

ETHYL CORPORATION

INTER-OFFICE

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Address : BRP

From: J. D. Watts

Address : BRT/BRP

Subject: Paint Spray Booth Operation
Drumming Plant

Date : 10/20/75

Both fixed station and personal samples were collected in evaluating a paint spray booth operation. Some unsuspected airborne contaminants were found in the supply air system. Further evaluation of the potential problem is necessary.

At the request of management, a survey of the spray paint booth operation in the drumming plant was conducted. Stationary samples at the spray booth, drying exit, overhead ventilation duct, and a personal sample of the painter were collected. The samples represent the chemical components found during the actual times of painting and does not include break time away from the subject area. The fixed station samples were collected on activated charcoal at a sample rate of approximately 1.5 liters/min. while the personal samples were collected on SKC charcoal tubes at a sample rate of 75 cc/min. Both samples were analyzed by gas chromatography.

Description of Process

The actual painting process usually involves a two man operation. One employee rolls an empty 55 gallon drum up onto the booth platform while the other man is spray painting. The drum is coated with an industrial paint manufactured by the Mobil Chemical Company (MSDS attached). Once the drum is painted it is dried in a baking oven and then later utilized for antiknock fluid container purposes.

On the average, 200 drums can be painted during a shift which is now routinely done on the "A" shift only. An exhaust fan in the spray booth operates to remove contaminants from the worker's breathing zone and is exhausted on the roof.

Observations

During the times of sampling, the employees wore protective equipment to varying degrees. Some wore dual cartridge respirators and goggles, while others wore neither. The sampling results are shown in the appendix.

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A ventilation check (using Alnor Jr. velometer) of the spray booth on September 11 showed the booth not to be in accord with the generally accepted recommendations for ventilation requirements at the face of a hood (capture velocity). It is recommended that the capture velocity be from 100-125 ft/min. Measurements of 80-100 ft/min. were taken directly above the drum paint location and decreased to 50-75 ft/min at the worker's breathing zone level.

Discussion

The results showed that although several contaminants were found, the hydrocarbons in the paint application did not exceed the OSHA standards. The hazardous ingredients of the paint included a fast aliphatic naphtha, xylene, and mineral spirits. The highest xylene concentration found was the personal sample which indicated a level of 22.5 ppm, well below the legal standard of 100 ppm. Consequently, there seems to be no problem in association with the airborne contaminants generated from this operation.

However, on the days sampled, the supply air to the drumming plant was contaminated with excessive levels of organic lead₃ and vinyl chloride. An organic lead concentration of 0.138 mg/m³ was found on September 17 which exceeds the OSHA standard of 0.075 mg/m³. Although respiratory protection would not be a requirement for the application of the paint, it would seem to be necessary due to this finding.

The vinyl chloride levels exceeded 1.0 ppm and if this phenomenon is commonplace, then the implications of a medical surveillance program for these workers would be evident. Furthermore, the dual cartridge respirator can not be used as adequate protection for both organic lead and vinyl chloride. At levels above 1.0 ppm vinyl chloride, the employee has the option of wearing a full-face piece canister mask but after April 1, 1976 it will be a requirement.

Recommendations

In regard to the wearing of eye protection (goggles) during the actual paint application, the safety department will have to make the decision. In order to better define the magnitude of the problem, further evaluation is necessary. This might include a more detailed sampling scheme and/or ventilation survey of the drumming plant.



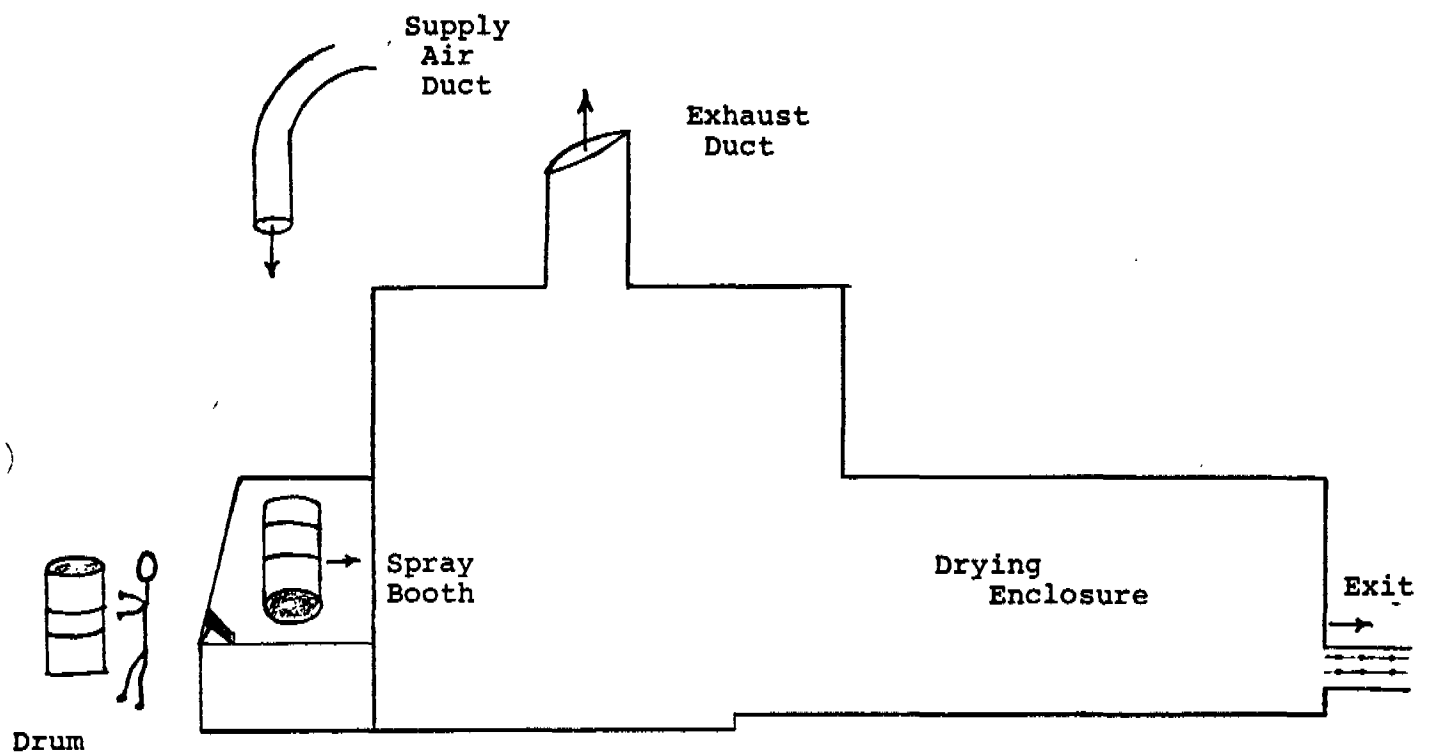
J. D. Watts
Industrial Hygienist

JDW:sp

cc: H. M. Taylor

Attachments.

Paint Spray Booth Diagram



Appendix

Sampling Results

Date	Component	TLV (ppm)	Air Duct	Spray Booth	Drying Exit	Personal Sample
8/28/75 PC, 90° E Wind	Benzene	10		0.08	0.03	0.78
	Chloroform	25			0.05	
	EDC	50		0.04	0.10	
	Ethyl Cl	1,000			0.03	
	Per	100		0.13	0.05	0.74
	Toluene	100	0.04	0.48	0.20	1.79
	1,1,1 Tri	350	0.03	0.14		0.92
	1,1,2 Tri	10		0.28		1.38
	Tri	100		0.21		0.93
	Unknown			x	x	x
	VCM	1	1.14	1.16	1.0	0.77
	Xylene	100	0.20	4.37	4.02	22.5
9/17/75 cloudy-PC, 80°, NE	EDC	50	0.03			
	Ethyl Cl	1,000	0.02			
	Methyl Cl	100	0.04			
	Per	100				0.16
	Toluene	100				0.32
	Tri	100	0.03			0.12
	VCM	1	1.39			1.61
	Xylene	100	0.05			3.77
9/17/75	Inorg Pb ^{mg/m³}	0.20		0.021		
	Org Pb	0.075		0.138		