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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. 73-124-127

SCHNADIG CORPORATION
CORNELIA, GEORGIA

MARCH 1974

I. TOXICITY DETERMINATION

Based upon information obtained during an environmental evaluation conducted in the Plastics Department on November 14, 1973, it has been determined that no health hazard exists from exposure to styrene or methylene chloride. A very minimal but potential hazard is considered to exist from exposure to petroleum distillate (naphtha) vapors. This is based not upon measured concentrations, but on the work practices in effect at the time of the evaluation. Methyl ethyl ketone peroxide (MEK peroxide) concentrations were not evaluated because a satisfactory analytical and sampling technique was not available. Therefore, the potential toxicity is difficult to access, but based upon employee interviews, if potential toxicity exists it must be low. These determinations were based on environmental measurements, conditions of use, employee interviews, and available literature on the toxicity of substances investigated.

It is recommended that the plant proceed with plans to remodel the hood at the mold waxing operation, and that the new mixer be installed as soon as possible to minimize employee exposure to these agents.

II. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this Determination Report are available upon request from the Hazard Evaluation Services Branch, NIOSH, U.S. Post Office Building, Room 508, 5th and Walnut Streets, Cincinnati, Ohio 45202. Copies have been sent to:

- a) Schnadig Corporation, Cornelia, Georgia
- b) Authorized Representative of Employees
- c) U.S. Department of Labor - Region IV
- d) NIOSH - Region IV

For the purpose of informing the Plastic Department employees, the employer will promptly "post" the Determination Report in a prominent place(s) near where exposed 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 (NIOSH) received such a request from the Schnadig Corporation regarding exposure to solvent vapors in the Plastic Department of the furniture mill, Schnadig Corporation, Cornelia, Georgia.

IV. HEALTH HAZARD EVALUATION

A. Conditions of Use

The Plastic Department produces decorative and structural furniture parts made of styrene polymer plastic. Molds are sprayed with a parting compound containing petroleum naphtha and then filled with styrene monomer and dimethyl phthalate stabilized MEK peroxide by the use of pouring nozzles. MEK peroxide is an excellent initiator for the polymerization of vinyl monomers and is particularly useful in the room temperature cure of polyester resins. In this application it imparts high exotherm characteristics to the cure. The nozzles are cleaned periodically with methylene chloride. After a few minutes of curing, the parts are broken from the molds and stacked in the area. The molds are subsequently returned to the waxing operation. The hood in use at the waxing operation at the time of the evaluation was inadequate to prevent spray mist and vapor from enveloping the head of the operator. The hood was much too open and the air flow was such that sprayed material was moved up through the operator's breathing zone. Gloves were not worn during the spray operation. No hoods were provided at the pouring operation, and excess styrene and methylene chloride were poured and stored in open containers convenient to the operators. Mixing was performed in open containers, however, a new completely enclosed mixer had just been delivered and was to be installed shortly. At the chemical storage area some spilled methylene chloride was observed on the floor. The Plastics Department operates two shifts with four men working the day-shift and three the night.

B. Evaluation Design and Methods

1. Vapor Air Sampling

Employee exposures to vapors were measured using personal air sampling equipment. Breathing zone and work area air samples were obtained using charcoal air sampling tubes. The charcoal tubes were returned to the Western Area Occupational Health Laboratory (WAOHL) in Salt Lake City, and analyzed by the Gas Chromatographic Method reported by White, et al.¹

2. Employee Interviews

Employees were asked non-directed and directed questions regarding work related and non-work related health problems. Information regarding their employment history was also collected.

C. Evaluation Criteria

The Occupational Health Standard promulgated by the U.S. Department of Labor, Federal Register, October 18, 1973, Title 29, Chapter XVII, Sub-Part G, Table G-1, for 8-hour time-weighted average exposures to petroleum distillate (naphtha) is 2000 mg/M³ of air, this level of exposure can be permitted in situations where the petroleum distillate (naphtha) is known to be free of aromatic substances like benzene, toluene, and xylene. In cases where these aromatics are present a lower level exposure is used depending upon the relative presence of benzene, toluene, and xylene, etc. The petroleum naphtha used at this plant is a "close cut" which is frequently designated as a technical grade containing predominately straight-chain composition, i.e., the aliphatic hydrocarbons.² Brulin and Company, Inc., the manufacturer of the parting compound called Perma-Mold, informed us that their specification calls for less than 7% aromatic hydrocarbons, but that the product as received from Ashland Chemical Company, contains strictly aliphatic hydrocarbons since the aromatics are sufficiently valuable to warrant a more or less complete separation. The airborne straight-chain hydrocarbon solvent vapors collected on charcoal tubes in this evaluation were identified using peak area integration techniques as petroleum distillate (naphtha) expressed in mg/M³. The Occupational Health Standard promulgated by the U.S. Department of Labor for styrene is 100 ppm and for methylene chloride 500 ppm. The American Council of Governmental Industrial Hygienists has proposed a Threshold Value for MEK peroxide of 0.2 ppm, a ceiling value. MEK peroxide is highly refined and is substantially free of hydrogen peroxide and methyl ethyl ketone. It is a strong irritant.

D. Evaluation Results

1. Vapor Air Sampling

Ten breathing zone samples were collected and analyzed for styrene and methylene chloride. Three breathing zone personal samples were collected and analyzed for petroleum naphtha. Three general area air samples were collected and analyzed for styrene and methylene chloride. Laboratory results for styrene and methylene chloride were reported in ppm's and for petroleum naphtha in mg/M³. All the data is tabulated in Table 1.

2. Employee Interviews

Of the six workers initially interviewed, none had any complaints of any health problems related to the working area in response to non-directed questioning. Only after it was asked if their eyes ever burned was a positive response given. Most of the men would say, "Oh yes, occasionally my eyes will burn", one of the employees said that only rarely did his eyes burn. We were told however, of a mold worker who developed a severe allergic rash. He was interviewed the following day and explained that on his first and only day of working in the Plastics Department he developed a severe itch and within a few hours had broken out in a rash very similar to that associated with poison ivy. His physician told him that he was allergic to some material in the Plastic Department. He is now working in another part of the plant and has had no further problems.

V. REFERENCES

1. White, W.D., et al: " A Convenient Optimized Method for the Analysis of Selected Vapors in the Industrial Atmosphere." Am. Ind. Hyg. Assoc. J., Volume 31, pp. 225-227. March-April, 1970.
2. American Industrial Hygiene Association, Hygiene Guide Series. Petroleum Naphtha.

VI. AUTHORSHIP AND ACKNOWLEDGMENTS

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TABLE 1

ENVIRONMENTAL AIR SAMPLING RESULTS

Position	Time		Styrene (ppm)		Concentration Methylene Chloride (ppm)		Petroleum Naphthalene (mg/M ³)	
	Sample (min.)	Total (hrs.)	Sample	Average	Sample	Average	Sample	Average
Mixer	78	4.6	25	11	37	21		
	101		8		23			
	96		3		6			
De-molder	11	0.2	13	13	21	21		
Mold Oper.	64	4.0	2	2	9	12		
	77		3		23			
	99		1		5			
De-molder	60	3.7	13	12	16	20		
	60		18		20			
	100		8		22			
General Area	97	4.6	4	2	19	25		
	85		2		31			
	95		1		26			
Mold Oper.	72	4.4					246	187
	90		187					
	99		145					