

## AN INTEGRATED FRAMEWORK TO SELECT BUILDING MATERIALS FOR CONSTRUCTION PROJECTS IN SRI LANKA

Senanayake H.H.\* , Jayasinghe C. and Kariyawasam K.K.G.K.D.

Department of Civil Engineering, University of Moratuwa, Moratuwa

Construction Industry has contributed to more than one third of global carbon emissions. Adoption of sustainable development approaches could minimize such environmental and social impacts. To guide the construction industry more towards sustainability, one of the key requirements is to develop a standard framework to rate the suitability or greenness of building materials. Such a framework should also address the country-specific priorities and assess whole life performance starting from extraction of raw materials to the disposal of material after usage. This study provides an improved standard framework to rate green building materials that could help policymakers to implement rules, regulations, and tax benefits in near future with the aim of encouraging the use of sustainable building materials. The framework was improved from the existing building material rating system in Sri Lanka by making changes for the fields and measurements and by assigning weightages based on country specific priorities. The developed approach provides a green building material rating for the materials considering the relative importance of seven factors including natural resource consumption, recycled / reused / regenerated component, energy demand and CO<sub>2</sub> emission in manufacturing and transportation stages, and indoor environment. This framework was assessed by a case study of five materials, and it was found that the framework provides an integrated solution to measure greenness of building materials. According to the framework developed, highly green-rated materials have the potential to reduce natural resource consumption, enhance energy efficiency and water efficiency, reduce greenhouse gas emissions, enhance indoor environment quality, and improve social well-being. This study shows that some products provide sustainable solutions only in one or two fields and those products are not fully green although the exceptional performance in the one or two fields makes the product attractive to the customers. Moreover, this study found that governing bodies should pay attention to knowledge sharing with not only manufacturing firms but also with rural industries as they tend to lag behind the large firms in producing fully green building materials. The integrated framework developed and tested in this study could be leveraged by the governing bodies, the industry, and the wider world to identify the greenness/sustainability of building materials quantitatively.

**Keywords: Integrated approach; selection framework; green building materials; construction; Sri Lanka**

\* Correspondence: [hashanih95@gmail.com](mailto:hashanih95@gmail.com)