



Pozvánka na přednášku / Lecture Announcement

Název / Title

Discrete Multi-physics Coupled Modeling of Concrete at high and low temperature

Přednášející / Lecturer

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Jazyk / Language Anglický/English

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FCE BUT, Brno, Veveří 331/95, budova / Building C
místnost / Room 421 - zasedací místnost ústavu STM

Abstrakt / Abstract

The discrete mechanical model effectively characterizes explicit cracking patterns in concrete fracture, while its multi-physics coupled behavior remains situated within a continuum problem. One solution is to establish a dual-lattice topology, including the Mechanical Lattice system for discrete modeling and the Flow Lattice system for continuous modeling of the mass flow along cracks and thermal resistances across cracks. For concrete under *extremely high-temperature* conditions, a mesoscopic thermo-moisture-gas-mechanical coupling discrete model is established, realistically simulating the phenomenon of thermally induced spalling at high temperatures. The two-way coupling scheme is employed to describe the concentration-vaporization-migration of gas-water mixtures in concrete pores and cracks. *Low temperature* problem uses a simplified one-way coupled scheme because the solid ice does not move through cracks. The proposed mesoscopic thermo-moisture-ice-mechanical coupling discrete model for concrete can capture the non-equilibrium hysteresis process of freezing-melting-migration of water in concrete pore as well as the damage from surface to inside.

Přednášející / Lecturer

Lei Shen was a joint Ph.D. student in Prof. Cusatis's group at Northwestern University from 2016 to 2018. He received his Ph.D. degree in hydraulic structural engineering from Hohai University in Nanjing in 2018. He then worked as a postdoctoral researcher in the Department of Engineering Mechanics at Hohai University for three years before becoming an associate professor in the Department of Hydraulic Structural Engineering in 2021. He received the Young Research Award at FraMcoS-X in 2019. His research and teaching interests focus on multi-physics coupled problems related to the mechanical behaviour of concrete under extreme high and low temperatures. He has been a key developer of the Multi-physics Discrete Particle Model for Fiber-Reinforced Concrete.

Organizátor / Organizer

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Projekt / Project Programu na podporu strategického řízení