



Special issue on Sustainable Structures: Whole-life analysis, environmental impacts, and material efficiency

Climate change is likely the most challenging issue ever faced by humankind, with far-reaching impacts to the natural environment and long-lasting effects on the economy and society. Engineering knowledge, research and innovation are the foundation of our modern world, and their advancement has created more wealth and enhanced quality of life for an ever increasing number of people. For the first time in history we are witnessing a global paradigm shift, with more than half of the global population currently living in urbanised areas, a proportion expected to further increase in the next 70 years, when an additional 2 billion people will be living on this planet. Yet, the historic reliance of such progress on non-renewable natural resources for energy and raw materials has brought up the necessity to redefine the many lines of knowledge along which research and innovation are pursued, including the field of structural engineering.

The aim of this special issue was to capitalise on the state-of-the-art research focused on such challenging lines and bring together a coherent knowledge capital to benefit academics and practitioners in the field of structural engineering to accelerate real-world impact.

A range of high-quality papers were received for consideration, covering the wider spectrum of sustainability themes that are interlinked with structural engineering research. These include: the characterisation of innovative materials and systems that can lower emissions via biogenic uptake [1] or enhance building thermal performances [2]; the potential for digital fabrication methods aimed at material-efficiency [3] and reuse of structural components [4] as well as investigations on how design choices affect embodied greenhouse gases in tall building structures [5]. Other contributions were focused around methodological issues involved with the application of Life Cycle Assessment (LCA) to materials [6] products [7,8] and systems [8]; as well as the implementation of novel and simplified approaches [9].

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