A Study on Identification of a Suitable Alternative for Asbestos Fibers

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Asbestos is a widely used roofing material in the construction field all over the world. In Sri Lanka, 85% of people use asbestos as a roofing material. According to the World Health Organization, fibers including in asbestos is one of the most harmful occupational carcinogens. Therefore, the government of Sri Lanka wanted to ban asbestos roofing sheets from 2018 in Sri Lanka which has not been successful. The main objective of this study was to find out the suitable alternative for asbestos fibers. Fibers of coir, bamboo, corn skin and polythene of rice sacks were considered as alternative materials that can be collected easily. Two samples were taken for each fiber type by changing fiber proportion and testing was carried out to check the breaking load, density, water absorption, and resistance to acidified water of the sheet. All the testing procedures were carried out according to the Sri Lanka Standards Institute specifications on corrugated asbestos sheets. This study indicated that the polythene of rice sacks has reached the breaking load up to 7.51 kN m^{-1} while the density of is 2946.6 kg m^{-3}. The water absorption percentage was 12.9% and resistance to acidified water was 0.024 kg m^{-2}. According to the Sri Lanka Standards Institute, even asbestos sheets also have a breaking load of 5 kN m-^{1} while the density of the sheet should not less than 1200 kg m^{-3}. Water absorption should not exceed 28% of the dry mass and resistance to acidified water test should not be more than 1.15 kg m^{-2}. The above results narrate that the polythene from rice sacks can be utilized as a good substitute for asbestos fibers which meets Sri Lanka Standards Institute standards. This study furthermore indicated that all test specimens except polythene fiber failed the breaking load test due to shorter fibers length. Shorter length fibers reduce the bonding between quarry dust, cement, and fibers. With the use of micro and lengthy fibers, these alternatives can be developed in the future.

Keywords: Asbestos, Alternative, Fibers, Corn, Bamboo