLV CONTROL TECHNOLOGY FOR AUTO BODY SHOP SANDING AT:

Kay Parks Autobody Rebuild Inc.
Tacoma, Washington

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: Kay Parks Autobody Rebuild Inc.
3102 South 12th
Tacoma, Washington 98405

SIC CODE: 7531 (Auto Body Shop)

SURVEY DATE: June 9, 1983

SURVEY CONDUCTED BY: Bruce A. Hollett, C.I.H., P.E.

EMPLOYER REPRESENTATIVES CONTACTED: Mr. Kay Parks, Owner
(206) 272-0512

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. When the perceived need for research requires further definition, a pilot study is undertaken to assess the need for bench research and/or validation of existing capabilities. If it is determined that field studies are needed, 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.

The objective of this pilot study is to determine the state-of-the-art of High Velocity Low Volume (HVLV) technology and to what extent it has been successfully applied in various industries. It will provide an assessment of the need for research and/or validation of existing capabilities and their potential for transfer to other industries. The purpose of this visit was to explore the potential for use of this technology in the Auto Body rebuilding industry.

II. PLANT AND PROCESS DESCRIPTION

Plant Description:

The shop was started in 1946, however, they moved to their present location only twelve years ago. The Hutchins HVLV tools have been used in this shop under an agreement to test prototype systems for many years. Then 5 years ago, a central vacuum system for the HVLV tools was installed. The shop normally employs 12 or 13 people.

Process Description:

The shop provides major and minor auto body repairs. It includes a ventilated spray painting enclosure. Typical work includes the sanding of plastic fillers and primer coats. Both of these activities generate a good deal of dust.

Potential Hazards:

Hazards include dust from the sanding and fumes from the paints and thinners. Due to the close proximity of these various tasks, it is likely that workers share a common exposure to most of these contaminants.

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 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 in the auto body rebuilding process is discussed below.

Engineering Controls:

Mr. Parks has pioneered in the application of HVLV to the auto body shop. He has installed a component system which accommodates the needs of a small business at a reasonable cost. The vacuum is provided by a heavy duty, 10 Hp, 3450 rpm turbine. This turbine is rated at 500 CFM @ 5.4" of mercury. He recommends straight self-cleaning turbine blades for handling the plastic resin dust. There is an indicator light positioned high on the wall so that workers are able to verify that the system is operating properly.

The dust collection system includes a separator fabricated from two 50-gallon drums located ahead of the turbine and a final stage bag collector to remove the finer dust prior to discharge. The main and branch ducts are made of 4" and 3" plastic pipe. The pipes can be purged of settled debris by removing the end plugs from each branch individually, thus allowing a surge to clean the lines. The 16 ceiling drops are distributed so that they are accessible from any part of the shop floor.

A unique hose retractor design adds greatly to the convenience of the system. The twenty foot lengths of flexible hose are retracted overhead by counter weights built into the vertical system support posts hung from the ceiling. The retracting cords are fastened to the midsection of each hose with a spring clip so that they can be detached for full extension of the hose if desired. When working at intermediate distances the cord is pulled to the length required to provide sufficient hose and locked into place by a toothed cord pincher which operates somewhat similar to those used on venetian blinds.

Work Practices:

The employees were observed using the vacuum system for various housekeeping tasks as well as HVLV sanders. The system is reported to greatly reduce the general dustiness. It is common practice in body shops to clean a panel to be worked on or painted by blowing it off with compressed air. The new system has eliminated resuspension of dust by using a vacuum sweeper attachment to clean the parts.

Monitoring:

Mr. Parks has not done any dust monitoring. He observes that his facility is cleaner than most and he is not aware of any other body shops who have measured their dust levels.

Personal Protection:

Workers typically wear coveralls and caps when doing dirty work. They are provided disposable 3M face masks for dust protection and spray paint cartridge respirators are used in the paint booth.

Other Unique Practices:

Mr. Parks has designed and built two punch machines to prepunch the sanding disks and rectangles for the Hutchins tools.

Mr. Parks has tested many of the original sanders for Hutchins. He pointed out some larger prototype models which he modified by adding a second handle. Hutchins subsequently provided similar handles on their production models.

Other Observations:

This facility has been visited by numerous prospective HVLV users. It was featured in the trade magazine "Automotive Body Repair News, October 1978." Mr. Parks has also traveled to Europe to observe their auto body shops. He has exchanged information and visits with a Swedish firm "Folksom Auto." This insurance company owns and operates its own repair shop. They have studied the auto repair business and have an exceptionally well developed dust control system among other advanced operating methods. They pride themselves on "building the workshop around the workmen."

During this visit, a video tape was made of this facility and a demonstration of the plastic dust collection efficiency. There was a remarkable visible difference with and without the HVLV vacuum hose attached.

Mr. Parks has been consulting with Hutchins regarding marketing of a prefabricated kit for installation of shop systems similar to his. He feels that many small shops are prevented from using HVLV tools because of the cost of design and installation of the system.

Conclusions and Recommendations:

The innovative system developed by Mr. Parks should provide valuable information to other small business who could benefit from using a HVLV control system.

If an in-depth study of HVLV were undertaken, this facility should be considered as a possible survey location. Should the travel to Sweden be approved in conjunction with the asbestos removal project, it would be worthwhile to include a visit to the Folksom facility.