Asbestos

CDFS-187-95

Michelle Toomey
Joe E. Heimlich

A common public perception about asbestos-containing buildings is that occupants will be subject to respiratory ailments; i.e., emphysema, lung cancer, etc. 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 the amount of 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 asbestos researchers, known as revisionists, insist that different types of asbestos should be regulated differently. Opposing arguments state that all fiber types should be strictly regulated. Two common asbestos types are amphiboles (or brown and blue) and chrysolites (also known as white). In the U.S., about 95% of asbestos used are of the white variety.
Fiber Size

Studies of the fiber sizes of asbestos have shown that lengths above eight 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. 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 one micrometer in diameter is approximately nine months due to the dissolution rate. This result is compared to a silica fiber of the same size that can take up to 438 years to dissolve. Amphibole asbestos fibers have width measurements from 0.073 to 0.243 micrometers yet biodurability tests have not been conducted on amphiboles. The rate of lung cancer in asbestos miners further explains why miners and millers working with this fiber type have elevated incidents.

Testing concentrations of airborne asbestos fibers in buildings is a means of determining exposure levels. The unit of measure is fibers per centimeter cubed over an 8 hour time weight average. The federal standard is 0.1 fibers per cubic cm.. To illustrate, a 12-story office building in Minnesota was sampled to ensure compliance with the maximum standard. Nine test sites with obvious damage to asbestos-containing surface material were chosen throughout the building. Variables included areas with or without suspended ceilings and areas with or without current construction. Other test sites were near the air intake on the roof and in the garage. Of the asbestos levels detectable, the highest was 0.008 fibers per cubic cm.. This level was detected in an area without a suspended ceiling undergoing current construction. This study was consistent with similar sampling methods; one conclusion that some researchers make is general building occupants are not at significant risk for concentrated asbestos exposure. Workers involved with renovation, however, are at an increased risk and are mandated to observe extra safety precautions.

Hazards of Asbestos

The clarity of true hazard of asbestos is not known -- there are many aspects of asbestos removal vs. 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% 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 white 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, therefore careful evaluation and scientific analysis are necessary on a case-by-case basis.

**Additional Reading**


All educational programs conducted by Ohio State University Extension are available to clientele on a nondiscriminatory basis without regard to race, color, creed, religion, sexual orientation, national origin, gender, age, disability or Vietnam-era veteran status.

Keith L. Smith, Associate Vice President for Ag. Adm. and Director, OSU Extension.

TDD No. 800-589-8292 (Ohio only) or 614-292-1868