NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

You are cordially invited to the seminar organised by Protective Technology Research Centre (PTRC).

Seminar on

Flexural Behaviours of Engineered Cementitious Composites Encased Steel Composite Beams

Abstract:

This presentation will discuss the flexural and bond-slip behaviour of composite beams fabricated by encasing universal steel beams with Polyvinyl Alcohol-Engineered Cementitious Composite (PVA-ECC) and Light Weight Concrete (LWC). We conducted four-point bending tests on one bare steel and four composite beams with different ECC and LWC encasement configurations. Test results showed that the ECC and LWC encasements could enhance the flexural strength and ductility of bare steel beams significantly. Furthermore, it was found that the weight of the encased beams could be reduced by either replacing the bottom ECC layer with LWC or even only encasing the compression flange of the steel section without reducing the flexural strength of the beam significantly. In addition, the bond-slip behaviour between the ECC matrix and the steel section was investigated. We also developed a non-linear finite element (FE) model which was validated against the test results. A small scale parametric study was then conducted by using the validated FE model to investigate the performances of beams formed by the steel sections with yield strengths ranging from 350 MPa to 960 MPa.

Speaker:

Professor Chi-King LEE is a Professor in Civil Engineering and Deputy Head of School of Engineering and Information Technology, The University of New South Wales Canberra at the Australian Defence Force Academy, ACT 2600, Australia. He was a Faculty with the School of Civil and Environmental Engineering, Nanyang Technological University, Singapore before his Professorship at the NSW Canberra.

Professor Lee has been working in the areas of finite element modelling and structural engineering for many years. His main research interests include automatic finite element mesh generation and adaptive algorithm, steel structure, sustainable building structure system and protective engineering for structure. He acts as reviewer for many international journals in the areas of numerical modelling, structural mechanics and engineering. He also worked as a consultant for the PSA Singapore on the dynamic fatigue study of container quay cranes, as well as for a building design software company to provide recommendations on the implementation of their analysis and design software.

Date: 11 Jan 2019 (Friday)
Time: 10.00am to 11.30am
Venue: CEE Seminar Room D, Block N1, Basement 4, Section C, N1-B4c-09b
School of Civil and Environmental Engineering (CEE), Nanyang Technological University | Singapore