

Short Course

Qualified for 12 PDUs by PEB

On

Fire Design of Steel and Composite Structures to EC3 and EC4

Dates

19 and 20 September 2016 (Monday & Tuesday)

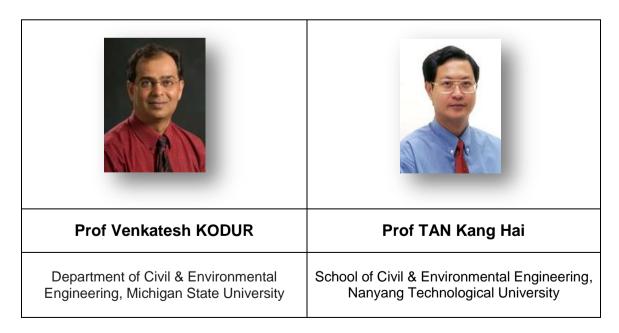
Time

Day 1: 9:00 am - 4:30 pm Day 2: 9:00 am - 5:00 pm

Venue

CEE Seminar Room A (N1-B1b-06)
School of Civil & Environmental Engineering
Nanyang Technological University

Course Instructors



Organised by:

Protective Technology Research Centre School of Civil & Environmental Engineering College of Engineering Nanyang Technological University

~~~ COURSE OUTLINE ~~~

The concept of structural safety, and in particular how structures are designed under extreme loading conditions, has come under increased focus since the collapse of WTC buildings following 9-11 disaster. Since fires played a crucial role in the collapse of WTC buildings, building performance under fire conditions has attracted significant attention in recent years. Further, there is an increased expectation from society-at-large on better performance of buildings under fire conditions. Thus structural engineers are expected to be familiar with the design principles governing fire safety in buildings. This course will provide the essential background for fire design of steel, and composite structures. Both behavior and design aspects related to structural fire design of steel, and composite structures will be covered in this course.

The course will introduce design provisions specified in Euro codes for fire design of steel, concrete, and composite structures. For engineers who are not familiar with the "Euro-terminology", the course instructors will go through the relevant terms for ambient and high temperature design. Also, examples and case studies will be presented to illustrate the applicability of fire design provisions in practical scenarios. Both Professors have been working in the field of structural fire engineering since 1990s and have extensive experience in the analysis, design and testing of steel, concrete and composite structures under fire conditions.

~~~ COURSE CONTENT ~~~

19 September 2016, Monday 20 September 2016, Tuesday 1. Introduction to Fire Safety and General Presentation of 7. Eurocode 3 for Steel Structures: Structural Analysis of the Eurocodes Members subjected to Fire 2. Eurocode 1 - Actions in Case of Fire 8. Eurocode 4 for Composite Steel-Concrete Structures: 3. The Structural Eurocodes Composite Floors - Traditional Approach 4. Eurocode 3 for Steel Structures: Calculation of 9. Eurocode 4 for Composite Steel-Concrete Structures: Temperatures in Protected and Unprotected Steel Composite Columns Structures 10. Eurocode 4 for Composite Steel-Concrete 5. Fire Resistance Tests - Fire Resistance Evaluation Structures: Composite Beams through Testing 11. Design Commentary for P288 and P390 for

~~~ WHO SHOULD ATTEND ~~~

6. Eurocode 3 and 4 for Structures: Application of Computer

This course has been developed to primarily cater to practicing Civil, Structural, Mechanical, and Fire protection engineers who require a working knowledge of structural fire design of buildings. The course is also highly relevant to regulatory (building code) officials and scholars and post graduate students of the built environment.

~~~ ABOUT THE INSTRUCTORS ~~~



Models (SAFIR/ANSYS)

Venkatesh KODUR Ph.D., P.E., F.ASCE, F.ACI,F.SEI, F.CAE, F.INAE

Composite Floor Deckings under Fire (NEW)

12. Science behind WTC Buildings Collapse;

Fire Safety Provisions (NEW)

Recent Developments in US Codes and Standards on

Dr Venkatesh KODUR is Professor and Director of the Center on Structural Fire Engineering and Diagnostics, Department of Civil & Environmental Engineering, Michigan State University, USA. His research is focused on the experimental behavior and analytical modeling of structural systems under extreme fire conditions, constitutive modeling of material properties at elevated temperatures, developing guidelines for fire design of structural systems, evaluating fire performance of high performing materials, performance based fire safety design, and building collapse investigations. He has published over 300 peer-reviewed journal and conference papers in Structural Fire Engineering field, and also

has given numerous invited 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.



Kang Hai TAN BSc(Eng), PhD, PEng, MIES, MASCE

Dr TAN Kang Hai is Professor of Structural Engineering and Associate Chair (Research) 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 written close to 150 SCI international journal papers and another 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 (MND).

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Venue	CEE Seminar Room A, N1-B1b-06 Nanyang Technological University 50 Nanyang Avenue, Singapore 639798						
Fees	 \$\$500/- per person Fees include 7% GST, refreshments, lunches, and course materials. Please submit the scanned registration form at least 7 working days before the commencement of the short course (d-ptrc@ntu.edu.sg). There will be no refund of fees for any cancellation made. However, a replacement can be made at no extra charge. Registration will be confirmed upon the receipt of the registration form. 						
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Registration Form						
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We wish to register for the following person(s)						
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	Email		Contact No.			
2.	Name		Designation			
	Email		Contact No.			
3.	Name		Designation			
	Email		Contact No.			
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Please mail the Cheque (payable to "Nanyang Technological University")						
To: Nanyang Technological University Protective Technology Research Centre School of Civil & Environmental Engineering Blk N1.1-B3-03, 50 Nanyang Avenue, Singapore 639798 Attn: Ms Debbie Low						
	registration and 6	enquiries, please send your email to <u>d-ptrc@</u>	ntu.edu.sg .			