

FILE NAME: General Motors (GM)

DATE: 1969 Oct

DOC#: GM021

DOCUMENT DESCRIPTION: Air Pollution Survey of Asbestos - A Literature Review - US Dept of Health

**PRELIMINARY
AIR POLLUTION SURVEY
OF
ASBESTOS**

A LITERATURE REVIEW

Ralph J. Sullivan
Yanis C. Athanassiadis

Litton Systems, Incorporated
Environmental Systems Division

Prepared under Contract No. PH 22-68-25

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Consumer Protection and Environmental Health Service
National Air Pollution Control Administration
Raleigh, North Carolina
October 1969

the long "asbestos bodies" remain in the lungs, a person who has inhaled asbestos may carry the potential (for the rest of his life) to develop carcinoma of the lung. Moreover, it has not been determined whether more than one fiber is necessary to induce a malignant tumor. Cox⁴² has suggested that the probability of cancer induction is proportional to the number of asbestos fibers, number of susceptible cells, the concentration of carcinogens on the fibers, and the time from exposure.

Why asbestos is carcinogenic is not clearly understood. At least three hypotheses have been advanced:

(1) That the fibers act as a physical irritant which after 20 to 30 years of constant irritation induces a tumor.

(2) That the fibers contain small amounts of carcinogens--such as benzo(a)pyrene, nickel, and chromium--which are eluted from the fibers by the serum in the lungs. These carcinogens then produce the cancer. Harington and Roe⁸⁸ have shown that (a) chrysotile contains little or no benzo(a)pyrene, but about 100 µg of chromium per g of fiber and 5,000 µg of nickel per g of fiber; (b) crocidolite contains 0.2 to 24 µg of benzo(a)pyrene per 100 g of fiber and negligible amounts of nickel and chromium; and (c) amosite contains 0.2 to 2.4 µg of benzo(a)pyrene per 100 g of fiber, 100 µg of nickel per g of fiber and 15 µg of chromium per g of fiber (see Appendix B, page 92). The authors have not only shown that these agents can be dissolved in the lung serum, but also that airborne fibers can adsorb

applied as mortar or plaster, or sprayed on walls; insulating materials for the covering of pipes, ducts, boilers, cables, and conduits; siding shingles, roofing shingles, tiles, flat and corrugated sheets, wallboard, clapboard, and automobile undercoating; threads, yarns, wicks, cords, tapes, cloths, sheets, and blankets; friction materials, brake linings, clutch facings, gaskets, and lagging cloths; and asphalt tiles, plastics, and similar materials.¹⁰⁸

Abrasion of brake linings and clutch facings has been suggested as a primary source of asbestos air pollution. Ayer¹³ and Lynch¹⁴⁵ have examined the emissions from brakes on automobiles and found that the fiber is destroyed by the heat of friction. Asbestos crystalline structures are also destroyed and are recognizable only by the chemical composition. Newhouse and Thompson¹⁷⁵ have reported one case of mesothelioma in a mechanic.

The existence of a wide potential for direct or indirect occupational exposure has been cited^{32,34,108,120} as a possible explanation for the frequent occurrence of "asbestos bodies" in the general public. Asbestos is now used in more than 3,000 products. Most people working in the construction and demolition of buildings come into contact with asbestos. Electricians and homeowners strip asbestos insulation off wires; the carpenter saws asbestos boards and often pounds the asbestos-insulated furnace ducts to make them fit. As a result, the air around a construction site is contaminated with asbestos fibers,