Fire Design of Concrete and Timber Structures to Eurocode 2 and Eurocode 5

INTRODUCTION
The performance of buildings under fire condition has attracted significant attention in recent years. This course will provide participants with the essential background for fire design of concrete and timber structures. Both behaviour and design aspects related to ambient and structural fire design of concrete and timber structures will be covered.

OBJECTIVES
At the end of the course, participants should be able to:

a) Understand the provisions in Eurocodes for fire design of concrete, composite and timber structures
b) Understand the basic principles and design aspects of wood related to ambient design of timber structures
c) Learn the Eurocode 2 and Eurocode 5 applicability of ambient and fire design provisions in practical scenarios

CONTENTS
DAY 1
- Introduction to Fire Safety and General Presentation of the Eurocodes
- Eurocode 1 - Actions in Case of Fire
- Eurocode 5 for Timber Structures: Timber Design at Ambient Conditions
- Eurocode 5 for Timber Structures: Timber Design under Fire Conditions

DAY 2
- Eurocode 2 material properties of concrete and reinforcement under fire effects
- Eurocode 2 for Concrete Structures: prescriptive requirements and Structural Fire Design through Tabulated Data
- Eurocode 2 for Concrete Structures: Structural Fire Design through Simplified Methods
- Eurocode 2 for Concrete Structures: Structural fire design of columns and beams
- Improving fire resistance of HSC materials
- Strategies for enhancing fire resistance of modern concrete structures

LECTURERS
DR VENKATESH KODUR, Ph.D., P.E., FASCE, FACI,FSEI, FCAE, FINAE
Dr Venkatesh Kodur is a Professor and Chairperson in the Department of Civil & Environmental Engineering and also serves as Director of the Center on Structural Fire Engineering and Diagnostics at the Michigan State University, USA. Dr Kodur’s research focuses on the experimental behaviour and analytical modelling of structural systems under extreme fire conditions and constitutive modelling of material properties at elevated temperatures. He develops guidelines for fire design of structural systems, and evaluates fire performance of high performing materials and performance based fire safety design. Dr Kodur also conducts building collapse investigations. He has published over 350 peer-reviewed journal and conference papers in Structural and Fire Engineering fields and invited to deliver numerous keynote presentations. Dr Kodur was part of the FEMA/ASCE Building Performance Assessment Team that studied the collapse of the World Trade Center buildings in New York as a result of the September 11, 2001 incidents.

DR TAN KANG HAI, BSc(Eng), PhD, PEng, MIES, MASCE
Dr Tan Kang Hai is Professor of Structural Engineering in the School of Civil and Environmental Engineering, NTU. He is concurrently the Co-Director of Transport Research Centre and Director of Protective Technology Research Centre in NTU. Prior to joining NTU, he worked in Ove Arup & Partners, UK. He is a registered Professional Engineer in Singapore. He works on numerical simulations of the fire effects on structures and experimental testing of sub-assemblies using electrical heating furnaces. Since 1996, he and his research team have developed finite element software FEMFAN3D to be used for progressive collapse analysis of structures. He also served as Chairman of a few task force groups on Structural Eurocodes relating to structural fire applications. He has been regularly conducting professional short courses and seminars on Eurocodes for reinforced concrete and steel structures and Structural Fire Engineering in Singapore, Hong Kong and China. He has authored about 150 SCI international journal papers and 178 international conference articles on structures. In 2014, he received a SGD$6 million research grant on “Life Safety and Structural Fire Safety of Mega Underground Caverns in Singapore” from the Ministry of National Development.
**REGISTRATION FORM**

**Fire Design of Concrete and Timber Structures to Eurocode 2 and Eurocode 5**

**Date:**

**Duration:** 2 days  
**Time:** 9.00am to 5.30pm  
**Venue:** BCA Academy  
**Fee (incl of GST):** S$850.00

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

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<tr>
<th>Name (Dr/Mr/Mrs/Ms): (as per NRIC/Passport)</th>
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<td>hp No.:</td>
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<td>Company Name:</td>
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<td>Residential Address: (for self-sponsored applicant)</td>
<td>Postal Code:</td>
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**PART B - COMPANY-SPONSORED APPLICANTS**  
(please fill in Part B and C and stamp and sign Part D(ii)). Confirmation email will only be sent to the HR Contact Person.

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**PART C - PAYMENT**

(i) Enclosed is Cheque No.:  
(Cheque should be crossed, marked “account payee only” and made payable to Building and Construction Authority and mailed to BCA Academy, 200 Braddell Road, Singapore 579790) for $850.00. OR  
(ii) Deduct from GIRO Account No.:  
(Note: Only company cheque or company GIRO will be accepted if the company is applying for funding or subsidy. The GIRO Account Number must be the same bank account number as indicated in the Direct Debit Authorisation form submitted to BCA.)

**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:

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

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### TERMS AND CONDITIONS

1) The company and individual applicant has read and understood the terms of the brochure (if available) and the application form are accurate.  
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 Deduct 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 an 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 fee without prior notice, cancel or postpone the course.  
9) No detriment is avoided.  
10) Request for withdrawal must be made in writing. Requests are subject to a processing fee of S$25.00.  
11) No Reassessment is allowed for funded participants.  
12) The Continuing Professional Development (CPD) points indicated for each course offered by BCA is subject to change and final approval by the relevant professional accreditation bodies.  
13) Funding and subsidies are allocated to BCA or third party organisations for the courses are subject to approval. 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 if funding and subsidies are either granted at reduced amount, not granted at all, if funding is revoked, for whatever reason.  
14) All information, materials, services, intellectual property and other property and rights provided by BCA during the course are provided on an “as is” basis. BCA makes no warranties of any kind, either express or implied, as to any matter, and all such warranties, including warranties of merchantability and fitness for a particular purpose, are expressly disclaimed.  
15) The materials supplied to the company and individual applicant for the course (“Materials”) are for their personal reference only and the company and individual applicant is not supposed to otherwise use the Materials. The company and individual applicant shall defend and indemnify BCA and its officers, employees and agents from and against any and all liability, damage, loss or expense (including reasonable attorneys’ fees and expenses) imposed upon BCA in connection with any claim arising out of the company and individual applicant’s use of the Materials.  
16) No reassessment fee is applicable for those who are required to re-take the assessment.  
17) I consent to BCA, BCA Academy, and BCA’s employees contacting me via my contacts (including email addresses and mobile numbers) to market future courses, seminars, conduct surveys, circulate publications (i.e. magazines, periodicals etc). If you wish to withdraw your consent to any use or disclosure of your personal data as set out above, you may contact us.

**GREEN PRACTICE:** As part of BCA’s sustainability efforts, electronic Statement of Attendance (eSOA) will only be issued to the participant on request. Please inform BCA staff on-site if you would like to request for the eSOA.

Graduates of BCA Academy’s Diploma, Specialist Diploma, Degree and Masters programmes may enjoy discounted course fee on some courses by applying for BCA Academy Alumni lifetime membership. To apply, visit www.bcaa.edu.sg or email to alumni@bcaa.edu.sg for more details.

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.