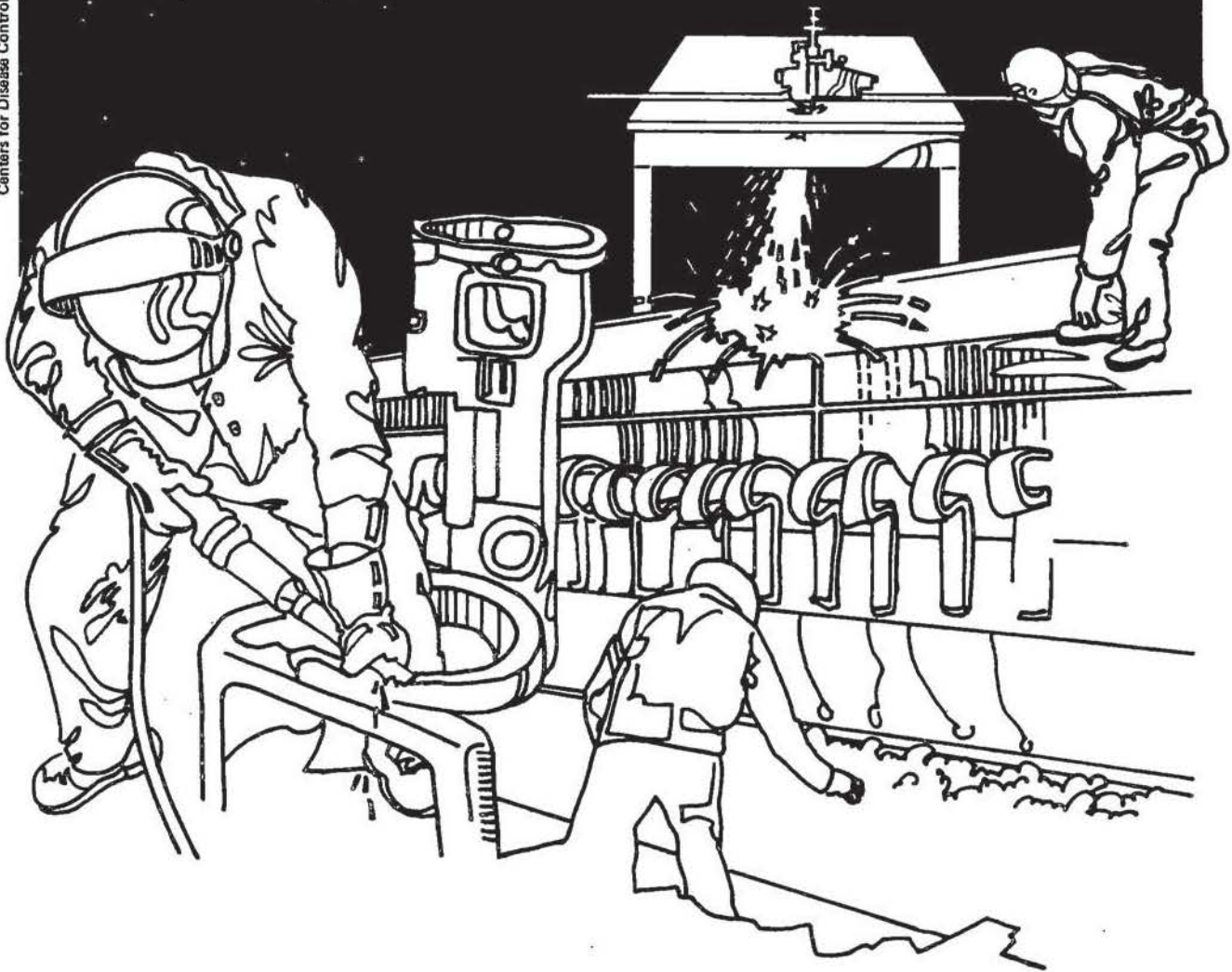


NIOSH



Health Hazard Evaluation Report

HETA 81-115-967
CF&I STEEL CORPORATION
PUEBLO, COLORADO

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.

Mention of company names or products does not constitute endorsement by the National Institute for Occupational Safety and Health.

HETA 81-115-967
OCTOBER 1981
CF&I STEEL CORPORATION
PUEBLO, COLORADO

NIOSH INVESTIGATORS:
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I. SUMMARY

In December 1980 the National Institute for Occupational Safety and Health (NIOSH) received a request from the United Steelworkers of America Local Union 2102 in Pueblo, Colorado, to evaluate the potential exposures to lime dust (calcium oxide or CaO) in the wire mill drawing room at CF&I Steel Corporation, Pueblo, Colorado.

An environmental survey was conducted on March 19, 1981. Breathing zone and general room air samples were taken on all workers that cared to participate. Approximately 50% of the total work population participated in the evaluation.

One of the ten air samples taken for total calcium oxide exceeded the Occupational Safety and Health Administration (OSHA) standard of 5.0 mg/M³. Seven of the ten total CaO samples exceeded the 1980 American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) of 2.0 mg/M³.

All workers who participated in this study were interviewed. The only consistent complaint was irritation of the nose and throat.

On the basis of the environmental data and personal interviews, NIOSH concluded that a potential health hazard existed from exposure to calcium oxide. Recommendations on work practices necessary to control these hazards are included in this report.

KEYWORDS: SIC 3315 (Blast Furnaces, Steel Works, and Rolling and Finishing Mills/Steel Wire Drawing and Steel Nails and Spikes), calcium oxide, lime dust, wire mill.

II. INTRODUCTION

NIOSH received a request from the United Steelworkers of America Local Union 2102 in Pueblo, Colorado, to determine if there was a health hazard from lime dust (calcium oxide or CaO) in the wire mill drawing room at CF&I Steel Corporation in Pueblo, Colorado. An environmental survey was conducted on March 19, 1981, to evaluate potential exposures. Environmental data was discussed with union and plant representatives in June 1981.

III. BACKGROUND

The wire mill drawing room department of CF&I Steel receives large coils of steel wire approximately one-quarter inch in diameter that have been coated with lime. The lime coating acts as a lubricant as the wire is drawn through stretchers to smaller diameters. Workers monitored during the evaluation were exposed to the lime dust along with other particulates that are removed from the wire during the drawing process. Plant management routinely vacuums dust throughout this department.

IV. ENVIRONMENTAL DESIGN AND METHODS

Calcium oxide samples were collected on preweighed 37 mm filters using vacuum pumps operated at 1.5 and 1.7 liters per minute and analyzed by total weight and x-ray diffraction.

Employees were interviewed with questions directed towards discomfort caused from the work place environment with special emphasis on nose and throat irritation.

V. EVALUATION CRITERIA

A. Environmental

Two sources of criteria used to assess the workroom concentrations of the chemicals were (1) recommended Threshold Limit Values (TLVs) and their supporting documentation as set forth by the American Conference of Governmental Industrial Hygienists (ACGIH), 1980, and (2) the Occupational Safety and Health Administration (OSHA) standards (29 CFR 1910.1000), July 1980.

	<u>Permissible Exposure Limits 8-Hour Time-Weighted Exposure Basis</u>
Calcium oxide.....	5.0 mg/M ³ (OSHA) 2.0 mg/M ³ (TLV)

mg/M³ = milligrams of substance per cubic meter of air.

Occupational health standards are established at levels designed to protect individuals occupationally exposed to toxic substances on an 8-hour per day, 40-hour per week basis over a normal working lifetime.

B. Toxicological

Calcium oxide is a white crystal used in steel manufacturing, in the manufacture of glass, and as a lubricant. CaO is an irritant of the eyes, mucous membranes, and skin. Its irritating effects are caused by its alkalinity. Inflammation of the respiratory tract, ulceration and perforation of the nasal septum, and pneumonia may be caused by inhalation of CaO dust. The severe and painful irritation of the upper respiratory tract cause a worker to avoid serious inhalation exposures.¹ When CaO comes into contact with moisture it forms calcium hydroxide, which is a strong irritant to the upper respiratory system.²

VI. ENVIRONMENTAL RESULTS

One of the ten air samples taken for total calcium oxide exceeded the Occupational Safety and Health Administration (OSHA) standard of 5.0 mg/M³. The 1980 American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) of 2.0 mg/M³ was exceeded on seven of the ten air samples for total CaO samples. One of the five respirable CaO samples was above the 1980 TLV of 2.0 mg/M³. Values ranged from 0.4 mg/M³ to 5.8 mg/M³. The results may be reviewed in Table 1.

VIII. RECOMMENDATIONS

1. No eating, drinking, smoking, or snuff usage should be allowed in the work area.
2. Every worker should shower before leaving work. Each worker should be provided with two lockers--one for street clothes and one for work clothes.
3. Periodic (once a year) medical examinations should be given to all employees in this area with emphasis given to the upper respiratory system.
4. Vacuuming of dust should be continued on a more regular basis.

IX. REFERENCES

1. Proctor, N.H. and Hughes, J.P. Chemical Hazards of the Workplace, J.P. Lippincott Company, Philadelphia, 1978, pp. 142-143.
2. Documentation of the Threshold Limit Values for Substances in Workroom Air, American Conference of Governmental Industrial Hygienists, Third Edition 1971, p. 36.

X. AUTHORSHIP AND ACKNOWLEDGMENTS

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XI. DISTRIBUTION AND AVAILABILITY

Copies of this report are currently available upon request from NIOSH, Division of Technical Services, Information Resources and Dissemination Section, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia. 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. CF&I Steel Corporation.
2. United Steelworkers of America.
3. United Steelworkers of America Local Union 2102.
4. U.S. Department of Labor/OSHA - Region VIII.
5. NIOSH - Region VIII.
6. Colorado State Department of Health.
7. State Designated Agency.

For the purpose of informing affected employees, a copy of this report shall be posted in a prominent place accessible to the employees for a period of 30 calendar days.

TABLE 1
Breathing Zone and General Room Air Concentrations of
Calcium Oxide

CF&I Steel Corporation
Pueblo, Colorado

March 19, 1981

Sample Number	Job Classification	Sampling Time	mg/M ³ Calcium Oxide
3783	Drawer	6:40 AM - 2:06 PM	4.9
3328	Forklift Driver	6:42 AM - 2:11 PM	0.8
3329	Laborer	6:41 AM - 2:05 PM	2.1
3347	Drawer	6:28 AM - 2:06 PM	2.6
3331	Laborer	7:02 AM - 2:04 PM	5.8
3790	Drawer	6:50 AM - 2:11 PM	2.1
3341	General Area	6:56 AM - 2:00 PM	0.9
3338	Drawer	6:50 AM - 2:07 PM	4.1
3349	Drawer	6:45 AM - 2:11 PM	2.8
3330	Baker Ram	6:18 AM - 1:52 PM	1.4
3784	Drawer	6:52 AM - 2:00 PM	1.1*
3348	General Room	6:45 AM - 2:10 PM	0.4*
3342	General Room	6:55 AM - 2:00 PM	0.4*
3346	Drawer	6:32 AM - 2:15 PM	2.4*
3345	Drawer	6:36 AM - 2:00 PM	0.7*

EVALUATION CRITERIA: OSHA Standard = 5.0 mg/M³
ACGIH TLV = 2.0 mg/M³

LABORATORY LIMIT OF DETECTION: 0.01 milligrams per sample

* = respirable particulate

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