Graduiertenkolleg 2075
Modelle für die Beschreibung der Zustandsänderung
bei Alterung von Baustoffen

Technische Universität Braunschweig

Vortrag im Gästeprogramm des GRK 2075

Prof. Adnan Ibrahimbegovic

University Technology Compiègne / Sorbonne Universities France

Multiscale analysis of concrete and reinforced-concrete with particular reference to structural integrity and structural durability

Mittwoch, 28.10.2015, 14.00 Uhr
Institut für Wissenschaftliches Rechnen, Raum 812
Mühlenpfordtstrasse 23, 38106 Braunschweig

In this work we discuss the computational models for concrete and reinforced-concrete that can help us quantify the structural integrity and durability. We start with macro scale and structural point-of-view to develop the models that allow to predict the crack spacing and opening. The key ideas pertain to capturing the localized failure induced by concrete cracking, along with the bond slip redistribution for reinforced concrete. We then turn towards the meso scale that allows to distinguish the internal structure of concrete as two-phase material, with aggregate and cement matrix. The meso scale representation of concrete provides material point-of-view that also enables to capture the concrete heterogeneities, and corresponding size effect. The latter implies that the difference in size between the specimen versus real structures can lead to rather different dominant failure modes and consequently rather different results on structural integrity. We finally present the results on micro scale of concrete structures, where different phases of cement are visible, which further allows to quantify the structure durability.

The key point of the development to be presented concern the comprehensive treatment of all these questions, where for successful models we should the sound theoretical formulations, the discrete approximations (based upon FEM, ED-FEM, and X-FEM) and algorithmic aspects with operator split.

Kontakt
Institut für Statik
Technische Universität Braunschweig
Beethovenstraße 51
38106 Braunschweig
0531 - 391-3668
statik@tu-bs.de
www.tu-braunschweig.de/grk-2075