

OCCUPATIONAL EXPOSURE AND AMBIENT AIR CONTAMINATION BY NATURALLY OCCURRING ASBESTOS IN VALMALENCO (ITALY)

Andrea Cattaneo, *Department of Occupational and Environmental Health, Università degli Studi di Milano, Italy*

Anna Somigliana, *Environmental Protection Agency of Lombardy Region (ARPA), Italy*

Mauro Gemmi, *Department of Earth Sciences "Aldo Desio", Università degli Studi di Milano, Italy*

Ferruccio Bernabeo, *Occupational Health Unit, Hospital of Lecco, Italy*

Domenico Cavallo, *Department of Chemical and Environmental Sciences, Università degli Studi dell'Insubria, Italy*

Pier Alberto Bertazzi, *Department of Occupational and Environmental Health, Università degli Studi di Milano, Italy*

Background and Aims: asbestos fibers naturally present in rocks and soils can be released into the atmosphere by occupational and other human activities, as well as by meteorological agents. The aim of this work was the evaluation of the occupational exposure levels and ambient concentrations of airborne fibers of naturally occurring asbestos (NOA) in quarries and processing facilities of Valmalenco serpentinites, in the neighbourhood of the facilities and in the nearest urban centres.

Methods: occupational exposures to NOA were studied through personal and static monitoring carried out during the more critical working activities. An analytical protocol composed by coupled TEM-SAED and SEM-EDS was specifically developed in order to improve specificity thanks to the crystallographic discrimination between chrysotile and other polymorphs. Airborne asbestos fiber concentrations were measured by SEM-EDS and only WHO fibers were counted according to the WHO criteria (length > 5 µm, diameter < 3 µm; aspect ratio > 3).

Results: air contamination from chrysotile fibers (amphiboles were never detected) in the selected occupational and life environments was site-dependent, as the degree of asbestos contamination of Valmalenco serpentinites is highly variable from place to place. Working activities associated with the highest exposures and airborne contaminations included cutting of non-foliated serpentinites with multiple blades or discs and drilling at quarries located in the area with rocks highly contaminated by chrysotile veins. On the contrary, working activities conducted on foliated serpentinites were related with airborne chrysotile concentrations comparable with ambient levels. Environmental chrysotile concentrations were always below 2 ff/l, except for one sample collected on a dirt road.

Conclusions: the present study would be useful for encouraging the development of an effective and harmonized policy for proper use of contaminated rocks and protection of public health. This work was supported by Regione Lombardia.