Assessment of Existing RC Bridges with Spatially-Variable Pitting Corrosion Subjected To Increasing Traffic Demand

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Abstract

Bridges are critical infrastructure for transportation networks. Two main factors play a key role in bridge health conditions: ageing and wear-and-tear due to the increasing traffic.

The seminar will discuss the outcomes of a newly developed comprehensive framework to quantify the above combined phenomena in a holistic approach. The reliability assessment of an existing reinforced concrete (RC) bridge subjected to increasing traffic demand and spatially-variable pitting corrosion is investigated. Empirical data are used to develop probabilistic models for cracking initiation, pitting factor, severe cracking, and cover spalling. Statistical distributions of temperatures from a local meteorological station are presented to investigate environmental effects on corrosion initiation. National highway databases are used to model the vehicular flow. Finally, Monte Carlo simulations are performed at intervals of 10 years to derive a time-dependent reliability profile compared against standard thresholds to determine the health conditions of the bridge.