Research on Health Effects of Asbestos

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ASBESTOS AS A CURIOUS MATERIAL was known several centuries B.C., especially for its ability to withstand flame. The physical and chemical properties of asbestos together with its fibrous structure made it a unique material with a wide range of potential industrial applications. It was not until the end of the last century, however, that it gained importance as an industrial resource. The study of the use of asbestos in a number of technological areas and its contribution to new products is the precursor of the special science of industrial mineral fiber technology.

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Asbestos is essential in today's industrial technology including national defense, aerospace, and civilian consumer use.

Asbestos is a general term applied to a group of fibrous crystalline hydrated silicate minerals. Although a number of different types of asbestos minerals exist, only four or five are of commercial importance. Each differs somewhat from the others in chemical composition, physical properties such as ability to withstand heat and chemical erosion, crystalline structure, fiber dimension and degree of fiber harshness and brittleness.

The worldwide production of asbestos has greatly expanded since the turn of the century, the over-all consumption in this country leveling off for the period 1958 to 1963 at around 750,000 short tons annually. Of this tonnage, approximately 93% was chrysotile, 3.5% crocidolite, 2.5% amosite, and 1% anthophylite and tremolite.

Even though asbestos has been in industrial use for well over 50 years, much is unknown regarding its health effects and safe levels of exposure.

It has been known since the early nineteen hundred's that excessive exposure to asbestos gives rise to the disabling pulmonary disease "asbestosis." More recently, evidence has been developed that the incidence of respiratory tract and other malignancies in asbestos workers is excessive. A major problem in studying the health effects of asbestos is the long latent period of 20 or more years from initial exposure to the onset of disease. Also in the mid-nineteen thirties and earlier, there was little dust control and the workers were often exposed to massive levels of dust from asbestos and other associated materials in the manufacture of asbestos products. Thus, the causative agents of the resultant disease are essentially unknown. Included in these potential sources of causative agents, either alone or in combination, are asbestos fibers themselves, materials associated with the fibers in the ores such as trace minerals and polycyclic aromatic oils, materials added during processing such as metals, tars and pitches, and concomitant external exposures to tobacco smoke or other air pollutants.

A salient point is that in subsequent years when heavy dust exposures were reduced, disease also diminished. This definitely indicates that with sufficient knowledge of the agent(s) responsible for the disease, along with dose-response data, safe levels of exposure can be established.

Research to elucidate the importance of the asbestos minerals as hazards to health fall into two broad categories: *first*, studies to provide answers