

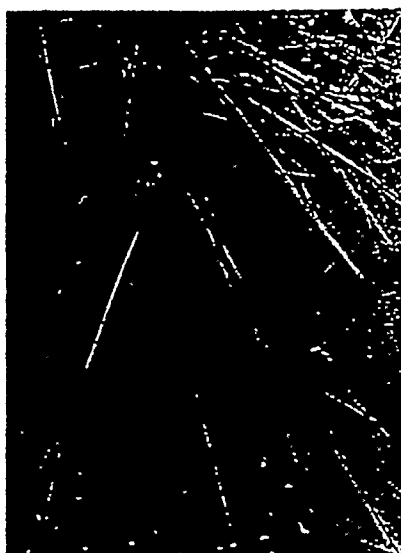
Asbestos

An Occupational and Environmental Health Hazard

It has been known for some 45 years that excessive exposure to asbestos fibers in the work place could result in a specific type of pneumoconiosis known as asbestosis. A thousandfold increase in output of asbestos during the past 60 years and more recent evidence that it is perhaps our most important occupational carcinogen has resulted in a worldwide focus of the scientific community upon this problem.

There are four major types of asbestos: amosite, chrysotile, crocidolite, and anthophyllite, each with different physical properties, chemical composition, and commercial applications. Approximately 95% of the asbestos used in the United States has been chrysotile. While there is evidence that all types of asbestos are not equally hazardous, more knowledge is needed to determine relative toxicities of different fibers or attached impurities in producing asbestosis, cancer, or mesothelioma.

There is ample evidence that exposure to asbestos causes a definite increase in the incidence of asbestosis and of cancer of the lung. Epidemiological studies have indicated that the incidence of bronchogenic carcinoma among asbestos and insulation workers exposed during the World War II era is about seven or eight times that expected. The extent of the exposure is not well defined. Selikoff et al (*JAMA* 204:104, 1968) estimated from a study of 370



"The devil's icicles."

workers that asbestos workers who smoke have about 92 times the risk of dying of bronchogenic carcinoma as men who neither work with asbestos nor smoke cigarettes.

Within the last eight years there has been increasing evidence for an association between both work and environmental exposures to asbestos and diffuse pleural and peritoneal mesothelioma. There is strong evidence that individuals with light to heavy exposure to crocidolite, amosite, or mixtures of amosite and chrysotile have a greatly increased incidence of this rare disease.

Since treatment for the asbestos diseases leaves much to be desired, every effort should be made to decrease exposures to safe levels. The

threshold limit proposed for 1970 by the American Conference of Governmental Industrial Hygienists is five fibers (length $> 5\mu$) per milliliter of air, in the work place. This is subject to revision with better definition of hazard. Every effort should be made to minimize exposure through improved working conditions; through medical supervision of workers, including health education; and by substitution of less-toxic materials where possible. Enclosure ventilation and respiratory protective devices should keep exposures as near zero as possible.

In the differential diagnosis of asbestos disease, a very detailed occupational and residential history for the whole life of the individual is necessary. The earliest and most reliable symptom of asbestosis is shortness of breath. The earliest detectable change is in pulmonary function as indicated by lowered vital capacity and exchange rate for carbon dioxide and oxygen. All asbestos workers should have x-ray films of the chest and pulmonary function tests as part of complete preplacement and annual health inventories. Asbestos workers should not smoke cigarettes and with the early development of asbestosis should either be encouraged to change to other work or exposures should be extremely low. Workmen's compensation laws for each state should be carefully checked to make sure that disability from asbestos disease receives adequate attention, and physicians should bear in mind the long latent period which may occur in this disease. The latent period for asbestosis may be only a few years when exposure is great, while for mesothelioma the period is said to be as great as 40 years.

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The Figure is reproduced from *Oregon Health Bulletin* 47:2 (Feb) 1969.