ADVANCED SIMULATION TECHNIQUES FOR THE STRUCTURAL DESIGN OF CARBON REINFORCED CONCRETE

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MINISYMPOSIUM

Driven by the rise of innovative materials such as non-metallic reinforced components, there is a general trend to rethink the design of structural buildings and allows conceiving the construction of those. Inspiration from biology is leading to new ways to build lightweight, resource-efficient components with optimized strength. Compared to their conventional steel counterparts, these reinforcements offer superior flexibility in geometric shape, while at the same time offering higher corrosion resistance. Especially in the civil engineering context, carbon reinforced concrete (CRC) emerges as a versatile and sustainable material option for a wide range of applications.

The construction with CRC necessitates the utilization of advanced simulation techniques for structural analysis. On the one hand, micromechanical mechanisms have to be investigated which take into account the material behavior of the components and their interaction. On the other hand, simulation methods for the analysis of curved, lightweight construction elements need to be developed. At all levels of analysis, a high degree of accuracy and efficiency is required to exploit the material properties to the optimum.

Topics of interest include (but not limited to)

- Material modeling of the inelastic behavior of carbon reinforced concrete
- Methods for the analysis of debonding, fracture and failure of CRC
- Simulation methods for thin, curved structures
- Homogenization, multi-scale modeling and mixed-dimensional substructure modeling
- Model order reduction techniques in quasi-static, inelastic analysis

This mini-symposium aims to convene researchers specializing in the field of modelling structural concrete and to provide a platform for the exchange of interdisciplinary knowledge. The primary focus is on advanced simulation techniques tailored for carbon reinforced concrete.
Nevertheless, the mini-symposium welcomes contributions involving techniques that either exclude reinforcement or incorporate alternative reinforcement materials.