Special Issue

Circularity in Construction Using Waste-Derived Materials: Present Challenges and the Way Forward for a Sustainable Future

Message from the Guest Editors

Rapid urbanization has greatly increased the demand for building materials, challenging environmental sustainability. Meanwhile, millions of tons of construction and demolition waste (C&DW) are generated worldwide, potentially reusable in new developments. However, limited understanding of their properties and insufficient policies often lead to stockpiling or landfilling, causing costs and environmental risks. The Waste Framework Directive 2008/98/EC prioritizes C&DW in the EU due to its large volume. Alternative aggregate sources are also being explored for construction. This Special Issue aims to share global best practices on waste-derived construction materials through a circular economy perspective, emphasizing reuse and recycling to reduce embodied carbon from extraction to end of life. This Special Issue focuses on the following:

- Innovative utilization of waste material in construction.
- Life cycle assessment and embodied carbon.
- Climate-resilient waste-derived building materials.
- Environmental toxicity and leaching of waste-derived materials.
- Digital technology in low-carbon construction.
- AI and ML in C&DW management.

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About the Journal

Message from the Editor-in-Chief

Current urban environments are home to multi-modal transit systems, extensive energy grids, a building stock, and integrated services. Sprawling neighborhoods are composed of buildings that accommodate living and working quarters. However, it is expected that the cities and communities of the future will face complex and enormous challenges, including maintenance, interconnectivity, resilience, energy efficiency, and sustainability issues, to name but a few. A smart city uses advanced technologies and a digital infrastructure to improve the outcomes in every aspect of a city's operations. A smart building optimizes the experience of occupants, staff, and management by using a modern and connected environment. Innovations in technology that can bring dramatic improvements to design, planning, and policy are critical in developing the cities and buildings of the future.

Editor-in-Chief

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