Special Issue

Performance Analysis and Design Method of Ultra-High Performance Concrete

Message from the Guest Editors

Concrete is one of the most important engineering materials from a socioeconomic perspective on the development of modern civilization. Ultra-high performance concrete (UHPC), which was first introduced as a reactive powder concrete in the early 1990s, is a class of advanced cement composites. Generally, coarse aggregate is eliminated in order to further improve the underlying material homogeneity. A proper number of fibers are also incorporated into UHPC in order to improve the post-cracking tensile strength and energy absorption capacity. Due to its ultra-high strength, good ductility, and excellent durability, UHPC has been increasingly emerging as a premier construction material over the past two decades for high-rise buildings and other infrastructure.

- recent developments and applications in UHPC
- mechanical, durability and microstructure properties
- mixture design methodology
- structural performance analysis
- design principle and guideline
- extreme loading
- strengthening and rehabilitation
- constitutive modeling
- finite element and meshless analysis
- machine learning technology

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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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