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Short Biography

Prof. Hatem is Professor of Environmental Planning at Egypt Japan University of Science and Technology. He holds a MSc in Architectural Engineering from the Aswan University, Egypt, and PhD in Urban Planning from Kyushu University, Japan. He is the Director of the Sustainable Architecture Program at Egypt Japan University of Science and Technology in Egypt. His areas of expertise include teaching and research in Sustainable Urban Planning and Environmental Solutions to improve the built environment. His previous publications have focused on urban geometry and its impact on micro-climate conditions to improve outdoor and indoor thermal comfort using onsite measurements and ENVI-met software, as well as developing green building materials that support the sustainability and green circular economy. His current research focuses on optimizing building envelopes, passive techniques, PV/green roof integration, Green and Sustainable materials. Prof. Hatem has published over 50 research papers in international refereed journals and conferences. He is the founder of Urban Climate Lab at Aswan University in cooperation with the Free University of Berlin (under the program of German Egypt Research Fund), as well as the founder of Sustainable Architecture and Green Materials Lab at Egypt Japan University of Science and Technology (funded by ASRT). He also has extensive practical experience.

Google Scholar: https://scholar.google.com/citations?user=aRFUB-4AAAAJ&hl=en

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Abstract

The disposal of construction waste presents a significant environmental challenge, with a substantial volume deposited in landfills and illegal dumping sites. A sustainable solution to this issue involves recycling construction waste into resourceful building materials such as masonry blocks, which has emerged as a sustainable alternative. Blocks constitute a large proportion of materials often used as building envelopes and contribute to the energy needs of a building. However, the thermal performance of the combined use of Construction and Demolition wastes (CDW) to produce blocks has received little attention. Therefore, this presentation addresses these issues and presents an assessment to the thermal properties of novel concrete blocks made from different recycled CDW for potential sustainable and energy-efficient building applications. In addition to experimentally conducted tests on the hardened properties and a sustainability impact assessment. Important findings will be shown in terms of the experimental and simulation tests for assessing the energy performance of the blocks when utilized as a single-layer building envelope.

Novel blocks mixture will be introduced which could decrease typical raw material consumption by up to 35% while substantially reducing thermal conductivity and heat transfer by more than half. average annual electricity consumption can be decreased by 114.87 kWh. The energy-use intensity of these blocks can improve energy efficiency by up to 9.28%. The sustainability assessment revealed that the developed concrete blocks could achieve lower production costs and carbon emission reductions, up to 31.60%, than typical concrete blocks. These blocks, therefore, present the masonry block market with a sustainable approach by offering improved performance and cost reductions in raw material consumption, energy savings, and environmentally friendly block production.