

(108)**Brick Material as a Remedy for Textile Waste Accumulation****Ukwaththa U.M.R.C.* , Danthurebandara M.**

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Abstract

At present, textile waste has become one of the major sources that emit solid waste which leads to environmental pollution. This industry emits large amounts of pollutants daily and dumped into landfills. Waste resulting from these industries are increasing gradually. Dumping textile waste leads not only to clog landfills around the world, but also to bury the resources without allowing them re-entering the natural material cycles. This eventually results in decreasing the quality of soil and as well as water. As a result, developments of ecofriendly technologies to minimise the negative impacts of this crisis are considered. Therefore, it is of vital importance to consider about the possibilities of valorization of textile waste through producing innovative products. Utilisation of textile waste in brick manufacturing with the objectives of minimising the environmental and social impacts and reintroducing textile waste to the material cycle is an important part of the research effort. The experiments were performed for spandex waste which contains 87% nylon and 13% lycra elastane. Textile waste samples and clay were collected from contourline-Pallekele and Thisawawe domestic clay brick manufacture site in Anuradhapura respectively. Then all experiments were designed from using design of experiments Taguchi method. Firstly, clay samples were dried under sunlight to remove moisture of clay. Then reduce particle size used by jaw crusher to prepare homogeneous mixture. Then necessary amount of clay and textile waste was measured separately followed by mixing textile waste and clay well by adding water gradually. Next, clay was put into the mold (50 mm×50 mm×50 mm) and kept 6 hours of normal environment conditions. After that get, away into the brick from mold and kept 12 hours in normal environment conditions. The molds were subjected to different burning temperatures (200-800° C) and burning hours (2-8 h). Finally, bricks were burn used by muffle furnace. The bricks were made of clay and different amounts of shredded spandex (3-9.75% w/w). The quality of the products was analysed by the compressive strength and water absorption levels of the brick. As a result, the mixture with the best combination was determined as 6.5% textile waste composition, 500° C firing temperature and time up to 5 hours.

Keywords: Textile waste, Clay Bricks, Compressive strength, Water absorption