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The Invisible Environment Fact Sheet Series

Asbestos

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A common public perception about asbestos-containing buildings is that occupants will be subject to respiratory ailments, such as, shortness of breath, emphysema, asbestosis (lung disease), and mesothelioma and other types of lung cancer. The belief that the threat is possible affects perception of risk even if the risk is minimal because the fibers are not exposed. Public fear of asbestos in the United States has had an impact on nationwide regulations associated with it. This fact sheet will examine the public's fear of asbestos and present current scientific evidence about this material.

The negative reputation of asbestos comes from the high death rate among asbestos workers exposed, without protective attire, to extremely high levels of asbestos dust. Because asbestos is only a generic name for fibrous aggregates of minerals, specific types need to be identified to understand their variations. Within the scientific community, views have polarized on the potential health hazards of asbestos due to the structure of the specific fibers and the time of exposure to given amounts. Some insist that different types of asbestos should be regulated differently. For example, while there still is debate on whether to include chrysotile to a trade watch list for hazardous chemicals, all other forms of asbestos are already on the list. Opposing arguments state that all fiber types should be strictly regulated. Both the EPA and the International Agency for Research on Cancer (IARC) have classified asbestos as a human carcinogen.

Some of the common types of asbestos are chrysotile (white asbestos), crocidolite (blue asbestos), amosite (brown asbestos), tremolite, actinolite, and anthophyllite. Based on structure, these minerals are categorized as serpentines (chrysotile is the sole member of this group),

and amphiboles (which includes all the other types of asbestos). Chrysotile is used primarily in cement products and accounts for 94 percent of the worldwide consumption of asbestos.

Fiber Size

Studies of the fiber sizes of asbestos have shown that lengths above 8 micrometers and widths less than 0.25 micrometers were linked with respiratory ailments. Fibers in these target ranges are the ones most easily inhaled through the respiratory tract into the lungs. The "curly" chrysotiles are more easily deposited in the lungs than the more symmetrical amphiboles. Once in the lungs, a fiber must be durable with respect to the lung fluids to stay intact and cause damage. One study found that the average lifetime or biodurability of a chrysotile fiber 1 micrometer in diameter is approximately nine months due to the dissolution rate. On the other hand, amphibole asbestos fibers are less soluble and thus have longer residence times in the lungs.

Exposure to Asbestos

Individuals working in asbestos mining and processing face the greatest levels of exposure to asbestos. New regulations have made these workplaces much safer, thus drastically reducing incidence of asbestos-related illnesses. Currently, the high number of reported cases of asbestos-related illnesses is due to exposure that occurred 30 or 40 years ago when regulations were still rather lax.

Old buildings (those built before 1970) may have insulation and other products that contain asbestos. The use of asbestos in many of these products is now banned. At present one of the main uses of asbestos is in asbestos-cement, but here the fibers are trapped within the cement

and will not be easily released. Asbestos exposure within buildings is usually not as big a threat as it is feared to be since the asbestos is generally not exposed. It is often only exposed during renovation, repair, maintenance, or vandalism. In most cases, products that have asbestos do not release fibers while they are in good condition. If you find asbestos in your home it is usually best to leave it alone. Disturbing it will release fibers. In fact, improper removal of asbestos may pose a greater risk than simply letting it stay. Whenever necessary, get a professional to assess and then repair or remove asbestos from the house.

Natural sources of asbestos include serpentine rocks, such as those found in California. Not much is known about exposure to such natural sources of asbestos. However, asbestosis has never been observed in non-occupational exposure to asbestos, leading to the conclusion that natural sources of asbestos are not a serious concern.

Hazards of Asbestos

The clarity of true hazard of asbestos is not known—there are many aspects of asbestos removal versus maintenance, such as economics, that make the issue more confusing. An anonymous survey was conducted to get reactions from those with an economic interest in asbestos abatement. The survey focused on the issue of asbestos abatement being a health and safety concern or a means of economic advancement. Six groups of twelve people each received the survey, including politicians, industrial hygienists, building managers, contractors, suppliers and lawyers. Of those who responded, 78.33

percent agreed that they would have an economic loss if asbestos were declared harmless. When asked if it were safer to leave asbestos in place, the majority replied that it was worth the short-term risk to increase the airborne fibers in renovation for the permanent removal benefits. These beliefs are in contradiction to a symposium held at Harvard University, which revealed that actual risks are much lower than once thought. Without definite standards from the medical community, danger of asbestos exposure to humans is uncertain.

Summary

It's still not clear whether heavy exposure to asbestos caused lung cancer in miners throughout North America, as cancer rates were highest in the workers who were also smokers. Conflicting research on the hazards of asbestos is all that is available to the public until differing scientific communities can communicate in the same arena. While beliefs about the hazard of asbestos are polarized, researchers do concur that there is a health risk. The intensity of the risk is the focus of the debate. One belief is that workers exposed to various asbestos fiber types contract lung diseases at similar rates. At the other end of the continuum, researchers state that the health risk posed by the roughly 30 million tons of asbestos in buildings is small, far less than most other environmental health hazards, such as tobacco smoke and radon. Asbestos management does include a range of variables. Thus, careful evaluation and scientific analysis are necessary on a case-by-case basis.

Additional Reading

Asbestos in Your Home. <http://www.epa.gov/asbestos/pubs/ashome.html>

Indoor Air Pollutants: Asbestos. American Lung Association.

<http://www.lungusa.org/site/apps/s/content.asp?c=dvLUK9O0E&b=34706&ct=67105#what>

Asbestos. Sutton Real Estate. http://www.sutton.com/resourcecentre/Home_Maintenance/asbestos_facts.html

Safety and Health Topics: Asbestos. Occupational Safety and Health Administration (OSHA). <http://www.osha.gov/SLTC/asbestos/>

Diseases and Conditions: Asbestosis. Mayo Clinic. <http://www.mayoclinic.com/health/asbestosis/DS00482>

Reynolds, S. J. et al. "Factors Affecting Airborne Concentrations of Asbestos in a Commercial Building." *Am. Ind. Hyg. Assoc.* 55 (1994): 823–828.

Bateson, C. "Results of a Survey Designed to Determine the Scientific and Economic Benefits of Asbestos Abatement." *Am. Ind Hyg. Assoc.* 53 (1992): 381–386.

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