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COMPOSITE AND HYBRID SOLUTIONS FOR SUSTAINABLE DEVELOPMENT IN CIVIL ENGINEERING

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Abstract

Construction has always been considered a major producer of serious environmental problems due to large consumption of resources in terms of materials and energy accompanied by environmental pollution; therefore, the projects aiming to reduce these damaging effects are more than welcome. The objective of sustainable development is difficult to be performed by civil and structural engineers at a global scale. However, some solutions and systems for load bearing and cladding elements that make the buildings or other types of civil engineering applications may contribute, at least partially, to attaining some goals of sustainability.

Fiber reinforced polymeric (FRP) composite structures and hybrid systems may become sustainable when they utilise minimum material resources, increase the life span of buildings, have a very low environmental impact and ensure the high quality of civil infrastructures. The main objectives of the paper are related to the use of FRP composites in new construction components as well as rehabilitation of deteriorated civil engineering structures aiming to achieve sustainable solutions in civil and structural engineering. Starting from the concept of FRP composites and hybrid systems the authors describe a number of research and development projects carried out by the Composite in Construction Research Group (CCRG) at the Faculty of Civil Engineering, “Gheorghe Asachi” Technical University of Iasi. After a critical evaluation of FRP composite materials applied in construction, the authors describe and analyse their results which addressed a long term program including: all composite structures, multilayered sandwich construction, concrete elements reinforced with FRP composite bars, and modern solutions for structural rehabilitation of load carrying elements made of traditional building materials aiming to improve the building components performance.

Key words: hybrid systems, polymeric composites, sandwich elements, sustainable construction, structural rehabilitation

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