

Operations and Maintenance

MANAGING ASBESTOS IN PLACE IN BUILDINGS



OPERATIONS AND MAINTENANCE
MANAGING ASBESTOS IN PLACE IN BUILDINGS
OSHA Class III Training
by The Asbestos Institute

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CHAPTER 2

HEALTH EFFECTS OF ASBESTOS EXPOSURE

A HAZARDOUS AIR POLLUTANT

Asbestos is a hazardous air pollutant. It is an inhalation hazard in humans. It is an airborne human carcinogen. In most cases, it causes health effects in humans if they are exposed to the airborne fibers in a high concentration for a long period of time.

There are two very different exposure hazard situations for humans: *Passive exposure hazards* and *occupational exposure hazards*.

Passive exposure may be described as exposure to the normal background air that we all breathe. As mentioned in Chapter 1, asbestos is in the crust of the earth, so it has become entrained in the atmosphere of the earth. There is always a measurable level of asbestos in the air that we breathe. Very few people develop health effects from this exposure, but it is possible. People with very compromised immune systems may be susceptible to a disease called mesothelioma from this ambient exposure. However, it depends on the level of asbestos in this ambient air. Large cities like New York could have very different ambient asbestos levels than a rural town in Midwest. As an example, ambient air levels measured in the city of Phoenix, AZ are in the area of 0.0006 fibers per cubic centimeters (f/cc). Before compliance with our current EPA National Emissions Standard for Hazardous Air Pollutants (NESHAP), ambient air levels in New York City were measured in the vicinity of 0.2 f/cc. This is a huge difference to the compromised individual mentioned above. However, this is not a measurable source of asbestos disease.

Occupational exposure is much easier to identify and measure, and is the source of most asbestos disease. Occupational exposure is the exposure to asbestos that you would have if you worked in the asbestos manufacturing industry in the 1950's. It is exposure from how you make your living – all day every day for a working career. This exposure usually resulted in asbestos disease that resulted in early mortality.

This type of occupational exposure was ended in the US over 40 years ago (at least by the end of the 1970's). In fact the occupational exposures most responsible for early mortality in this country,

manufacturing and installation of asbestos materials, has been “outlawed” by a combination of regulation and litigation by 1980. The occupational exposure that remains, for the most part, is in the construction industry. This exposure is to construction workers and is the result of remodels, renovations and demolitions of existing buildings in this country that disturb Asbestos Containing Building Materials (ACBM).

In spite of required controls in the construction industry, asbestos exposure is very difficult to control. This exposure is to something that you cannot see, taste or smell. If you are exposed to it, we cannot determine that exposure has taken place. The only way we know that a person has been exposed is to diagnose a disease in that person. This diagnosis can only happen at the end of a 20-30 year latency period. A latency period is the time lag between exposure to a substance that causes a disease and the diagnosis of that disease. So, how do we protect workers on an asbestos site (construction site)?

OSHA has determined the best way to do this, and has published it in the construction standard for asbestos, that we will discuss in the next chapter.

ASBESTOS DISEASES

There are 3 main asbestos diseases: Lung Cancer, Asbestosis and Mesothelioma.

LUNG CANCER

Lung cancer is a cancer or tumor in the interior portion of the lung, associated with the bronchial tubes. It is perhaps the most common of the asbestos diseases, although it is not asbestos specific. This means that it is not caused by asbestos only. It can be caused by any inhaled carcinogen, and it is not possible to determine the causative carcinogen. However, our data on lung cancer by industry shows us that it is at least 10 times more common in the construction industry than any other industry. Asbestos, as a source of occupational exposure, is by far most common in buildings that are disturbed by the construction worker. Lung cancer develops from a buildup of the carcinogen in the bronchial tubes.

This buildup of fibrous asbestos in the bronchial tubes is not normal. Normally, there is a cleaning mechanism in the bronchial tubes that involves a naturally secreted mucous blanket and the action of cilia cells beneath the blanket that moves it in an upward direction. Inhaled particulate are trapped in the mucous blanket that is moved upward continuously and eventually expelled. The most common way this natural mechanism is disrupted is cigarette smoking. Cigarette smoke stops the action of the cilia. EPA’s data tells us that the cigarette smoker that is

occupationally exposed to asbestos has at least a 90 times greater chance of contracting lung cancer than the non-smoking, non-occupationally exposed public.

The normal latency period for lung cancer is about 20-30 years.

ASBESTOSIS

Asbestosis is not a cancer, but is a thickening or “scarring” of the pleural membrane at the alveoli level in the respiratory system. This inhibits the normal transfer of oxygen from the air we breathe into the bloodstream. Asbestosis results in oxygen deficiency and eventually death. This thickening or “scarring” of the alveoli membrane is specific to asbestos particulate contacting the membrane. Normally, special cells clean the membrane of particulate, but cannot ingest asbestos. The only recourse the body has is to seal the particulate in place with layers of cellular material, which renders that microscopic spot unable to let oxygen pass through. With enough “spots”, enough oxygen is inhibited to cause death. This is the most common of the diseases caused by occupational exposure. Today, the normal latency period of asbestosis is likely to be about the same as lung cancer (20-30 years). In the days of the 1950’s and 60’s, the latency was about 15 years.

MESOTHELIOMA

Mesothelioma is a cancer of the mesothelial membrane in the body. Mesothelioma is indeed an “oma” or tumor on this membrane. The mesothelium is found mainly in the chest cavity surrounding the lungs and in the abdominal cavity surrounding the intestines and lower organs. This disease is an asbestos marker disease. As far as we know for certain, it is not caused by anything other than asbestos. The average latency is very long, but it is probably in line with the other asbestos diseases today in the US, about 30 years (usually at the end of a normal lifespan). Mesothelioma is uniformly fatal, usually within a short time after diagnosis.

GENERAL COMMENTS

By far the majority of asbestos disease in the US is from very heavy, on-going occupational exposure. Since that is a thing of the past, for the most part, the incidence of asbestosis mortality is falling off sharply since about 2016.

The incidence of mesothelioma deaths in the US has stayed fairly constant for many years. The source of exposure is in the construction industry, and for non-construction personnel, it is probably related to asbestos in occupied buildings.