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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45202

HEALTH HAZARD EVALUATION DETERMINATION REPORT NO. 73-131-196

ELECTRO-MOTIVE DIVISION, PLANT 1
GENERAL MOTORS CORPORATION
LA GRANGE, ILLINOIS
MAY 1975

I. TOXICITY DETERMINATION

It has been determined that obnoxious odors generated by bacterial breakdown of soluble oil used as a coolant in the Head Line, the Piston Line, and the Liner Line, Fabrication Department, Building 100, at Electro-Motive Division, Plant 1, La Grange, Illinois were not toxic to employees at the time of this evaluation. However, such odors may cause nausea, which could interfere with the employees' normal work functions. This determination is based on interviews conducted with employees, the frequency and duration of exposure, a review of available technical literature, and review of company records.

It has also been determined that inhalation of dust from a polyester resin body filler, used in the welding and spraying area, Building 100, Bay 2, was not toxic to employees at the time of this evaluation since removal of dust by compressed air was not observed during the survey. However, since some workers complained of symptoms during such a procedure and since considerable amounts of dust can be put in the air by this practice it is possible that a potentially hazardous situation may exist during the time dust is being removed by compressed air. For this reason and because this type of procedure is an unacceptable practice, it should be discontinued. Care should also be taken to avoid accumulation of body filler dust on the floors. This determination is based on observation of the work area, interviews conducted with employees, literature, and a review of chemical information supplied by the company.

II. DISTRIBUTION

Copies of this Determination 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) Electro-Motive Division, GMC, La Grange, Illinois
- (B) Authorized Representative of Employees
- (C) U.S. Department of Labor - Region V - Chicago, Illinois
- (D) NIOSH - Region V - Chicago, Illinois

For the purpose of informing the 49 affected employees in the welding and spray-painting area, Bay 2, and the 125 affected employees in the Fabrication Division, Building 100, the employer will "post" the Determination Report in a prominent place(s) near where affected 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.C. 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 substance 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 received two such requests from an authorized representative of employees regarding employee exposure to (1) obnoxious odors emanating from cooling oil used in the machining of diesel engine pistons, heads, and liners, and (2) plastic body filler dust generated during the welding, spray-painting, and finishing of locomotive hoods.

IV. HEALTH HAZARD EVALUATION

A. Plant Process - Conditions of Use

Electro-Motive Division, Plant 1, La Grange, fabricates and assembles diesel locomotives. In the Fabrication Department, Building 100, machining of diesel engine pistons, heads, and liners is performed. A series of machines, each programmed to do a certain machining operation, accomplishes the machining of the pistons, heads, and liners. The process is completely automated, with the operators controlling individual machining operations via a console. The coolant is circulated to each machine via a "closed loop" system. After the coolant cools and lubricates the machine tool, it falls to a drain where it is carried to an oil filter located at the end of the head line. All lines use the same coolant which is cycled through the filter; after being filtered, the oil is recirculated to the machine. Approximately 125 people are involved in the operation of the three lines over a 2-shift period. This group is made up of 110 machine operators, 5 sweepers, 4 packagers, and 6 stockmen.

All of the employees in the aforementioned groups would have a potential to be exposed to obnoxious odors generated by coolant breakdown, which might occur after a weekend or other extended period of non-use.

Another exposure of concern is skin contact with the coolant while inspecting work pieces or by splashing of oil. For the machine operators, contact

with the coolant is an intermittent 8-hour exposure, with the type of contact ranging from a few drops (splashing) to considerable skin contact, especially on the hands (inspecting work pieces). The other aforementioned groups (sweepers, packager, and stockmen) would come into occasional contact with the coolant as a result of handling oil-filmed work pieces, or splashing of coolant when passing the machining area.

In Building 100, Bay 2, diesel engine hoods are assembled. Fifty employees are involved in the above operations, being comprised of 30 assembler-fitters, 15 welders, and 5 sander-painters. In this Bay, diesel engine hoods are welded, and the weldments are ground to remove rough burrs. The plastic body filler, which is used in small quantities, is applied as a finishing technique to smooth surface irregularities, allowed to set, and sanded to a smooth finish. The hood is then spray-painted. Local ventilation is provided for the spray paint operation.

The sanding of the body filler results in generation of dust, which, dependent upon air currents in the area, employee work practices, and amount of sanding, can be inhaled by any or all employees in Building 100, Bay 2. General dilution ventilation prevails in this area.

The 4 sander-painters have primary exposure to the body filler dust. Exposure to the dust would be less than 8 hours per day in that the sanding operation is not continuous. The sander-painters wore protective clothing and respirators at the time of this evaluation.

The 15 welders have secondary exposure to the filler dust. Exposure of this group to the filler dust results from a combination of sander-painter work practice and air currents in the welding area. Exposure to the dust would be less than 8 hours per day since the sanding operation is not continuous. No respiratory protector was observed to be worn by the welders at the time of this evaluation.

All assembler-fitters, except for 4 or 5 who assist the sander-painter, are not in "close proximity" to the sanding operation, and would have low exposure, if any, to the body filler dust. Again, exposure, if any, would be conditioned on sander-painter work practice and air currents in the area.

B. Evaluation Progress

On January 31, 1974, NIOSH representatives conducted an observational survey of the areas in question. Pertinent information was obtained from the employer regarding plant processes. Affected employees were interviewed and work procedures observed.

In the Fabrication Department, Building 100, the High Volume Line, the Head

Line, the Piston Line, and Liner Line operations were observed, and interviews were conducted with 8 employees, chosen at random at various locations throughout the 3 lines, regarding obnoxious odors generated by the coolant, and also skin contact with the coolant.

In Building 100, Bay 2, work procedures used in welding and spray-painting of locomotive engine hoods were observed, and interviews were conducted with 4 employees regarding exposure to plastic body filler dust.

C. Evaluation Criteria

The coolant used in Fabrication Department 100 is a soluble oil, consisting of a base oil, several stabilizers, a detergent and water.

Bacteria in lubricating coolants, some coming from human contamination, some from air and water, may contribute to the breakdown of the coolant. The rancid odor, which usually accompanies coolant breakdown, can be extremely obnoxious, and, depending on intensity and personal susceptibility, can cause nausea in some workers. Nausea, per se, is not normally considered to be an occupational disease. However, it may affect the employees' work efficiency.

The belief that bacteria present in cutting fluid are an important cause of skin disease has no basis in fact. Certain areas of the skin structure are periodically contaminated by pathogenic staphylococci (a disease-causing organism), and although they may survive for long periods, they do not multiply or cause infection on undamaged normal skin. In particular, the soluble oil emulsions, which frequently contain bacteria, are rarely associated with bacterial infections of the skin.¹

The chief type of skin disorder resulting from contact with soluble cutting oils and synthetic coolants is primary irritation contact dermatitis, which produces skin inflammation at the point of contact. Redness, scaling,² cracking, and thickening of skin accompany this type of irritation.

The plastic body filler is comprised of a talc-polyester resin and benzoyl peroxide catalyst. Polyester resins are noted for their ability to cause dermatitis upon skin contact.³ Principle effects of the benzoyl peroxide catalyst are also related to irritation and sensitization upon contact with the skin.⁴

D. Evaluation Results and Discussion

Interviews were held with 8 employees in the Fabrication Department, Building 100, chosen at random throughout the 3 lines and maintenance areas,

regarding exposure to obnoxious odors from the coolant and skin contact with the coolant.

Employee response to a question regarding intensity and/or adverse effects of obnoxious odors is subject to personal susceptibility and opinion. Therefore, to each of the employees interviewed, the question was asked, "Do you have any health problems that you feel might be related to your work?"

One of the 8 employees interviewed felt that the coolant was responsible for producing skin cracks and itching.

Six of the 8 employees interviewed stated that they had no health problems due to employment.

All employees interviewed made no mention of the obnoxious odors when asked the above question.

The plant safety director stated that sometime prior to the date of this evaluation, rancid odors emanating from the coolant were detected upon entry into the Fabrication Department on a Monday morning. This was due to the fact that the cooling oil had not been flushed through the filtering mechanism at the end of the previous Friday's workday, leaving much unfiltered oil in the oil trough below the machines. According to the safety director, this was not a common occurrence.

Company records examined showed a continuous monitoring program for the coolant. The coolant is checked daily and the coolant pH, percent total oil, bacteria reading is recorded. Additions of coolant and bactericide are also recorded.

In prevention of skin problems associated with the use of cutting oils, there is no substitute for personal cleanliness. Personal cleanliness can be achieved by (a) adequate cleansing of skin, (b) use of tight-fitting sleeve gauntlets, rubber or plastic aprons and (c) protective barrier creams. Clothing should not be allowed to become saturated with oil, and should be laundered after each day's wear. External splash guards or other machine parts which come into contact with clothing or skin should be cleaned frequently and wiped free of oil. If irritant dermatitis should persist even after protective measures, prompt medical attention should be obtained.

Interviews were also held with 4 welders in the welding and spray-painting areas of Building 100, Bay 2. Two of the 4 interviewed indicated that they sometimes experienced coughing during the day and felt that it was brought

about by welding fumes and plastic body filler dust. One of the aforementioned was a welder, and the other was a fitter who assisted the welders and spray-painters. Two of the employees interviewed said they experienced no problems.

At the time of this evaluation, airborne plastic body filler dust was not observed in the areas in question. However, traces of "dust" were observed on the floor.

The inhalation by the welders of plastic body filler dust arises from work practices by the spray-painters (blowing off body filler grindings with an air hose; which, under the influence of air currents, drifts over to the welding area). Two employees interviewed and the union representative stated that such practice was, at times, observed.

Alleviation of this potential health hazard is best accomplished via good work practice. The blowing off of body filler dust with an air hose should be strictly forbidden. Care should be taken to avoid accumulation of body filler dust on the floors in the areas in question - as this dust can be stirred up by air currents, thus creating a potential health hazard.

Consideration by the employer should be given to installation of a local ventilation system for the grinders. An effective local ventilation system for the grinders would reduce accumulation of body filler dust on the hoods (thus "deleting" the necessity to use the air hose to clean off surfaces), reduce accumulation of dust on the floor, and, most important, reduce exposure of dust to other employees in this area.

REFERENCES

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4. Fundamentals of Industrial Hygiene, National Safety Council, Chicago, P. 753.

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