



PROJECT SUMMARY

Ref No.: MRIC-PCS-2002	Title: Investigating the use of PET Plastic Chips in Concrete Blocks
Local Company: Green Block Sustainable Manufacturing Ltd	
Collaborating Institution: University of Mauritius	
Project Leader	
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TECHNICAL ABSTRACT	
<p>The use of concrete blocks in Mauritius has made a strong hold due to its resistance to cyclonic conditions while providing aesthetic designs which the local construction industry has become well versed in. However, concrete blocks and concrete products in general carry a negative environmental index due to the extensive use of imported ingredients, which themselves are produced using non-environmental friendly processes, e.g. energy intensive processes to thermally decompose calcium carbonate into lime and carbon dioxide. Past research work has investigated the impact of replacing sand in the concrete mix, and in our local context, this can be likened to the substitution of either rocksand or 3/8 aggregate which are used in the fabrication of concrete blocks in Mauritius. The production of both rocksand and 3/8 aggregate involves energy intensive processes to break basalt stones. The transportation of the cement to Mauritius adds a further embodied energy component that worsens its environmental index. The potential to use plastic to reinforce concrete has been investigated to achieve different goals, e.g. to improve compressive strength, toughness and crack resistance. The incorporation of plastic into the concrete mix brings another advantage in terms of reduction in the percentage of the raw materials overall, and makes the end product more environmental-friendly provided the reinforcement materials themselves have a good environmental index. For example, use of glass reinforcement in concrete can be shown to be beneficial, but production of glass fibres themselves may not be environmental-friendly. This project aims to build on the findings in literature on the use of chips generated from waste plastic bottles in concrete blocks for the local market. The use of waste PET plastic bottles to</p>	

produce chips is a low energy process (compared to rocksand and 3/8 aggregate production) and also helps in diverting plastic bottles from landfills. The need to research into the appropriate percentage of plastic chips in the concrete mix stems from the specificity of the concrete block mix for Mauritius as well as the influence of the concrete grade and plastic fibre fabrication method on the mechanical properties of the resulting product. This research aims to use existing test methods such as tensile and compressive strength to systematically devise experiments which will allow setting the parameters for various grades of concrete blocks with accompanying characteristics.

Key Words: Plastic chip integrated concrete blocks, Environmental index, sustainable construction, recycled materials