Special Issue

Eco-Friendly and Sustainable Concrete Technology

Message from the Guest Editor

To reduce CO2 emissions in the cement industry, various measures can be adopted, such as improving energy efficiency, carbon capture and storage, and clinker substitution. Supplementary cementitious materials (SCMs) play a crucial role as partial substitutes for cement in concrete, either in blended cement or incorporated directly. These materials, including quarry fines, industrial wastes, or byproducts, offer significant environmental and economic benefits in reducing Portland cement use. While many studies focus on the durability of SCM-based concretes, limited research addresses their microstructural, porous structure (e.g., porosity, pore size distribution), and transport properties (e.g., permeability, diffusion coefficients, water absorption). Furthermore, understanding their mechanical performance under thermo-hydro-chemo-mechanical (THCM) stresses remains underexplored. This Special Issue seeks to advance knowledge in these areas to optimize SCM use in concrete.

Guest Editor

Dr. Harifidy Ranaivomanana

Department of Civil Engineering and Sustainable Construction, Nantes Université, 44000 Nantes, France

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Buildings
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
buildings@mdpi.com

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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

Prof. Dr. David Arditi
Construction Engineering and Management Program, Department of Civil, Architectural, and Environmental Engineering, Illinois Institute of Technology, 3201 South Dearborn Street, Chicago, IL 60616, USA

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