Feasibility of using industrial waste in Sri Lanka to develop composite construction material: A Review

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Sri Lanka has been facing an increasing industrialization process since free market economy in 1977. Consequently, a multitude of factories were located in highly populated urban or sub-urban areas and their improper disposal of waste has ensued environmental pollution and public health hazards. On the other hand, an excessive demand for clay bricks has arisen due to the growth of population and advancements in the construction sector in the country. A sustainable solution for both above stated problems can be derived by developing this composite clay brick using selected industrial wastes in order to achieve green economic benefits. The purpose of this paper is to review the previous literature to overlook the feasibility of utilizing industrial waste to develop a composite brick for construction industry in Sri Lanka by using clay and solid industrial waste such as ceramic, glassware and electronic waste, fly ash, rice husk ash and sugarcane bagasse ash. Clay is a non-renewable resource which was used as the main raw material in the production of the clay brick. As the first step, selected industrial waste materials were processed and mixed with clay in different weight ratios. Thereafter, the mixture was subjected to shape and press. Subsequently the firing was done in suitable temperature conditions for selected time ranges. Finally, drying process was carried out by natural or artificial methods. After the manufacturing, standard tests were done in order to examine the *compressive* strength, water absorption and bulk density of the bricks. The composite bricks that were made from various industrial wastes indicated favorable results in above tests in different clay to waste mass ratios. Despite the limitations in the research area, this brick can be used for constructions in the future through further research, development and standardization.

Keywords: Industrial Waste, Composite, Construction Material, Sustainability, Waste Management