

3 hour Technical Seminar

Advanced Design of Steel Connections and Joints – Strength, Stiffness and Ductility

by

SX Jing, YY Wang, YP Liu and JLY Chan

Organized by

The Hong Kong Institute of Steel Construction

Supported by

*Structural Division, The Hong Kong Institution of Engineers
Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University*

Abstract

Joints and connections play a pivotal role in stability and safety of steel structures, which should provide an adequate load transfer between ends of members and their connecting components. To date, the connection design heavily relies on ‘Hand Calculations’ by spreadsheet or in-house tools, leading to a potential risk of human manipulation errors due to their over-simplifications as infinite rigid or frictionless pinned joints. This ‘Hand Calculation’ method may only be valid for some typical connections. Also, the actual details may violate the assumption of ‘pinned’ or ‘rigid’ connection, while the ‘semi-rigid’ connection offers the potential of significant decreases in steel weight as a means of decarbonization with less use of material without an introduction of joint complexity and construction cost. Further, it seems not rational to consider stiffness of beams and columns but not joints in a structural design. This seminar will share the knowledge and applications of the component-based finite element method for the design of both typical and complex steel connections and joints.

About the Speakers

Mr. SX Jing is a principal structural engineer of China United Engineering Corporation (中國聯合工程集團有限公司). He is a First class registered constructor in Mainland China. He was responsible for and involved in many EPC design of power station projects in China and oversea.

Ir Kevin Wang is an Associate of Buro Happold. He is a chartered structural engineer and registered professional engineer, experienced in structural steel engineering and had led and involved a variety of projects in Hong Kong, Mainland China and other regions of East Asia such as XRL, Xiqu Centre and Morpheus Hotel.

Dr. YP Liu obtained BSc. and MEng from Sun Yat-Sen University and his PhD at HK PolyU. He is currently a guest professor at Southwest Jiaotong University and Shenyang Jianzhu University in Mainland since 2018. He was involved in drafting of steel design codes in Mainland GB50017 (2017) and sits in the ad hoc committee in Hong Kong Steel Code. Dr. Liu publishes more than 100 publications in second-order direct analysis, nonlinear finite element and computational methods and acts as the principal developer of software Nida for practical analysis and design by second-order direct analysis and its theoretical development. In addition to research in steel, composite and seismic and wind engineering and position as Associate editor of the SCI-e Journal “Advanced Steel Construction” and the Journal “Progress in Steel Building Structures”, Dr. Liu acquires extensive practical experience in steel structure design which includes the second-order direct analysis and design of the world longest steel roof in MGM resort in Macau archived in Guinness Record 2019.

Dr. Jake Chan obtained his PhD in the field of Structural Engineering at the University of Hong Kong in 2020. He is currently a senior researcher at NIDA technology Ltd. His research interests are in advanced scaffold design and semi-rigid connections by finite element modelling. His research publication “Direct Analysis of Steel Frames with Asymmetrical Semi-rigid Joints” co-authored with his PhD supervisor Prof SH LO was granted a commendation award for HKIE Structural Excellence Award (R&D Project) in 2020.

Date: 20th December 2022 Tuesday
Time: 1:30 pm for 2:00 pm - 5:00 pm
Venue: Room Z414, The Hong Kong Polytechnic University, Hung Hom, Kowloon.
CPD: This seminar is recommended for 3 CPD hours
Certificate: An attendance certificate will be issued upon request.

Please send the completed registration form to **Mr. Sam Chan, Secretary of the Institute of Steel Construction, c/o Unit 209B, Photonics Centre, No. 2 Science Park East Avenue, Hong Kong Science Park, Shatin, N.T., Hong Kong** by **12:00 noon, 9 December 2022**. (Fax No.: 3619 7238) or through email: samchan@hkisc.org. For more technical information, please contact Prof. S.L. Chan at 3595 6150 or ceslchan@connect.polyu.hk

Programme

Time	Programme	Speaker
1:30 pm	Registration	N.A.
2:00 pm	Welcome speech	Ir Prof. SL Chan
2:05 pm	Design of complex steel joints in practical projects using advanced method	Mr. SX Jing
2.45 pm	Theoretical background and advantages of component-based finite element method	Ir YY Wang
3:25 pm	Break	N.A.
3:40 pm	Innovative design of hoarding system with consideration of semi-rigid connection	Dr. Jake Chan
4:20 pm	Steel design by second-order direct analysis allowing for finite joint stiffness	Dr. YP Liu
5:00 pm	End	N.A.

REGISTRATION FORM

(To be replied on or before 15th December 2022)

Please follow the 2 steps registration procedure:

1. Fax or email the completed registration form to Mr. Sam Chan (Email: samchan@hkisc.org, Fax: 852-3619 7238) for preliminary registration.
2. Post the completed registration form together with a crossed cheque payable to **Hong Kong Institute of Steel Construction Limited** to Mr. Sam Chan, at:

HKISC c/o Unit 209B, Photonics Centre, No. 2 Science Park East Avenue, Hong Kong Science Park, Shatin, N.T., Hong Kong

Registration fee can also be paid by ATM or bank in to HKISC bank account at Hang Seng Bank. Our **Hang Seng Bank** account number is **222-049918-001** and account name is "Hong Kong Institute of Steel Construction Limited".

Please email the ATM transfer advice or deposit form to samchan@hkisc.org for record after transferred.

To: Mr. Sam Chan

Fax: 852- 3619 7238

- o Face-to-face mode is offered with limited seats and will be provided as first-come-first-served basis. Organiser reserves right to change all attendants to "on-line mode only" in event of health or other contingency requirements.
- o Link for On-line mode will be sent to applicants before seminar date upon successful registrations.
- o CPD certificates will be delivered with indication on mode of attendance and other information related to the course.
- o Please indicate the following.

(please note the "only face-to-face mode" option below implies cancellation in case of the selected mode unavailable)

I/We take (please tick one square below) :

- only ZOOM mode
- only face-to-face mode
- prefer face-to-face mode but accept ZOOM mode if required

A. Personal Details:

Title	Name in full (Block Letter)	Name of company	Tel.	E-mail address	Institution/ Membership No.
1.					
2.					
3.					
4.					
5.					
Postal Address (for official receipt):					

B. Registration Details:

Item	Registration Fee	Total no. of registration	Sub-total
1. Regular registration (Member*price)	HK\$ 600 each x	_____ person(s)	= HK\$ _____
2. Regular registration (Non-member*price)	HK\$ 700 each x	_____ person(s)	= HK\$ _____
3. Group registration (at least 5 people)	HK\$ 600 each x	_____ person(s)	= HK\$ _____
Total amount:			HK\$

Note: The registration fee includes lecture notes and CPD certificate

*Member refers to HKIE or HKISC member

I enclosed a crossed cheque (cheque no. _____) with the sum of HK\$ _____ for the registration fee of the captioned Seminar.

Signature: _____ Date: _____

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

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

The Hong Kong Institution of Steel Construction Limited HKISC is a non-profit making organization certified by qualified accountant yearly and serves to disseminate latest technology in construction.