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# STRUCTURAL DESIGN FOR FIRE SAFETY

Online, watch-  
at-your-own-  
speed course  
from 19 April to  
12 July 2021

A seminar for engineers and built environment professionals covering the fundamental principles of designing buildings for fire safety.

## Format:

- 2 “day” CPD course - Online with watch-at-your-own-pace videos.
- Postgrad level course – Online post-graduate level course with assignments and exam
- CPD course available from 19 April until 12 July

**2 CPD**  
CREDITS

**R 4200**  
EARLY BIRD

Postgrad  
level course

**R12500**





## COURSE OBJECTIVE

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This course covers the principles of structural design for fire safety. The topics addressed are:

- Fire safety in buildings
- Fires and heat
- Fire severity and resistance
- Design of structures exposed to fire
- Steel structures in fire
- Concrete structures in fire
- Composite structures in fire
- Timber structures in fire
- An introduction to advanced modelling methods

The seminar is designed for structural engineers and fire engineers, along with built environment and regulatory professionals, to expose the industry to how to achieve safer, and economical, structures. For those from non-structural engineering backgrounds additional content will be provided to help with required foundational knowledge.

## COURSE FOCAL POINTS

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The seminar seek to provide an understanding of factors such as:

- How do real fires behave?
- What is the difference between a standard fire and a real fire?
- What is a 1 hour standard fire rating and how do I achieve it?
- Understanding how structures behave at elevated temperatures
- What is structural failure?
- Understanding how to calculate temperatures and design passive protection for structural members
- Understanding steel, concrete and timber response to fire
- Understanding the limitations of current guidelines or codes of practice
- Highlighting how significant cost savings can be made when structures are well-designed for fire

Engineers, architects and built environment practitioners are regularly designing and constructing buildings which may either be unsafe in the case of a fire, or conversely could be safe but be very uneconomical due to the specifications required for fire safety. It shall be shown that through rational, well-validated, engineering design procedures economical and safe buildings can be delivered.

# ONLINE PROGRAM

	SECTION	TOPICS	FORMAT
<b>A</b>	<ul style="list-style-type: none"> <li>• Fire safety in buildings</li> </ul>	Understanding fire safety and building requirements	<p>This seminar is an online program, with all content being presented through the Stellenbosch University online platform. The lectures, notes and example videos pertaining to each section will be posted online. <b>Seminar attendees will be able to access the recorded material at any time.</b> The system will track what videos and material have been completed for CPD verification purposes.</p> <p>At the end of the course, after the closing date, CPD certificates will be issued to everyone who has completed the videos and content in the course.</p> <p>The <b>Postgraduate Course Option</b> will also include online assessments, submission of assignments and the completion of an exam. Significant amounts of extra reading is required from the course textbook “Structural Design for Fire Safety” by Buchanan &amp; Abu, which must be purchased for the course.</p>
<b>B</b>	<ul style="list-style-type: none"> <li>• Fires and heat</li> </ul>	Heat transfer and fire behaviour Fuel loads and real fires Standard and real fire curves	
<b>C</b>	<ul style="list-style-type: none"> <li>• Fire severity and resistance</li> </ul>	Fire severity Fire resistance tests Understanding fire resistance ratings	
<b>D</b>	<ul style="list-style-type: none"> <li>• Design of structures exposed to fire</li> </ul>	Loads and load combinations during fires Analyses for structures in fire Building response when members are heated	
<b>E</b>	<ul style="list-style-type: none"> <li>• Steel structures in fire</li> </ul>	Resistance of steel members at elevated temperatures How to determine passive protection for steel members Saving money on passive protection	
<b>F</b>	<ul style="list-style-type: none"> <li>• Concrete structures in fire</li> </ul>	Response of concrete to fire Understanding basic cover requirements and resistance Design of concrete members for fire resistance	
<b>G</b>	<ul style="list-style-type: none"> <li>• Composite structures in fire</li> </ul>	Understanding composite members in fire Tensile membrane behaviour Design of composite structures for fire	
<b>H</b>	<ul style="list-style-type: none"> <li>• Timber structures in fire</li> </ul>	Timber structures and fire resistance Charring rates and material behaviour Designing mass timber structures	
<b>I</b>	<ul style="list-style-type: none"> <li>• An introduction to advanced modelling methods</li> </ul>	Models available for fire calculations Simple vs. complex models	
	<ul style="list-style-type: none"> <li>• Online live Q&amp;A sessions will be provided, along with an online platform for posting queries and getting feedback.</li> </ul>		

# PRESENTERS



## 1. Prof Richard Walls

Richard Walls (PhD, MSc, GDE, BScEng, BTh, PrEng, FSAICE) is the head of the Fire Engineering Research Unit at Stellenbosch University (FireSUN). He worked as a professional structural engineer designing industrial, petrochemical and commercial buildings before joining Stellenbosch University as a lecturer and researcher. His areas of research include structural fire design, informal settlement fire safety, timber in fire, full-scale fire testing, modelling, structural steel and burning things down Myth Buster style (has destroyed more than 70 full-scale informal homes). He works closely with local fire services developing solutions for informal settlement fire problems, and was involved in an analysis of the almost 1000 homes that burnt down in the 2017 Knysna Fire disaster.

Prof Walls lectures on the design of steel and concrete structures, fire dynamics, structural fire design and supervises various masters and PhD students. He has published more than 50 peer-reviewed articles on various topics, and consults to industry on specialist fire engineer projects. He has contributed to publications by the World Bank and United Nations on developing world fire safety issues. In 2020 he was awarded the NSTF-South32 national prize as the Emerging Researcher of the year in South Africa, and was made a Fellow of the SA Institute of Civil Engineering (SAICE). He is on the advisory committee for the NFPA Fire Protection Research Foundation.

## 2. Dr John Babafemi

John Babafemi (BSc, MSc, PhD) is the head of the Structural Engineering Division at Stellenbosch University. He is active in research regarding construction materials such as fibre-reinforced cement-based materials, time-dependent behaviour of cement-based materials with special focus on creep of cracked fibre reinforced concrete, the use of supplementary cementitious materials in concrete, durability and eco-friendly construction products. He has recently become involved with work on the fire resistance of construction systems utilising waste plastics, such as Eco-bricks. He has extensive teaching experience in South Africa and Nigeria.

## 3. Darren Sulon

Darren Sulon (BEng, PhD cand.) is a researcher in the resistance of timber structures in fire, with a specific focus on experimental testing and numerical modelling of timber connections. He is developing innovative computer modelling techniques for considering factors such as intumescent sealants in connections and heat transfer through complex geometries. He is collaborating with researchers in the USA and Europe in the development of his work. He has been involved in teaching various subjects at Stellenbosch University.

## 4. Industry expert contributions

A variety of talks from industry experts on practical topics related to structural fire design will be given by the persons listed below, amongst others. These talks will help show how performance-based fire engineering and testing is being developed and applied around the world.

- **Kevin LaMalva** – Warrington Fire (USA)
  - Case study on structural fire design
- **Dr Lisa Choe** – National Institute of Standards & Technology (NIST) (USA)
  - Large-scale experimental work & testing on composite flooring systems
- **Dr Özgür Atlayan** – Walter P Moore (USA)
  - Case study on structural fire design
- **Dr Jenny Sideri** – Thornton Tomasetti (USA)
  - Case study on structural fire design
- **David Barber** – Arup (USA)
  - Timber structures in fire
- **Dirk Streicher** – Ignis Testing (South Africa)
  - Fire testing of products

# CPD CREDITS

The seminar is accredited for 2 Continued Professional Development credits with ECSA (Engineering Council of South Africa).



# REGISTRATION

Please register online by clicking on the link below:

2 “day” CPD course – <https://shortcourses.sun.ac.za/application-form.html?offeringid=99999218-ea74-eb11-a5db-0050568000ff>

Postgrad level course – <https://shortcourses.sun.ac.za/application-form.html?offeringid=34ff43ad-2e7b-eb11-a5db-0050568000ff>



Our system will generate an email with payment details.

# PAYMENT



**Early Bird: R 4200**

**Normal Bird: R 4700**

**Payment must be received by 31 March 2021**

**Access will be granted approximately 5 days after receipt of payment. You may register at any stage after the start date, but must be finished by the required completion data.**

## PAYMENT INSTRUCTIONS

After online registration for a course you will receive an automated email with payment details. Invoices to companies will be created after successful online registration.

## PLEASE EMAIL PROOF OF PAYMENT TO: Ms. Tsholofelo Seroalo

Stellenbosch University, Department of Civil Engineering  
Email: [civilcourses@sun.ac.za](mailto:civilcourses@sun.ac.za)  
Enquiries: 021 808 4131

## EVENT SPONSORSHIP OPPORTUNITIES:

Please contact [civilcourses@sun.ac.za](mailto:civilcourses@sun.ac.za) for options.

## POST GRADUATE COURSE OPTION

This course is also offered as a 15 credit (150 hours) NQF Level 9 (masters) equivalent course, with lectures and content presented online, in addition to the CPD course. Assignments and an exam must be completed for this course. The course is identical to the SAQA accredited Stellenbosch University postgraduate course. Due university regulations short courses are not officially SAQA registered, although identical work along with external moderation and quality control is carried out. Students currently registered for degrees may register for university SAQA credits. For more information: [civilcourses@sun.ac.za](mailto:civilcourses@sun.ac.za).