1-Day Course on
Design of Bolted and Welded Joints in Steel Buildings using Eurocode 3

Introduction
Connections form a very important part of any steel structure and integrity of the structure depends on them. Accurate details and specifications are required for fabrication to ensure trouble-free erection. The workshop will focus on connection design specifications as per the new SS EN 1993 (Eurocode 3): Part 1-8: Design of joints. Results of recent research on steel connections detailing and fabrication will also be introduced. The course will be taught with practical examples of connection designs which are reliable as well as economical.

Objectives
After attending the course, participants will be able to:
1. Design bolted and welded connections as well as the combined bolted and welded connections for strength and stiffness;
2. Apply methods learnt from the course to achieve economy in design, fabrication and erection of steel structures;
3. Avoid common mistakes with lessons learned from case studies and collapse investigations.

Course Content
(i) OVERVIEW OF EUROCODES
Characterisation and classification of joints

(ii) GENERAL INFORMATION AND DETAILING FOR BOLTED CONNECTION
Detailing requirements

(iii) DESIGN OF NON-PRELOADED BOLTS
Requirements for non-preloaded bolts; Shear resistance; Bearing resistance; Effect of steel packing; Effect of long joints; Bolts in tension; Bolts in shear and tension; Bolts in direct shear and torsion: Block shear tearing

(iv) DESIGN OF PRELOADED BOLTS
Methods for tensioning friction-grip bolts; Slip resistant at ultimate; Slip resistant at serviceability; Torque on HSFG bolts

(v) SIMPLE CONNECTIONS
Simple beam-to-column connections; Typical beam-to-beam connections; Column base connection resisting shear force; Column base connection resisting compression and shear

(vi) MOMENT CONNECTION
Rigid beam-to-column connection; Column splice; Various details to achieve rigid and full strength joints

(vii) CODE REQUIREMENTS FOR WELDED CONNECTIONS
Details of fillet welds; Design of fillet welds; Simplified method; Directional method; Types of butt welds; Full strength and partial strength butt welds; Welding of hollow sections; Practical examples and case studies

Profile of Lecturers

ER PROF RICHARD LIEW - BEng (Hons), MEng, PhD, CEng, PEng, ACPE, StEr
Professor of the National University of Singapore, Department of Civil and Environmental Engineering.
Prof Richard Li ew is a Chartered Engineer and Professional Engineer. He joined NUS in 1986 where he lectured, conducted research and provided short courses and consultancy services to the industry especially in the field of steel and composite structural engineering. He has been awarded with multiple teaching excellence awards by the Faculty of Engineering over the years. He is world-renowned as an expert of advanced analysis and the application of theory of stability and plasticity in structural and offshore engineering with emphasis on robustness and hazard assessments including the effects due to fire, blast and impact loads. He has authored and co-authored five books and published over 300 technical papers. He is a member of the Institution of Structural Engineers (UK) and the Institution of Engineers, Singapore, and the Hong Kong Institute of Steel Construction and Singapore Structural Steel Society. He has served in numerous international and local technical committees relating to material and building standards. He is currently a member of SPRING, Singapore’s Technical Committee on Building Structure and wherein he also serves as a Convenor on the adoption of Eurocode 3 and Eurocode 4 in Singapore and chairing several workgroups for Eurocodes 3 and 4.

DR PANG SZE DAI - Assistant Professor of the National University of Singapore, Department of Civil and Environmental Engineering
Dr Pang Sze Dai joined NUS in 2006 where he lectured in courses on structural steel design and system, structural stability and dynamics and has been awarded with multiple teaching excellence awards by the university and the faculty over the years. He has provided regular short courses in Singapore and Malaysia on design of buildings against seismic actions using the UBC, IBC and Eurocode 8 and provided consultancy services to the industry in the fields of structural stability and steel design. He is active in the research of composites for structural and offshore applications and in advanced numerical analysis of complex problems. He is a member of the Institution of Engineers, Singapore and an observer in the Singapore Structural Steel Society council.
1-day Course on **Design of Bolted and Welded Joints in Steel Buildings using Eurocode 3**

**Course Date:**

**Time:** 9.00am to 5.30pm

**Venue:** BCA Academy

**Fee (incl of GST):** S$450.00

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**PART A - SELF-SPONSORED APPLICANTS** (please fill in Part A and C and sign in Part D(i)).

- **Name (Dr/Mr/Mrs/Ms):**
  - (as per NRIC/Passport)

- **Birth Date:** (DD-MM-YYYY)

- **Company Name:**

- **Residential Address:** (for self-sponsored applicant)
  - (Residential address as per NRIC for Singaporeans & PRs)

- **Designation:**

- **Email:**

- **NRIC/FIN/Passport No.:**
  - (in NRIC/FIN if available)

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**PART B - COMPANY-SPONSORED APPLICANTS** (please fill in Part B and C, stamp and sign Part D(ii)).

- **Name (Dr/Mr/Mrs/Ms):**
  - (as per NRIC/Passport)

- **Designation:**

- **Company Name:**

- **Company Address:**

- **Contact Person:** (HR Personnel)
  - Fax No.:
  - Contact No.:

- **Contact Person:** (Finance Personnel)
  - Fax No.:
  - Contact No.:

- **Email:**

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**PART C - PAYMENT**

(i) **Enclosed is Cheque No.:**

(ii) **Deduct from GIRO Account No.:**

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**PART D - DECLARATION**

By submitting and signing this application form, the self-sponsored or company-sponsored applicant agree to the terms and conditions below.

(i) **FOR SELF-SPONSORED APPLICATION:**

- **Name :**
  - (signature/date)

- **Signature :**
  - (signature/date)

- **Date :**

(ii) **FOR COMPANY-SPONSORED APPLICATION:**

- **Name of authorised personnel:**

- **Signature :**

- **Date :**

- **Company Stamp**

**TERMS AND CONDITIONS**

1) The company and individual applicant has read and understood the terms of the brochure (if available) and the application form. 2) The company and individual applicant warrant that the particulars given in the application form are accurate. 3) The Building and Construction Authority (BCA) can disclose to other government agencies any information relating to this application. 4) Payment for the course must be made to BCA before the course commencement date. 5) Any Direct Debit and Direct Credit Authorisation for GIRO applications previously signed and passed to BCA will apply to payments made under this course. 6) BCA reserves the right to accept or reject the application for whatever reason. 7) BCA shall at its discretion allocate a space to the registered applicant, based on availability. 8) BCA reserves the right to amend any details relating to the course, revise the course fees without prior notice, cancel or postpone the course. 9) No deposit is allowed. 10) Request for withdrawal must be made in writing. Requests are subject to approval by BCA and administration fee will be charged. Written request for withdrawal that reaches BCA - At least 2 weeks before the course commencement date: 10% of course fee is payable. - Less than 2 weeks but more than 3 working days before the course commencement date: 25% of course fee is payable. - Less than 3 working days before the course commencement date: full course fee is payable. 11) No Replacement is allowed for funded participants. 12) BCA is not to be held liable and the company agrees to pay BCA the applicable funding amount if funding and subsidies are either granted at a reduced amount, not granted at all or if funding is revoked, for whatever reason. 13) The company must make the application for funding and subsidies. BCA is not to be held liable and the company agrees to pay BCA the applicable funding amount. BCA reserves the right to amend any details relating to the course, revise the course fees without prior notice, cancel or postpone the course. 14) The company is responsible for any materials purchased or expenses incurred as a result of the course. 15) The company is responsible for any materials purchased or expenses incurred as a result of the course.

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To check the status of your course applications, please log into the Customer Self Service Portal (CSSP) at www.bcaa.edu.sg/self_help_portal/selfhelp/login.aspx. If you need assistance on using the CSSP, please call our customer service hotline: 6248 9999, from 8.30am to 5.00pm, Monday to Friday.