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Asbestos Exposures During Brake Changes. Case: 48106-3

March 30, 1977

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7885

MEMORANDUM FOR RECORD

Introduction

Measurements for asbestos were taken at three different garages in the Miami District on December 1,2, 1976. In addition, measurements for lead, tin and copper were taken in one garage where a worker was welding and grinding on a truck which was undergoing extensive bodywork.

Procedures

The asbestos samples were collected using the procedures outlined both by the National Institute of Occupational Safety and Health (NIOSH) and the Occupational Safety and Health Administration (OSHA). Basically the procedure involves collection of the fibers on a small filter, with later analysis using phase contrast or transmission electron microscopy.

The samples for metals were collected in a similar manner. The filters used for collection of the samples were either 37 mm Millipore cellulose ester filters, or 37 mm Nuclepore polycarbonate filters. Both filter types have nominal pore diameters of 0.8 micrometers (μm).

Air was pulled through the filters using battery powered sampling pumps manufactured by Bendix. The pumps were calibrated using the soap bubble flowmeter technique.

The cellulose filters were analyzed using phase contrast microscopy while analysis of the polycarbonate filters was performed using transmission electron microscopy. Analysis for the metals was performed using the procedure of atomic absorption spectroscopy.

Background

During the course of this survey measurements were taken at three different garages. Rough sketches of the garages are attached.

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The main jobs being performed at garages 1 and 3 during the time measurements were being taken was annual preventive maintenance examinations of the vehicles. These include visual examination of the brake linings with replacement if necessary. At garage #2 welding, torching and grinding was being performed on the vehicles as well as the annual preventive maintenance examinations.

In all cases the vehicles being examined were 3/4 or 1/2 ton vans. In addition, once the brake drum has been pulled the drum and backing plate were cleaned by blowing out out the dust using compressed air. The total time it took to check the brakes and mount new linings, if necessary, was 40 to 60 minutes per truck.

Results

The results of the phase contrast analysis are presented in Table I while results of the electron microscopic analysis are presented in Table II. Table III presents the results of the metal analysis.

Briefly, the results of the metal analysis indicate that during the operations of grinding, torching, and welding insignificant amounts of metal fumes and or dust are generated. The levels measured were well below the appropriate OSHA standards for lead, (200 $\mu g/m^3$), tin (2000 $\mu g/m^3$), and chromium (1000 $\mu g/m^3$).

The results of the phase contrast microscopy analysis, presented in Table I, indicate that a definite exposure to asbestos fibers occurs during the operation of changing brakes. Three of the samples, one taken for a period as short as 12 minutes, has dust concentrations too heavy for an accurate count to be performed. The remaining personal samples gave values between 0.16 and 0.24 fibers longer than 5μm per cc of air. These values are elevated over the one ambient sample of 0.02 fibers/cc and the blind blank with an assigned value of 185 L of <0.015 fibers/cc.

The results of the electron microscopic analysis are presented in Table II. They indicate that of the five general air samples collected, including the ambient, asbestiform fibers >5μm in length were detectable on only one sample; on this sample the concentration was 0.24 fibers > 5 μm/cc.

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The one personal sample analyzed by electron microscopy indicated an asbestos concentration of 1.04 fibers >5μm/cc, during the eleven minutes necessary to blow out the brake drums. This level indicates that an occupational exposure to asbestos does occur during the blowing out process, a conclusion that correlates with the phase contrast microscopy results.

Summary

As a result of these measurements it is evident that an exposure to asbestos fibers occurs during the operation of inspecting and/or changing brakes. Consequently, where possible, engineering means to control the exposures should be investigated. In addition, the employees should be afforded medical examinations where possible.

ORIGINAL SIGNED BY
W. J. SCHREIBEIS

MH-7885-GDK-jm — G. D. Kenney

Attachments
Tables I, II, III

Copy to
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