

CHARACTERIZATION AND RADIATION IMPACT OF CORRUGATED ASBESTOS ROOFING SHEETS IN SRI LANKA

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Asbestos products have been banned and restricted in more than fifty (50) countries in the world, however, currently about 125 million people in the world have been exposed to asbestos and used in thousands of asbestos products. Large numbers of people are being died in the world due to asbestos related diseases such as asbestos-related lung cancer, mesothelioma and asbestosis from occupational exposures, which are categorized as disorders caused to the lung and pleura due to inhalation of fibres of asbestos. It is noticeable that a considerable amount of asbestos remains in buildings where constructions take place, weathering and aging of such buildings could also result in fragmentation of asbestos. Disturbing the asbestos-containing material for maintenance or renovation could also generate asbestos fibre and pose a threat to the life of the people who are exposed to such environments. The prohibition of more dangerous 'blue asbestos' by Sri Lankan government started in 1987, however, the usage of less dangerous 'white asbestos' in the forms of corrugated asbestos roofing sheets, water supply lines, fire blankets, insulation materials and some parts for automobiles in recent times has been increased, presuming that most of the asbestos have been imported from the countries that are not used asbestos products anymore. X-ray diffraction and its radiation measurements of corrugated asbestos-cement roofing sheets allows for characterization of commercially available corrugated asbestos roofing sheets in Sri Lanka. X-ray diffraction and its radiation measurements of corrugated asbestos-cement roofing sheets allows for characterization of commercially available corrugated asbestos roofing sheets in Sri Lanka. Four (04) types of commercially available corrugated asbestos roofing sheet samples namely were studied to characterize the fibres. Hazardous fibre namely chrysotile was detected in the three asbestos roofing sheet samples (*Sigiri*, *Sri Ramco* and *Rhino* corrugated asbestos) in Sri Lanka whereas hazardous fibres have not been detected in *Elephant Masconite* corrugated asbestos roofing sheet sample. The usage of corrugated asbestos sheets may be a potential hazardous for human as asbestos building materials have originated from mantle derived olivine and amphibole minerals, which could lead to substitute radioactive cations. The specific activity of ^{40}K , ^{238}U and ^{232}Th , the radium equivalent activity and gamma index were evaluated in corrugated asbestos sheet samples to assess the potential radiological hazard associated with the roofing materials. The average $R_{\text{a,eq}}$ values of the studied samples range from $39.12 - 75.42 \text{ Bq kg}^{-1}$, which are below the internationally accepted values (370 Bq kg^{-1}). Based on the values of the radiological parameters (Radium Equivalent Activity ($R_{\text{a,eq}}$), Gamma index (I_{γ}), Absorbed gamma dose in air (D_{in}), Absorbed gamma dose out in air (D_{out}), annual indoor effective dose rate (D_{effin}) and Annual Outdoor Effective Dose Rate (D_{effout})) obtained in this study, all the currently used corrugated asbestos roofing sheets samples considered do not pose any significant radiation hazard. It is suggested to introduce to asbestos management plan and the phasing out plan with proper alternative for asbestos roofing sheets.

Key Words: corrugated roofing sheets, asbestos fibre, XRD, radiation, Sri Lanka