ENGINEERING TRAINING BLAST, FIRE & PROGRESSIVE COLLAPSE WORKSHOP (Structural Robustness for Extreme Events)



DR. FARSHAD REZVANI

BEng MEng PhD RPEQ NER MIEAust

- Senior structural engineer (Inertia Engineering)
- Over 15 years of experience in civil and structural design.
- Extensive research in progressive collapse assessment of structures.

WORKSHOP SUMMARY 8 hours of CPD

This workshop is aimed at practicing civil and structural engineers, and consultants working in the areas of structural design, construction and remediation of reinforced concrete and post tensioned concrete buildings and bridges.

Structures may be subjected to various hazards during their service life, which may affect their overall structural response in an unfavourable manner. Most building codes only suggest general recommendations for mitigating the effect of progressive failure in structures that are overloaded beyond their design loads.

Robustness is a term used to describe the ability of a structure to withstand unforeseen events, without being damaged to an extent disproportionate to the original cause. A structure that is robust will not collapse in progressive manner. Blast, fire, vehicular collision, etc are the potential extreme hazards that may lead to this catastrophe.

This workshop will address progressive collapse resistant design of steel and concrete buildings subject to extreme events based on internationally accredited design codes.

PROGRAMME (8.30am Zoom invite will be emailed)

9.00 - 11.00 Session 1

- EXTREME EVENTS

- Background and challenges: review of some of the events that have led to collapse of structures and the changes in the design codes to mitigate the risk of progressive collapse.
- Extreme events and their effect on structural elements: physical expression of abnormal loading such as blast, fire, and impact and their effects on structural behaviour.
- Building codes and extreme events: review of design codes for progressive collapse resistant buildings.

11.00 - 11.15 Morning Break

11.15 - 1.00 Session 2

- DESIGN APPROACHES

- Direct and indirect design approaches: Summary of explicit and implicit considerations of resistance to progressive collapse during the design process
- Tie Force Method: required tie strength, distribution, and location
- Alternate Path Method: Capability of the structure to bride over a missing structural element with the resulting extent of damage being localized
- Analysis procedure: linear static, nonlinear static, and nonlinear dynamic analyses to assess progressive collapse potential and design to mitigate the risk of it.

1.00 - 1.30 Lunch Break



1.30 - 3.00 Session 3 - PROGRESSIVE COLLAPSE RESISTANCE

- Force-controlled & Deformation-controlled actions: definitions, examples, and classification for primary and secondary structural elements
- Structural Modelling and acceptance criteria: how to model structural elements and assess progressive collapse potential
- Alternate Path method requirements for structural steel and reinforced concrete: Design strength and rotational capacity of structural elements and connections



Livestreamed

via

zoom



3.00 - 3.15 Afternoon Break

3.15 - 5.00 Session 4 - DESIGN EXAMPLE

- Design and modelling assumption: description of the structure, baseline preliminary design, and modelling approach
- Analytical modelling: using computational analysis and design packages.
- Progressive collapse potential assessment and preliminary design modifications through various analysis and design procedures.

Certificate of Attendance will be emailed



Cancellations made more than 5 working days prior to a course will incur a 20% processing fee of the full registration amount. Cancellations made 5 working days or less will incur forfeiture of the full registration fee.