Department of Mechanical Engineering
機械工程學系

THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

Seminar

Date: 27 October 2009 (Tuesday)
Time: 11:00 am -12:00 pm
Venue: EF 305, The Hong Kong Polytechnic University

Selective Use of High Performance Cementitious Composites in Concrete Structures

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Abstract:

To enhance the performance of concrete structures and to extend their lifetime, there have been continuing research efforts to improve the various properties of concrete, including its strength, workability, toughness and transport behavior. Materials with better performance, however, are often much more expensive than conventional concrete. In view of the large volume of materials employed in infrastructure projects, it is important to come up with novel designs in which more costly materials are only used in selected parts of the structure to achieve the highest performance/cost. To illustrate this concept, high performance fiber reinforced cementitious composites (HPFRCC) are used as examples. Depending on the composition, HPFRCC can be designed to have very high ductility (up to 5% in direct tension) or very high strength (above 150 MPa in compression). In this talk, we will cover the design principles of both high ductility and high strength cementitious composites. The applications of these materials in real world projects are described. Recent research results on the use of HPFRCC in (i) the fabrication of permanent formwork for concrete structures, (ii) the resisting of tensile splitting at regions of localized stresses (such as the anchorage region in post-tensioned members), and (iii) the joint between pre-cast concrete components, are then presented. With various examples, we hope to demonstrate that advancements in materials can make possible the design of new structures that are performing better, more durable and easier to construct.

Biosketch:

Prof. Christopher Leung received his Ph.D from MIT in 1990 and worked as post-doctoral fellow and assistant professor at MIT from 1990-1997. After his promotion to associate professor in 1997, Prof. Leung joined the Department of Civil and Environmental Engineering at HKUST. He became a full professor at HKUST in 2005 and Head of the Department in 2009. Prof. Leung's research interest is in composite mechanics and he has worked on various problems including the design of pseudo-ductile cementitious composites, the retrofitting of concrete structures with fiber reinforced polymers as well as the micromechanics-based design of fiber optic sensors. He has delivered keynote lectures in international conferences in the U.S., Canada, U.K. as well as China. One of his papers was awarded the Best Practice-Oriented Paper published in the ASCE Journal of Composite Construction for the Year 2007. Professionally, he is serving as associate editor of several SCI journals and has recently been elected Honorary President of RILEM (International Union of Laboratories and Experts in Construction Materials, Systems and Structures) for the Year 2011.

* Refreshment will be served after the seminar.