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HAZARDOUS FREE SURFACE AREA OF ASBESTOS: CHANGES DURING REMOVAL

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Since attention was drawn to the diseases that can be induced by asbestos, removal of asbestos containing materials from buildings has become an increasingly important issue. Asbestos fibres entering the human body by means of inhalation can cause a wide range of both chronic inflammatory and malignant diseases, dominantly in the respiratory system.

Among asbestos containing products, sprayed asbestos carries the greatest health risks due to the high concentration of asbestos (60–90%) and the great free surface area of the fibres. Containing practically no binding agent, fibres in sprayed insulation materials are completely exposed, can easily increase the concentration of airborne fibres, and thus endanger human health.

Sprayed asbestos was widely used for insulation purposes in buildings built or renovated between 1940 and 1982 in Hungary. Assessment of the amount of asbestos built in as sprayed insulation material has already begun in Hungary and removal of these materials is most cases executed according to the strict regulation of the European Union.

Removal is the only long-term solution to the problem of asbestos, but it raises new problems as well. During removal, the concentration of airborne fibres can be extremely high, which should be avoided even if preventive measures are taken to protect the workers' health. On the other hand, removal produces a high amount of hazardous waste that must be disposed completely isolated from the environment.

Soluble glass is used to coat sprayed asbestos in order to decrease the concentration of airborne fibres during removal. A patented new Hungarian removal method applies different additive agents to improve the adhesive properties of soluble glass to asbestos fibres. This special material is also used to decrease the free surface area of other asbestos wastes. Thus, isolated by the treatment, the fibrous waste can be utilised as filler in core concrete. According to the inventors this development offers solution to both problems raised by the removal of asbestos. Our study aims to characterise the relation between asbestos fibres and this special soluble glass with the help of optical microscopy, XRD and SEM-EDX analyses.

XRD analyses were performed on both untreated and treated insulation material. XRD patterns revealed that the treatment did not altered the original chrysotile. SEM studies of untreated and treated chrysotile justify that fascicles of chrysotile got covered with soluble glass, so the potential of fibre emission to the air decreases significantly, however, the degree of coverage slightly decreases inwards from the surface of the thick samples. The study of concrete samples confirmed that the glassy coating of fascicles did not get hurt during the production of concrete.

Our results are in accordance with air concentration tests done on asbestos removal areas: in areas where the described method is used, the concentration of airborne fibres is significantly lower than in areas where insulation materials are not treated before removal.