Multiscale modeling of concrete and concrete structures

in honor of the 80th birthday of Prof. Herbert A. Mang

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ABSTRACT

The special session is dedicated to celebrating the 80th birthday of Prof. Herbert A. Mang. The topic “Multiscale Modeling of Concrete and Concrete Structures” is to be understood in a broad and inclusive fashion. This includes methodological developments regarding multiscale and multiphysics modeling of all types of concrete made from traditional and innovative binders: normal strength concrete, high strength concrete, light weight concrete, fiber reinforced concrete, sprayed concrete, 3D-printed concrete, etc. Length scales of interest range from atomistic via molecular, nano, micro, and meso up to the macro scale of concrete. All time scales relevant for the behavior of concrete subjected to different environmental and static as well as dynamic loading conditions are also included, e.g. the time scales relevant for early-age hydration, shrinkage, creep, transport processes, impact and blast loading, etc. Approaches to material modeling supported by innovative experimental protocols and applications of predictive material models to multiscale analysis of unreinforced and reinforced concrete structures are particularly welcome. Structures of interest include pavements, bridges, tunnel linings, power plants, cooling towers, and high-rise buildings. Structural analyses supported by measurement data from real-scale testing and/or monitoring of existing structure, contributions dealing with serviceability and ultimate limit states under regular and exceptional load cases, as well as research work targeted at decreasing the CO2 footprint and increasing the durability of engineering infrastructure are especially encouraged.