U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES ■ Public Health Service
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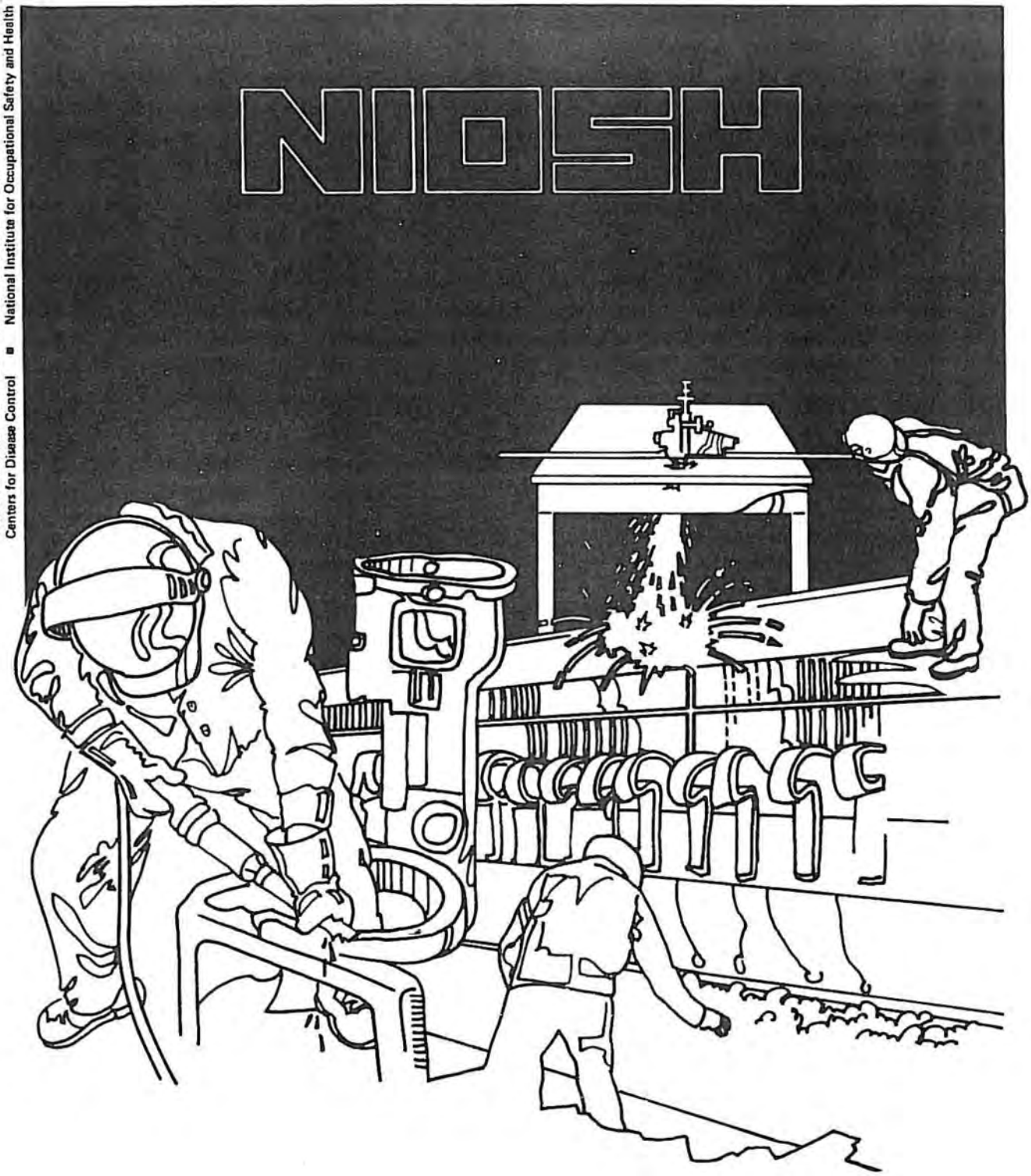
NIOSH



Health Hazard Evaluation Report

HETA 82-038-1127
FEDERAL AVIATION ADMINISTRATION
AIRWAYS FACILITIES SECTOR
FREMONT, CALIFORNIA

PREFACE

The Hazard Evaluations and Technical Assistance Branch of NIOSH conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from 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 Hazard Evaluations and Technical Assistance Branch also provides, upon request, medical, nursing, and industrial hygiene technical and consultative assistance (TA) to Federal, state, and local agencies; labor; industry and other groups or individuals to control occupational health hazards and to prevent related trauma and disease.

HETA 82-038-1127
JUNE, 1982
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NIOSH INVESTIGATORS:
Pierre L. Belanger, I.H.

I. SUMMARY

On October 20, 1981, the National Institute for Occupational Safety and Health (NIOSH) received a request for a health hazard evaluation from the Airways Facilities Sector Manager (Federal Aviation Administration) at the Fremont Facility. The manager was concerned that air traffic controllers using the teleprinter may be exposed to formaldehyde and methyl chloroform from the teleprinter paper. One worker who visited the Assistant Regional Flight Surgeon complained of eye irritation.

On November 23, 1981 NIOSH conducted an environmental survey of the air traffic control room where the teleprinters are used and the paper is stored. Six personal and area air samples were collected for formaldehyde, and six were collected for methyl chloroform. Neither of the contaminants was detected.

Eight controllers who work in proximity to the teleprinter were asked if they experienced any irritant symptoms due to the teleprinter paper. None of the workers expressed any health problems related to the teleprinter paper.

Based on the environmental air samples collected on the day of this survey, exposures to formaldehyde and methyl chloroform did not exist. Furthermore, workers did not express any irritant symptoms of exposure due to working in proximity to the teleprinter.

KEYWORDS: SIC 999 (Nonclassified) Teletypewriter/Teleprinter paper, formaldehyde, methyl chloroform.

II. INTRODUCTION

On October 20, 1981 the National Institute for Occupational Safety and Health (NIOSH) received a request for a health hazard evaluation from the Manager of the Airways Facility Sector (Federal Aviation Administration) located in Fremont, California. The manager requested NIOSH to determine whether workers are being exposed to airborne compounds (methyl chloroform and formaldehyde) found in the teletypewriter/teleprinter paper used at this facility.

On November 23, 1981 NIOSH conducted an environmental survey of the air traffic control room where the paper is used and stored. Environmental air samples were collected for formaldehyde and methyl chloroform, and these results were telephoned to the sector safety officer as soon as they were available.

III. BACKGROUND

The Airways Facility Sector has been at this facility for about 20 years. Approximately 225 employees work at the Facility which operates 24 hours a day, seven days a week.

In June 1981, the Assistant Regional Flight Surgeon saw a patient who complained of eye irritation and reported that the teleprinter paper was responsible for his symptoms. A qualitative analysis of the paper by the FAA, under laboratory conditions, revealed several contaminants were present: methyl chloroform, formaldehyde and several other unidentifiable chemicals. Consequently, NIOSH was requested to determine the potential health hazard exposure concentrations to the air traffic controllers.

Two teleprinters are used by the controller to monitor aircraft movement within specified sectors. The teleprinters peak workload periods, based on peak air traffic, is from about 10:00 a.m. to 2:00 p.m. (teleprinter at station OC-7) and 11:30 a.m. to 3:30 p.m. (teleprinter at station OC-3). A maximum of ten workers may be exposed to airborne contaminants.

IV. HAZARD EVALUATION DESIGN

A. Evaluation Criteria and Health Effects

Occupational exposure criteria have been developed to evaluate worker's exposure to chemical substances. Two sources of criteria were used to assess the workroom concentrations: (1) NIOSH Current Intelligence Bulletin No. 34 and Criteria for a Recommended Standard, and (2) Federal Occupational Safety and Health Administration (OSHA) Standards. These values represent concentrations to which it is believed that nearly all workers may be exposed for up to an eight-hour day, 40-hour work week throughout a working lifetime with out experiencing adverse health effects.

TABLE A

SUBSTANCE	PERMISSIBLE EXPOSURE LIMIT 8 HOUR TIME-WEIGHTED AVERAGE	CEILING VALUE
Methyl Chloroform (NIOSH)	200 ppm[a]	350 ppm (15 min)
Methyl Chloroform (FED-OSHA)	350 ppm	---
Formaldehyde (NIOSH)	---	Lowest Feasible limit
Formaldehyde (FED-OSHA)	3 ppm	10 ppm (30 min/8 hrs)

a - ppm = parts of a vapor or gas per million parts of air.

B. Environmental Monitoring

Environmental air sampling (personal and area) was conducted at the two teleprinter stations (oceanic control station #3 and #7) and at the paper storage area located in a corner of the control room. Six formaldehyde air samples were collected using a chromosorb 102 tube and a Sipin® vacuum pump operating at a flowrate of 50 cubic centimeters per minute (cc/min) for approximately 3.5 hours. Air samples wer analyzed using Physical and Chemical Analytical Method (P & CAM) 318. The analytical limit of detection was 3.5 micrograms per sample. Methyl chloroform air samples were collected using a charcoal tube and a vacuum pump operating at 50 cc/min for approximately 3.5 hours. Air samples were analyzed using P & CAM No. S-328. The analytical limit of detection was 0.01 milligrams per sample.

C. Toxicological Effect

1. Methyl Chloroform - This solvent (liquid and vapor) is irritating to the eyes on contact. Acute exposure cases may produce mild conjunctivitis but recovery is usually rapid. Repeated skin contact may produce dermatitis due to the solvents defattening properties. Methyl chloroform acts as a central nervous system depressant. Acute exposure symptoms include dizziness, incoordination, drowsiness and increased reaction time.

2. Formaldehyde is best known for its use by embalmers and morticians to perserve dead bodies and tissues. It has a sharp odor which can be smelled at very low levels (less than 1 ppm). At concentrations ranging from 0.1 to 5 ppm, formaldehyde makes the eyes burn, tearing may occur and general irritation of the upper respiratory passages. Low levels of

0.3 - 2.7 ppm have also been found to be irritating to a smaller number of people (3). Higher exposures (10 - 20 ppm) may produce coughing, tightening in the chest, palpitation of the heart.

Formaldehyde has induced a rare form of nasal cancer in two test animals as reported by the Chemical Industry, Institute of Toxicology. Formaldehyde has also been shown to be a mutagen in several test animals.

Based on these findings, NIOSH recommends that formaldehyde be handled in the workplace as a potential occupational carcinogen, and that work practices be employed to control occupational exposures to the lowest feasible limit.

V. RESULTS AND DISCUSSION

Six environmental air samples were collected for formaldehyde at both teleprinter stations and from the paper storage area, and no formaldehyde was detected. Six air samples were collected for methyl chloroform from the same locations, and no methyl chloroform was detected.

Eight air traffic controllers were asked if they experienced any irritant symptoms when they worked next to the teleprinter. None of the workers expressed any irritant symptoms.

Several workers indicated cigarette smoke was previously a problem (eye irritant), however, an electrostatic precipatator was installed several years earlier to control cigarette smoke and improve the general air quality.

VI. CONCLUSIONS

In conclusion, formaldehyde and methyl chloroform were not detected, and none of the employees working in proximity to the teleprinter experienced any irritant symptoms.

VII. REFERENCES

1. Formaldehyde; Evidence of Carcinogenicity, NIOSH Current Intelligence Bulletin, No. 34, April 15, 1981, DHHS (NIOSH) Publication No. 81-111.

2. Criteria for a Recommend Standard: Occupational Exposure to Methyl Chloroform, DHEW (NIOSH) Publication No. 76-184.

3. Occupational Diseases - A Guide to their Recognition, Rev Ed., June 1977 - DHEW (NIOSH) Publication No. 77-181.

VIII. AUTHORSHIP AND ACKNOWLEDGEMENTS

Report Prepared by: Pierre L. Belanger
Industrial Hygienist
NIOSH - Region IX
San Francisco, California

Analytical Support Service: Measurement Support Branch
NIOSH
Cincinnati, Ohio

Report Typed By: Nancy A. Luciano
Secretary/Typist
DPHS/NIOSH

IX. DISTRIBUTION AND AVAILABILITY OF REPORT

Copies of this report are currently available upon request from NIOSH, Division of Standards Development and Technology Transfer, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days, the report will be available through the National Technical Information Service (NTIS), 5285 Port Royal, Springfield, Virginia 22161. Information regarding its availability through NTIS can be obtained from NIOSH Publications Office at the Cincinnati address. Copies of this report have been sent to:

1. Federal Aviation Administration - Airways Facilities Sector
2. NIOSH, Region IX
3. OSHA, Region IX

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