

**One hour Technical Seminar**

Organized by

The Hong Kong Institute of Steel Construction

Sponsored by

Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University

Joint Structural Division, The Hong Kong Institution of Engineers

***Reliability considerations for system-based design of steel structures by advanced analysis***

***3 July 2013***

*by*

***Dr. Hao ZHANG***

*School of Civil Engineering, the University of Sydney, Sydney, Australia*

**Abstract**

Several national steel design standards (e.g., American National Standard AISC360-2010 and Australian Standard AS4100) allow, in principle, the use of second-order inelastic analysis (advanced analysis) to check the integrity of a steel structural system. However, system reliability considerations have yet to be implemented in any rational way in the system-based design. In design by advanced analysis, the system strength is associated with the limit state of incipient collapse of the system, and it is not clear what the reliability implications would be for a structural system designed using such a method. Second, steel structural systems come in many configurations, in which the structural actions are resisted by different mechanisms. Yet, for practical design implementation, a relatively small number of resistance factors must be stipulated; what would be the taxonomy of these system resistance factors? And finally, design by inelastic analysis is likely to lead to better integrated but lighter structures; what are the implications for the serviceability performance of such frames? This presentation will investigate these questions by studying two representative mid-rise steel moment frames subject to combined gravity and wind loads. The probabilities of strength and serviceability limit states are evaluated. The effects on these limit state probabilities of system resistance factor and wind-to-gravity load ratio are examined.

**About the speaker**

Dr Hao Zhang is a senior Lecturer in the School of Civil Engineering at the University of Sydney. He obtained his BE and ME degrees from Tsinghua University. He received his PhD in 2005 at Georgia Institute of Technology. Prior to joining the University of Sydney in 2008, he spent three years with Uzun & Case Engineers, Atlanta, USA as a structural engineer. His primary research interests lie in structural reliability theory, probability-based design, risk-informed hazard mitigation, performance-based engineering, and advanced analysis and design of steel structures. His research has been strongly supported by external research funding from Australian Research Council. His most recent research projects include 1) system reliability-based steel structure design, 2) reliability-based design of temporary supporting structures at the stage of construction, and 3) probabilistic design criteria for steel rack structures under accidental forklift truck impact.



香港  
鋼結構學會

Hong Kong Institute of  
Steel Construction



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**Date:** 3 July 2013  
**Time:** 6:00 pm for 6:30 pm – 7:30 pm  
**Venue:** Room QR403, The Hong Kong Polytechnic University, Hung Hom, Kowloon.  
**CPD:** This seminar is recommended for 1 CPD hour  
**Certificate:** An attendance certificate will be issued upon request.

**Free attendance** but places are limited. Please send the completed registration form to **Mr. Sam CHAN, Secretary of the Institute of Steel Construction, c/o Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University, Hung Hom, Kowloon** by **12:00 noon, Date**. (Fax No.: 2334 6389) or through email: samchan@hkisc.org. For technical information, please contact Prof. S.L. Chan at 2766-6047

**REGISTRATION FORM**

**(To be received on or before 1 July 2013)**

Please fax the completed registration form to *Mr Sam CHAN* (Fax: 852-2334 6389 or Email: samchan@hkisc.org) for preliminary registration.

**on or before 1 July 2013**

**To: Mr Sam CHAN**

**Fax: 852- 2334 6389**

Personal Details:

Title	Name in full (Block Letter)	Name of Company	Tel.	Fax	E-mail address	Institution/ Membership No.
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Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**CPD Certificate of Attendance** Please tick the appropriate box to indicate your choice:

Yes, I/ we would like to have CPD certificate(s).  Not request for certificate(s).