# MULTISCALE AND MULTI-CHEMO-MECHANISTIC APPROACH TO THE LIFE-CYCLE ASSESSMENT OF STRUCTURAL CONCRETE

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## ABSTRACT

Moisture and micro-space including cracks are the two scourges of structural concrete, and understanding the multi-scale interactions between the two is the key to determine long-term durability performances. This paper firstly deals with moisture migration/balance and its volume change with creep in in-service bridge viaducts that are experiencing excessive deflections by using an integrated micro-material-structural modeling. Second, the shear capacity and post-peak ductility change caused by concrete self-desiccation with autogenous shrinkage is discussed and water-crack interaction in RC slabs under moving loads is discussed in line with multi-scale modeling and analysis.

Keywords
Multi-scale analysis, micro-pores, fatigue, creep, shear capacity, self-desiccation