ASSESSING ASEPTOS EXPOSURE POTENTIAL IN NONINDUSTRIAL SETTINGS

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ABSTRACT: The presence of asbestos containing materials (ACM) in office and commercial buildings is a significant environmental problem. Asbestosis, mesothelioma and lung cancer have been linked with industrial exposure to airborne asbestos. The extensive use of asbestos products in buildings has raised concerns about the widespread exposure of the general public to asbestos in nonoccupational settings. The presence of asbestos in a building does not necessarily mean that significant exposure of the occupants of the building has occurred, but it is important that the asbestos be monitored regularly to ensure that fibers do not become airborne. If ACM are contained within a matrix and not disturbed, exposure is unlikely. However, if the asbestos becomes friable (crumbling) or if building maintenance, repair, renovation or other activities disturb ACM, airborne asbestos fibers may be a source of exposure to the occupants of the building.

Currently, asbestos exposure assessment is conducted by a phase contrast light microscope (PCM) technique. Due to its inherent limitation in resolution and the generic counting rules used, analysis by the PCM method underestimates the airborne asbestos fiber concentration as compared to analysis by transmission electron microscopy (TEM). It is important that the air monitoring results analyzed by PCM be interpreted carefully in conjunction with a survey by a professional to judge the physical condition of the ACM in buildings. Exposure levels to airborne asbestos fibers vary from day to day and depend on the physical condition of the material involved and the type of operating and maintenance program in place. Although federal regulation does not mandate corrective actions in buildings with ACM, appropriate steps should be undertaken to prevent occupants from unnecessary exposure to asbestos.

INTRODUCTION

While asbestos has been used in the western world since 1870s, World War II marked the wide spread commercial use of asbestos. There are six types of asbestos commonly identified: chrysotile, amosite, crocid...
olite, actinolite, tremolite and anthophyllite. Initial concerns about adverse health effects associated with asbestos centered on the development of asbestosis in workers who had been exposed to very high levels of fibers in their jobs. Asbestosis is a diffuse interstitial fibrosis associated with exposure to asbestos fibers of a characteristic length and diameter. In the 1960s, landmark epidemiological studies by Selikoff et al. identified high rates of lung cancer in insulation workers who had dealt with asbestos for 20 years or more. Mesothelioma, a rare cancer of the lining of the lung or abdomen, was linked to asbestos exposure. Later, other cases of mesothelioma were identified in individuals whose only contact with the materials was possible exposure from asbestos carried home on the clothes of asbestos workers. This raised the question of the possible risk of mesothelioma or lung cancer from lower levels of asbestos, and in particular, those present in indoor air in buildings containing asbestos containing building materials.

Asbestos fibers can be detected both indoors and outdoors in ambient air in almost any instance when it is monitored with sensitive techniques. Sources of asbestos in outdoor air include natural rock, mining and manufacturing operations, and particles released from the brake linings of cars and trucks. In buildings, asbestos was used extensively as an insulation and fireproofing material for many years. The presence of asbestos containing material (ACM) in public and commercial buildings has raised concerns about the increased risk of the development of mesothelioma or lung cancer in the occupants from exposure in these settings, particularly in cases where the asbestos material is aging or damaged. These concerns initially centered on the widespread use of asbestos in schools because of the large number of children potentially exposed to low levels of asbestos, coupled with the expected length of the life span of the young children in the schools. These factors contributed to the calculation of a statistical risk which was a cause for concern. This concern has been extended to include the exposure of all individuals who work in buildings containing asbestos; however, the risk may not be as great because of the length of time needed for the development of mesothelioma (20 to 40 years) may be greater than the expected life span of many adults in these buildings.

Surveys conducted by the Environmental Protection Agency (EPA) estimate that asbestos containing materials (ACM) can be found in over 30,000 schools and 700,000 other public and commercial buildings in this country. The presence of asbestos in a building does not necessarily mean that the health of building occupants is endangered. In buildings where asbestos containing materials remain in good condition and are not disturbed, exposure is unlikely because the asbestos is bound to other material and is not likely to become airborne. However, when ACM