

# External Fire Spread Risk in Tall Building Design

## Five-Day Continuing Professional Development Course

The Fire Safety Engineering Research Group at The University of Queensland invites practicing fire safety engineers and other building design professionals to join us for a 5-day continuing professional development course on the external fire spread risk in tall building design.

The purpose of this course is to provide practicing engineers with the specialist knowledge to address the fire safety strategy of buildings and understand the implications of using cladding products capable of supporting external flame spread. The provision of design solutions for buildings requires competent fire engineers with the understanding of the key fundamental processes regarding the fire safety strategy, cladding design, and the interactions between the cladding of a façade and the building in the event of a fire.

**EDITION:**  
4th edition

**WHEN:**  
Monday 20 April - Friday 24 April 2020  
8am to 5pm (35 hours)

**WHERE:**  
The University of Queensland, St Lucia Campus

**CONTACT:**  
T: +61 7 3336 53838  
E: [uqfirecpd@civil.uq.edu.au](mailto:uqfirecpd@civil.uq.edu.au)  
W: [www.civil.uq.edu.au/fire-externalspreadcpd](http://www.civil.uq.edu.au/fire-externalspreadcpd)

Upon completion of the course, the participant should be able to:

- To explicitly define and describe the fire safety strategy for a given building in the context of external fire spread;
- To interpret the inherent links and interdependence of fire safety systems and phenomena with respect to code-based solutions and external fire spread;
- To describe the fire dynamics and fluid dynamics behind vertical fire growth;
- To recognise the distinction between construction typologies with respect to the fundamental phenomena that control fire spread;
- To comprehend the mechanical behaviours that are relevant to external fire spread in common facade systems;
- To understand the use and interpretation of the Cladding Materials Library;
- To create fire safety engineering solutions that explicitly link the governing phenomena of vertical fire spread, common cladding systems, and the fire safety strategy.



## REGISTRATION FEES:

Course fees include catering, lecture notes and certificate of attendance and completion. The rates are per person and do not include GST.

### Spaces are limited - REGISTER NOW!

<https://www.civil.uq.edu.au/fire-externalspreadcpd>

Early Bird (register before 3 January 2020)	\$4,000
Standard Rate	\$5,000
Group (2 participants), per person	\$4,000
Group (3 participants), per person	\$3,500

## COURSE PROGRAMME

### Module 1: Analysis of the fire safety strategy

This module covers an analysis of the fire strategy of the building based on the solutions for an implicit (prescriptive-based) and an explicit (performance-based) design. The objective of this section is to highlight the relationship between an implicit design and external flame spread, and the consequences of external flame spread related to main objectives inherent to the fire safety strategy (occupants' life safety and fire-fighting intervention).

### Module 2: Fundamentals of fire spread

This module aims to establish the fundamentals of fire spread, identifying the main parameters that govern flame spread and characterising the conditions required to enable horizontal and vertical fire spread. This module covers fundamentals relevant to the flammability of materials such as material composition, thermal decomposition mechanisms (pyrolysis and oxidation), flaming ignition, flame spread, burning behaviour, the role of fire retardants, and the dynamics of external fire plumes. A discussion on fire testing methods and their relevance, and the differences between the material and system behaviour are included. A series of case studies consisting of different façade systems are used to illustrate the mechanisms of external flame spread and the interaction between different façade components.

### Module 3: Responding to the 'Shergold & Weir Inquiry'

This short session will review the design and verification processes for fire safety engineering. It will also briefly discuss professionalism of the discipline and the competencies and attributes that could be expected of fire safety engineers.

### Module 4: Curtain walling systems

This module covers the mechanical behaviour of façade elements when exposed to severe conditions of heat exposure. The module is split into two sections: the first reviews current drivers for the mechanical design of façades, including current fire test methods; the second gives an introduction to structural mechanics at high temperature and links this to the overall mechanical response of curtain walls in fire.

### Module 5: Reformulation of the building fire safety strategy

This module consists of two case studies in which the fire safety strategy of real tall buildings is reformulated based on the risk of external fire spread. The first case study covers the case of a tall building with a classical façade system (curtain wall system) where no combustible/flammable cladding materials are used; thus, the risk of external fire spread is represented by the mechanical displacement of the façade and the geometrical constraints of openings. The second case study covers the case of a tall building with a modern façade system where potentially combustible/flammable cladding materials are used.

### Module 6: The Cladding Materials Library

This module introduces the development, contents, and use of the Cladding Materials Library. The Cladding Materials Library consists of an extensive flammability database of aluminium composite panels, insulation materials, sarking materials and other types of materials identified in the audit of buildings in Queensland. The Cladding Materials Library is intended to provide a characterisation of the flammability of different cladding materials and complement the assessment of the performance of cladding systems. A series of laboratory sessions will be carried out at The University of Queensland's fire laboratory. These sessions will consist of multi-scale experiments applied to cladding materials, which correspond to part of the experimental protocols proposed by The University of Queensland to develop the Cladding Materials Library with data regarding the flammability cladding materials.

### Module 7: Examination

A final examination will take place to assess the participants' knowledge with regards to the concepts presented over the course. The participants will be required to pass the test according to UQ policies regarding marking and scoring.

## WHO SHOULD PARTICIPATE

Experienced fire safety engineer professionals interested in acquiring knowledge to address the fire safety strategy of buildings and the potential implications of using cladding materials capable of sustaining external flame spread.

This course is not an introductory course, and it is only intended for experienced professionals who are familiar with the different aspects of building design and Fire Safety Engineering.

## PREREQUISITES

- Accredited engineering degree (4-year minimum) or equivalent, or
- Practicing fire safety engineer with demonstrated experience, or
- Registered professional engineer standing or ability to become one.

### For further information:

T: +61 7 3336 53838

E: [uqfirecpd@civil.uq.edu.au](mailto:uqfirecpd@civil.uq.edu.au)

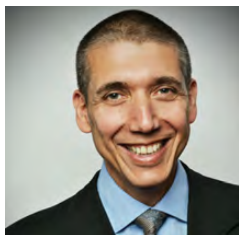
W: [www.civil.uq.edu.au/fire-externalspreadcpd](http://www.civil.uq.edu.au/fire-externalspreadcpd)

CRICOS code: 00025B



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## COURSE PRESENTERS



**Professor Jose L. Torero**

**Head, Department of Civil, Environmental & Geomatic Engineering, University College London**

Professor Jose Torero is an expert in Fire Safety Engineering. Professor Torero works in many aspects of fire safety engineering, remediation and sanitation. He has developed novel methodologies for the safe design of complex buildings such as tall buildings, historic architectures and timber structures. He is an expert witness in the Grenfell Tower Inquiry.



**Dr Rory M. Hadden**

**Senior Lecturer, The University of Edinburgh**

Dr Rory Hadden is the Rushbrook Lecturer in Fire Investigation. His research interests include pyrolysis, ignition and flammability of solid fuels with application to the built and natural environments. He specialises in experimental work ranging from laboratory scale studies to field scale measurements of fire phenomena with novel sensing methods.



**Dr Juan P. Hidalgo**

**Lecturer, The University of Queensland**

Dr Juan Hidalgo is a lecturer in Fire Safety and Timber Engineering at The University of Queensland. His research interests include the performance of timber structures and façade systems under fire conditions, and the fire dynamics in open plan compartments. He is the CI of Cladding Materials Library research project and the coordinator of this CPD programme.



**Dr Martyn S. McLaggan**

**Research Fellow, The University of Queensland**

Dr Martyn McLaggan is a research fellow at The University of Queensland responsible for leading research on combustible cladding and fire performance of building façades. He coordinates the Cladding Materials Library. His research has predominantly focused on the design of buildings, particularly those involving modern architecture with innovative materials.



**Dr David Lange**

**Senior Lecturer, The University of Queensland**

Dr David Lange is a senior lecturer in structural engineering at The University of Queensland. His research interests include the mechanics of structures exposed to fire, fire safety engineering, and infrastructure resilience. He currently leads The University of Queensland's involvement in the Warren Centre project to professionalize fire safety engineering.



**Dr Cristian Maluk**

**Senior Lecturer, The University of Queensland**

Dr Cristian Maluk is a senior lecturer in fire safety and structural engineering. His teaching and research activities span across multiple topics in fire engineering, structural engineering, and material science. Dr Maluk has developed new fire testing methods and advances in the fire safe design of building construction materials and structures.



**Jeronimo Carrascal**

**Fire Laboratory Manager, The University of Queensland**

Jeronimo Carrascal is the manager of the fire laboratory at The University of Queensland. He coordinates the research activities of the Fire Safety Engineering research group. His research interests include fire testing methods and bushfires.

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