THE UNIVERSITY OF HONG KONG

DEPARTMENT OF CIVIL ENGINEERING

SEMINAR

Durability design and cracking control of concrete structures

Dr. Shengjun Zhou
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Date: November 1, 2019 (Friday)
Time: 2:00 p.m. - 4:00 p.m.
Venue: Room 612B, 6/F Haking Wong Building
The University of Hong Kong

Abstract

The presentation comprises four parts – **1).** ***Deterioration Mechanism due to Reinforcement Corrosion*****:** Including transport modes of deleterious media in concrete and deterioration mechanism due to reinforcement corrosion, key influencing factors and some research outcomes. **2).** ***Service Life Design, Assessment and Repair*****:** Including major methods in durability design of concrete structures and their features, principle of chloride modelling and development, development of third generation (3G) analytical models for chloride diffusion and 3G numerical models for carbonation, using modelling method in service life design of new structures and in residual life determination of in service structures, some examples of their applications. **3).** ***Effect of Cracks on Concrete Durability*****:** Including the causes of cracking, effects of crack width on transport of deleterious media, on carbonation, on rate of reinforcement corrosion, and on service life of concrete structures, and the maximum limit of crack width. **4).** ***Thermal and Cracking Analysis*****:** Including mechanism of crack formation, numerical modelling of temperature distribution in concrete with a certain mix proportions, raw materials, initial temperature, weather condition and formwork/ insulation, with cooling pipe system, evaluation of restraint, cracking analysis and control measures, project examples etc.

About the Speaker

Dr. Shengjun Zhou is Principal Engineer – Civil/Materials in BCRC Australia. He received PhD degree in University of Dundee in UK and Master of Engineering in Tsinghua University in China. He previously worked in AECOM and Ancon Beton as Principal Engineer/Consultant and in Boral as R&D Manager. He also worked as Research Fellow in Dundee University and National University of Singapore. He has 34 years of experience in concrete research and engineering. He has key contributions to modelling of reinforcement corrosion in concrete structures and early age thermal modelling to control cracking. He established the third-generation (3G) analytical chloride models for concrete with an increasing surface chloride level and a decreasing diffusivity and also the third-generation (3G) numerical models to predict concrete carbonation under gradually changing climate conditions (CO_2, temperature and humidity). These models are more accurate than the previous generations and have been used in in durability design and condition assessment of concrete structures. His latest paper resolved the long-term dispute between two widely used second generation (2G) chloride models. He established the thermal models for concrete element on ground, cylinders and cooling pipe system.

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