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Advanced Materials and Novel Technique in Civil Engineering

Guest Editors:

Dr. Xiaoming Liu
School of Civil Engineering and Architecture, Central South University, Changsha 410075, China

Dr. Jianguo Jiang
School of Civil Engineering and Architecture, Central South University, Changsha 410075, China

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Message from the Guest Editors

Civil engineering is a comprehensive science that has been applied throughout the whole of history. Indeed, concrete is the most important and widely used building material in civil engineering. Many new materials have been applied to the field of civil engineering in the form of additives or aggregates, in order to improve the engineering properties of concrete; as such, the efforts of researchers around the world are focused on the working performance of, and the methods used to modify, advanced additives. At the same time, this research benefits from the application of microscopic test methods, such as X-ray diffraction (XRD), scanning electron microscopy (SEM), and the Fourier transformation infrared (FTIR), and the development of computer technology, such as molecular dynamics (MD), the finite element method (FEM) and mesoscopic modeling. The influence of advanced materials on the working performance of concrete and the action mechanism between different materials can be further studied at the meso-scale and micro-scale.

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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

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.

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Contact Us

Buildings Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland

Tel: +41 61 683 77 34
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