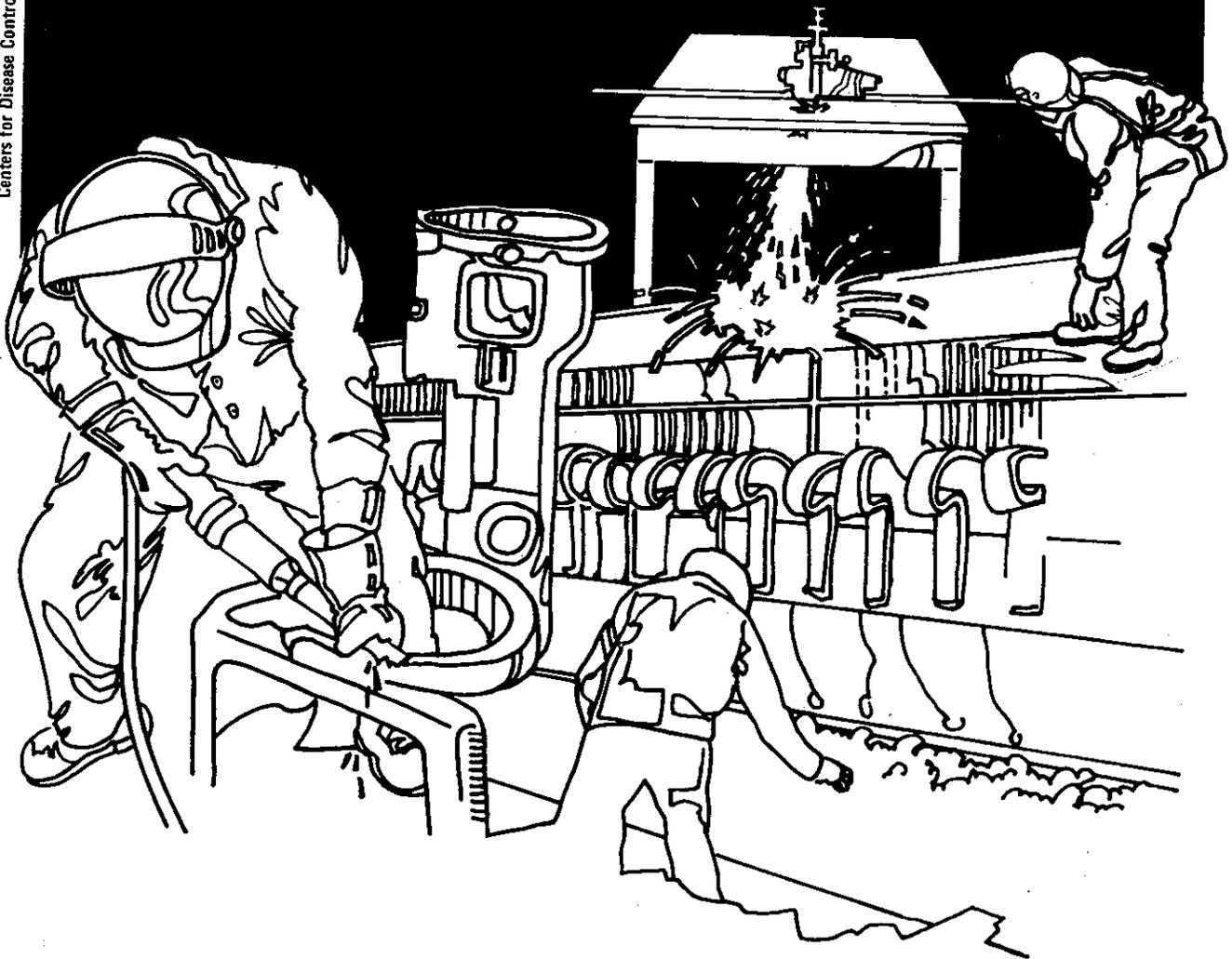


U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES ■ Public Health Service
Centers for Disease Control ■ National Institute for Occupational Safety and Health

NIOSH



Technical Assistance Report

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PREFACE

The Hazard Evaluations and Technical Assistance Branch of NIOSH 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.

TA 80-100 -792
JANUARY 1981
U. S. FOREST SERVICE
GASQUET, CALIFORNIA

NIOSH INVESTIGATORS:
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I. SUMMARY

In May 1980, the National Institute for Occupational Safety and Health (NIOSH) received a request for technical assistance from the U. S. Forest Service concerning the potential health hazard to private contractors and Forest Service personnel during road building operations in National Park lands. The request was prompted by the fact that roads can be built through serpentinite deposits which are the host rock for asbestos in California.

The typical road building operation requires about 10 employees who operate the rock crushing operation and build the Forest Service roads. The crushed rock (aggregate) is used on the roads. The roads are built by private companies, but the Forest Service has jurisdiction over the operations. Since there was a possibility that asbestos could be mixed in with the aggregate, the Forest Service wanted NIOSH to determine whether any airborne levels of asbestos was a potential health hazard.

Environmental samples were collected using personal sampling techniques during an actual rock crushing (quarry) operation. Only a small number of samples were collected because the private contractor refused to cooperate with NIOSH. Although the Forest Service has jurisdiction over National Park lands and awards contracts to private companies to build roads, the Forest Service did not enforce regulations concerning occupational health among its contractors. The survey was limited to one day: August 12, 1980.

Analysis of the personal samples for asbestos collected on the employees at the Blue Ridge quarry site indicated no exposure to asbestos. All samples were below the limit of detection for asbestos using phase contract microscopy counting techniques. Analysis of the one bulk sample of aggregate material indicated that no asbestos was present.

The environmental air sampling results at the rock crushing site at Blue Ridge indicated that overexposure to asbestos did not exist during the day and conditions of the NIOSH survey. A full evaluation of the potential asbestos exposures during road building operations was not completed due to the lack of cooperation by the contractors.

Because a more complete assessment of the occupational health problems of road building operations in Forest Service lands is advisable, recommendations were made to the U. S. Forest Service to assist them in future efforts.

KEYWORDS: SIC 1610 (Highway and Street Construction), serpentinite, asbestos, U. S. Forest Service, aggregate, road building.

II. INTRODUCTION

A request for technical assistance was submitted to NIOSH by the Regional Engineer for the U. S. Department of Agriculture Forest Service in San Francisco. The requestor wished NIOSH to determine whether asbestos fibers were a potential health hazard to private contract workers or Forest Service personnel who take part in the construction of Forest Service roads in National Forest lands in Northern California.

III. BACKGROUND

A. Work Area Description

The U. S. Forest Service has jurisdiction over certain areas of Northern California where both private logging companies and vacation visitors travel over roads that have been built by private contractors. In Forest Service lands, new logging roads are routinely built as the trees are felled. The Forest Service awards contracts to private construction companies to build these roads. Basically, these types of roads are carved out of the mountainside with heavy equipment. Along the road at some point, a quarry site is selected where rocks are crushed to a predetermined size (aggregate). The aggregate is spread on the freshly cut roads and serves as a base for the road. Either oil or asphalt is placed on the aggregate to complete the road. In Northern California, some of the rock formation that serves as a quarry may contain serpentinite deposits. Serpentinite is the host rock formation for asbestos mineral in California, and there can be some small amounts of asbestos at a quarry site. Since quarry sites change as roads are completed and since only small traces of asbestos may be in the serpentinite deposits, the presence or absence of asbestos at any given time cannot be predicted. Preliminary work for the Forest Service by the California State Department of Health indicated that asbestos could become airborne at times. The Forest Service indicated that concentrations of asbestos did not exceed the current OSHA Standard of 2.0 fibers per cubic centimeter of air (cc), but some samples showed concentrations above 0.1 fibers/cc (NIOSH's recommended criteria for airborne asbestos).

A standard road building crew consisted of quarry site workers and the road crew. At the quarry site, there was a bulldozer which was used to push rock and dirt into the crusher from the hillside and a front-end loader which was used to load the crushed aggregate into dump trucks. The crusher was operated by two workers. One person stands on the platform of the crusher and a helper works around the bottom of the crusher and near the conveyor belt. Water is used on the conveyor belt to keep the general dust levels down. The road crew consisted of four to six workers who operated dump trucks and road grading equipment.

B. Environmental Design

Personal and general area air samples were collected for asbestos using MSA Model G battery-operated pumps and AA mixed cellulose ester filters. Samples were collected at 1.5 liters per minute with open-face cassettes. Sampling times varied depending upon the dust levels in the work area. The cassettes were sent to NIOSH laboratories where the filters were counted for asbestos fibers.

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Supplementary Notes

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Abstract (Limit: 200 words)

Worker exposures to asbestos (1332214) were surveyed during road construction operations (SIC-1611) in National Forest lands in Northern California. The date of the survey was not reported. The survey was requested by the United States Department of Agriculture Forest Service in San Francisco. Approximately 10 workers were assigned to each road crew. Personal and area air samples were collected during rock crushing operations at Blue Ridge. No asbestos was detected in any of the samples; the OSHA standard for asbestos is 20 fibers per cubic centimeter with a ceiling concentration of 10 fibers per cubic centimeter. The author concludes that road construction workers in Northern California National Park lands probably are not exposed to an asbestos hazard, however he notes that sampling limitations precluded definite characterization of exposures. Additional sampling is recommended, along with noise exposure surveys and implementation of a hearing conservation program. The Forest Service should award grants to private contractors only when the contractors agree to abide by OSHA regulations regarding personal and area sampling.

Content Analysis - Descriptors

Hazards-unconfirmed, Asbestos-dusts, Construction-industry, Air-sampling, Noise-levels, Occupational-health

Intitlers/Open-Ended Terms

SATI Field/Group

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IV. EVALUATION CRITERIA

There are several criteria which can be used to evaluate the toxic air contaminants of an employee's work environment: (1) NIOSH Criteria Documents for a Recommended Occupational Health Standard, (2) Proposed and Recommended Threshold Limit Values (TLV's) as suggested by the American Conference of Governmental Industrial Hygienists, (3) The Federal OSHA Standards.

For the purposes of this evaluation, the NIOSH recommended limit of 0.1 fibers/cc based on a time-weighted average over a work shift or a ceiling concentration of 0.5 fibers/cc based on a 15-minute sample were used as an environmental criteria. The NIOSH recommended limit is more stringent than the OSHA Standard or CAL/OSHA Standard which are both 20 fibers/cc (TWA) and a ceiling concentration of 10.0 fibers/cc.

A. Toxicological Effects

Overexposure to asbestos fibers can cause asbestosis as well as other lung ailments. Asbestosis is a chronic lung ailment which can result in shortness of breath due to fibrotic changes and scarring of lung tissue. Usually there is a period of 10 to 35 years before this chronic lung ailment will become manifest. Other effects from inhalation of asbestos fibers are the asbestos-related neoplasms. A high incidence of lung cancer is associated with persons who are exposed to asbestos and smoke cigarettes. Additionally, mesothelioma (a cancer of the thin membranes which line the chest and abdomen) are associated with asbestos exposure.

V. RESULTS AND DISCUSSION

As stated in the introduction, the Forest Service awards contracts to private construction companies to build roads on Federal lands. NIOSH agreed to the technical assistance request with the understanding that all of the arrangements had been made with the Six Rivers National Forest. As it turned out, this assumption was not true as the contractor at the road building site refused to allow NIOSH to place personal sampling pumps on the workers. With some discussion, the owner of the company allowed some minimal amount of personal sampling as long as the workers agreed to wear the sampling pumps. This arrangement allowed NIOSH to collect several samples at the quarry site, but the road crew refused to cooperate. The samples that were collected were taken at the crushing operation at the Blue Ridge road site. At Blue Ridge, the main rock structure was not serpentinite, though the Forest Service representative stated that some serpentinite was present. Two other quarry sites that were supposed to contain serpentinite deposits and were selected by the Forest Service for study did not operate as planned during NIOSH's visit. No samples could be collected.

Three 20 minute samples were collected on the crushing platform operator at Blue Ridge. The samples were taken over a shorter time period since it was necessary not to overload the filters. The concentration of asbestos fibers was below the limit of detection for the analytical method used. The fibers were counted by phase contrast microscopy. Three 15 to 26 minute samples were collected on the helper at the crusher. The concentration of asbestos fibers was below the limit of detection. Two samples (25 and 35 minutes) were collected on the front-end loader operator. The concentration of asbestos was below the limit of detection in these samples. Therefore, no asbestos was detected in any of the samples at Blue Ridge. Additionally, one bulk sample of the aggregate dirt was analyzed for percent asbestos, and no asbestos was detected.

VI. CONCLUSIONS

In conclusion, asbestos was not detected in the samples collected on selected personnel at the crushing operation at Blue Ridge. However, since the predominant rock structure at Blue Ridge was not serpentinite, this result was not unexpected. To characterize the exposure to crushing and road crews to asbestos, more samples need to be collected in a serpentinite area.

VII. RECOMMENDATIONS

Although definite findings for asbestos could not be made under the conditions of this evaluation, some recommendations are made to assist the U. S. Forest Service in protecting workers on Federal lands:

- 1) The U. S. Forest Service should make it a condition of awarding any grants to private contractors that all provisions of the OSHA Act will be enforced including the Forest Service's mandate to collect samples where necessary.
- 2) Further sampling for asbestos should be conducted at a serpentinite area.
- 3) Noise exposures to crusher operators should be evaluated and a hearing conservation program instituted.

VIII. DISTRIBUTION AND AVAILABILITY OF REPORT

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, 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) U. S. Forest Service - Region IX.
- 2) U. S. Department of Labor - Region IX
- 3) U. S. Department of Health and Human Services - Region IX.

For the purpose of informing the "affected employees," the employer shall promptly "post" for a period of 30 calendar days this Determination Report in a prominent place(s) near where exposed employees work.

IX. AUTHORSHIP AND ACKNOWLEDGEMENTS

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TABLE I. CONCENTRATIONS OF ASBESTOS FIBERS IN AIR SAMPLES COLLECTED AT THE SIX RIVERS NATIONAL FOREST, GASQUET, CALIFORNIA ON AUGUST 12, 1980.

<u>Job Classification or Operation</u>	<u>Sample Time Period</u>	<u>Concentration of Asbestos</u>
Operator-crushing platform	10:45 a - 11:05 a	ND*
" " "	11:05 a - 11:25 a	ND
" " "	11:25 a - 11:50 a	ND
Helper-crushing area	10:49 a - 11:04 a	ND
" " "	11:04 a - 11:30 a	ND
" " "	11:30 a - 11:50 a	ND
Operator-front-end loader	10:45 a - 11:10 a	ND
" " "	11:10 a - 11:45 a	ND

*ND - none detected; the number of fibers per cubic centimeter of air were below the limit of detection for the method of analysis.

