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

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 75-115-225

FAIRBANKS WEIGHING DIVISION, COLT INDUSTRIES INCORPORATED
MERIDIAN, MISSISSIPPI
OCTOBER 1975

I. TOXICITY DETERMINATION

It has been determined that painters and painters' helpers are not exposed to toxic concentrations of paint and paint solvents (potentially toxic components of which are xylene, benzene, and lead) from the two airless spray paint operations conducted in the Fabrication Building and the one dip painting operation conducted in the "paint shed".

This determination is based on environmental evaluation conducted by NIOSH on June 17-19, 1975, lack of adverse medical symptomatology, and toxicity information on those substances of concern.

Recommendations to improve current work practices are incorporated within the body of this report.

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) Fairbanks Weighing Division, Colt Industries, Incorporated, Meridian, Mississippi and St. Johnsbury, Vermont.
b) U. S. Department of Labor - Region IV
c) NIOSH - Region IV

For the purpose of informing the approximately 6 "affected 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)(b) 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 such a request from the employer of the Fairbanks Weighing Division, Colt Industries Incorporated to evaluate painter' and painters' helpers' exposure to paint and paint solvent resulting from two airless spray paint operations conducted in the Fabrication Building and the dip painting operation conducted in the "paint shed". The request was prompted by management to determine environmental concentration associated with a newly introduced (to its Meridion plant) spray painting operations - airless spray painting.

IV. HEALTH HAZARD EVALUATION

A. Plant Processes - Conditions of Use

The Fairbanks Weighing Division, Colt Industries Incorporated, Meridian, Mississippi plant has been engaged in the manufacturing of heavy capacity scales since March of 1975. Prior to this, such scales were manufactured at another location.

Part of the operation includes painting scales or scale components. This painting occurs by either spray painting them in one of two designated areas in the Fabrication Building or by dipping them in a dip tank housed in the "paint shed".

The spray paint areas are located at opposite ends of the Fabrication Building, of which both ends are open. The Fabrication Building is 750 feet long, 75 feet wide and is approximately 40 feet high. The spray painting (conducted near the open ends of the building) is done without the use of mechanically forced ventilation.

There are two employees at each of these spray paint operations; a painter and a painter's helper. Only one respirator has been provided at each location. The respirator was worn by the person doing the painting. Painter and painter's helper rotated some, but the painter did the major portion of the painting.

The respirator provided for the east spray paint area was designed to filter out particulate matter and not organic vapors. Judging from the paint streaks near the painter's nose, the respirator also leaked. Those respirators provided at the other locations were approved for organic vapors.

During the first sampling day, the painter's helper at the east spray paint area was driving a fork lift truck and was not exposed to paint solvent. During the second sampling day, he was in the immediate spray paint area and tended to stand on the downward side of the spray painting.

Dip painting is conducted in a nearby building (30' X 60' X 12') identified as the "paint shed". Parts (levers) are individually dipped in a large rectangular tank located in the center of the building. This dipping is conducted with the aid of an electric winch since levers are quite heavy. After dipping, levers are elevated to the top of the tank and excess paint is permitted to run off.

The next step is to prepare the levers for stocking and later shipment. This consists of wiring in wooden wedges at specific points. This is done while the paint is partially wet.

A second tank along the north wall was provided with wooden slats in order to allow smaller parts to drip dry. On the second sampling day the painter's helper dipped small parts in a 5-gallon bucket of paint and stacked them on the indicated slats. Only the painter was present in this building on the first day.

During the evaluation, dip painting was conducted with the two large doors (at opposite ends) open, and a large wall fan operating the entire time. The large wall fan was located at the southeast corner of the building and an air inlet was located at the northwest corner.

Personal protective equipment in this area included cloth gloves made partially impermeable by dipping them in a plastic-like material and one respirator approved for organic vapors. This respirator was not worn during our presence. Painters and painters' helpers commonly removed paint from their skin by using the paint solvent (xylene).

B. Evaluation Design

The evaluation was conducted by NIOSH personnel on June 17-19, 1975 and proceeded as follows:

1) A brief meeting was held with an employee representative on the afternoon of the seventeenth; the purpose of this meeting was to obtain some background information on the Fairbanks Weighing Division, Colt Industries, Meridian, Mississippi plant.

2) Following the meeting, a walk-through survey of the areas of concern was conducted for the purpose of establishing a more definite sampling protocol.

3) The environmental evaluation was conducted on the eighteenth for one complete shift and half of a shift on the nineteenth.

4) In addition to this, employees in the areas of concern were privately questioned in regard to their work history and any adverse health symptomatology they may be experiencing at the time of the evaluation.

C. Evaluation Methods

Material safety data sheets for paint and paint solvents were obtained prior to the plant visit. From these data sheets it was determined that the solid materials contained in the paint are presently considered essentially inert in regard to their toxicity or else were present in very small quantities. Also, these data sheets identified the paint solvent as xylene. For this reason, the environmental air sampling was concentrated on sampling for xylene vapor. This was accomplished by collecting both breathing zone and area samples on charcoal tubes.

Workers' exposure to xylene vapors was determined by collecting two consecutive four hour samples over the eight hour shift; on the second day one four hour sample was collected. These samples were collected at a very low flow rate with the aid of a Sipin pump. Total volume for each sample was approximately 10 liters. Also, area samples were collected in each of the areas of concern. All of these charcoal tube samples were analyzed by gas chromatography after desorbing the charcoal with carbon disulfide.

Although the material safety data sheets did not list lead as one of the paint constituents, all paint containers were marked "contains lead". For this reason, a bulk sample of the paint presently used and the paint to be used were collected to determine lead content. A bulk sample of each solvent was also collected for the purpose of checking for benzene. Also, one breathing zone sample was collected in the east spray painting area to determine lead concentration (if present). This sample was collected on a AA Filter at 2 liters per minute and analyzed by Atomic Absorption as were the paint samples (bulks).

As part of the evaluation, employees in the areas of concern were interviewed in regard to their work history and medical history. This consisted of administering a non-directed questionnaire for the purpose of detecting any adverse symptomatology which is possibly attributed to employees' work environment.

D. Evaluation Criteria

a. Environmental Criteria

The three primary sources of environmental evaluation criteria considered in this report are (1) NIOSH Criteria documents recommending occupational health standards (2) American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV) and (3) Federal Occupational Health Standards promulgated by the U.S. Department of Labor (Federal Register, June 27, 1974, Vol. 39, No. 125; Title 29, Chapter XVIII, Part 1910, Subpart G, Tables G1 and G2). The recommended standards, threshold limit values, and federal standards for those substances of concern are listed below:

	NIOSH Recommended Standard	ACGIH Threshold Limit Value	OSHA Federal Standard
Lead[a]	0.15 mg/M^3*	0.15 mg/M^3	0.2 mg/M^3
Xylene[b]	100 ppm** 200 ppm	100 ppm - skin	100 ppm
Benzene[c]	10 ppm 25 ppm	10 ppm	10 ppm 25 ppm 50 ppm

* Milligrams of particulate per cubic meter of air
** Parts of vapor or gas per million parts of air by volume
Skin means skin absorption

a) In each case, the value is for an 8-hour time weighted average, 40-hour work week.
b) Both the ACGIH Threshold Limit Value and the OSHA Standard are for an 8-hour time weighted average, 40-hour work week. The NIOSH Recommended Standard is a time weighted average for up to a 10-hour work day, 40-hour work week; the second value given is a ceiling value for a 10 minute period.
c) NIOSH Recommended Standard and ACGIH Standard are for an 8-hour time weighted average, 40-hour work week. The OSHA Federal Standard is for an 8-hour time weighted average. The second value is an acceptable ceiling value and concentrations up to and including 25 ppm are permitted as long as the 8-hour time weighted average is not exceeded. The third value is an acceptable maximum peak (for 10 minutes) above the acceptable ceiling concentration for an 8-hour shift which means that concentrations between 25 and 50 ppm are permitted for 10 minutes only, provided the 8-hour time weighted average is not exceeded. Concentrations above 50 ppm are never permitted.

b. Physiological Effects

Lead: Some of the symptoms of lead poisoning, depending on degree, may include: loss of appetite, metallic taste in the mouth, constipation, anemia, pallor, malaise, weakness, insomnia, headache, nervous irritability, muscle and joint pains, fine tremors, encephalopathy.

Benzene: The most significant effect is from chronic intoxication. Benzene's action is primarily on the bone marrow, which results in numerous blood changes and, in serious cases, aplastic anemia. Benzene has a narcotic effect upon acute exposure.

Xylene: Excessive exposure to xylene may cause dermatitis, irritation of mucous membranes, nausea, vomiting, anorexia, and heartburn. Dizziness, incoordination and a staggering gait may also occur.

E. Evaluation Results and Discussion

Analysis of the paint samples (bulks) showed a very low lead content; 0.09% by weight for the paint currently being used and 0.18% by weight for the paint to be used in the future. Also, lead was not detected on the one breathing zone sample collected in the east spray paint area; detection limit for analysis by atomic absorption is 1.5 micrograms.

Paint solvent samples analyzed for benzene were found to contain small amounts; 1.2% for the solvent identified as xylene and 0.2% for the solvent identified by number only. For this reason, the charcoal tubes collected to determine exposure to organic vapors were analyzed for benzene as well as xylene. All samples collected were within acceptable levels (see Table I).

There was no significant evidence of acute or chronic intoxication brought out in the medical questionnaire. One employee reported occasionally sneezing during spray painting, a second reported occasional eye and nose irritation, and a third reported experiencing a mild headache the first two days he was in the paint area. No other symptoms were reported.

F. Recommendations

Although all environmental exposures were within acceptable limits, recommendations to improve work practices observed during the evaluation are as follows:

1) The current practice of issuing respirators is acceptable; however, this can be improved by issuing them to both the painter and the painter's helper. Also, all respirators should be approved for organic vapors, should contain a pre-filter to remove the paint pigment, and should be properly fitted.

2) The painter's helper should refrain from standing on the downward side of the spray painting operation as observed on the last day of the environmental evaluation.

3) The cloth gloves as presently used are not completely impermeable because of improper dipping in the plastic-like material. This impermeability can be adequately achieved by more fully submerging them.

4) The dip painting process as conducted now results in frequent contact with the paint. For this reason, the use of impermeable aprons and long sleeved garments is recommended.

5) The practice of mixing paint (by adding zinc to a base) as observed during the evaluation and reportedly done 2-3 times per year (upon request only) should be conducted with local exhaust present or else employee should wear approved respirator while doing this.

6) The practice of removing paint from the skin with the paint solvent should be discontinued.

V. REFERENCES

1. NIOSH, Occupational Exposure to Xylene, 1975.
2. NIOSH, Occupational Exposure to Benzene, 1974.
3. NIOSH, Occupational Exposure to Inorganic Lead, 1974.
4. ACGIH, Documentation of the Threshold Limit Values for Substances in Workroom Air, Third Edition, 1971.
5. Patty, F., Industrial Hygiene and Toxicology, Vol. II, 1963.

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