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Asbestos Exposure during Brake Lining Maintenance and Repair¹

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Data obtained on asbestos exposure of garage mechanics during brake lining maintenance and repair work show that fiber concentrations frequently in excess of regulated limits are common. The presence of chrysotile, ranging from 2 to 15%, in brake drum dusts, was demonstrated by X-ray diffraction, transmission electron microscopy, selected area electron diffraction, and electron microprobe analyses. Unaltered chrysotile was found, both in fiber and fibril form, in air and brake drum dust samples. The chrysotile asbestos content of personal air samples, taken during automobile brake repair work, was measured both by optical and electron microscopic techniques. While a positive correlation exists between the types of measurements, the present technique of optically counting asbestos fibers may considerably underestimate the levels of total asbestos exposure.

INTRODUCTION

During the past decade, significant disease risk has been found associated with the inhalation of asbestos fibers in a number of occupational and environmental circumstances other than in asbestos mining, milling and manufacturing, where serious hazard was already known (Wagner *et al.*, 1960; Newhouse and Thompson, 1965; Selikoff *et al.*, 1964, 1965; Harries, 1968).

Such exposures were found in the construction industry and in shipbuilding, as well as in other industrial settings where asbestos products were used. More recently, asbestos exposure has been suggested to occur during automotive brake lining repair and installation work, and measurable concentrations of asbestos fiber were observed in the work environment of workmen involved in these operations (Hickish and Knight, 1970; Hatch, 1970; Boillat and Lob, 1973). With limited data available, however, uncertainty remained regarding the type and extent of asbestos exposure during this work. Some investigators have questioned whether free asbestos fibers survive the high temperatures produced during braking action (Lynch, 1968; Hickish and Knight, 1970; Hatch, 1970) contending that asbestos decomposes as a result of the high point contact temperatures produced at the interface of the brake drum or disc and brake lining.

We have sought to obtain information concerning asbestos exposure of workmen engaged in brake lining maintenance and brake shoe installation, by analysis of residual dusts recovered from brake linings and by direct measurement of the

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