

Faculty of Engineering – Industry Showcase

Fire engineering in transportation

Presented by: Prof Richard Walls

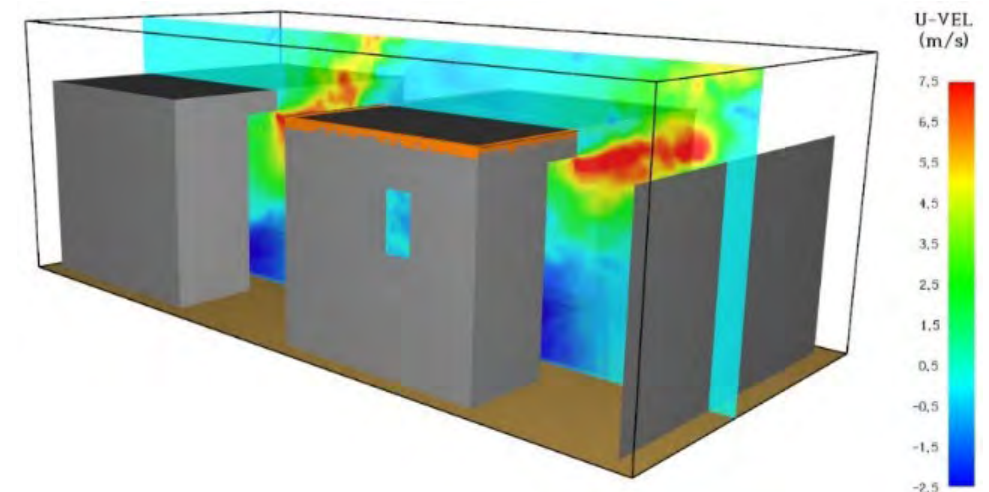
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Talk overview


1. Overview of fire engineering at Stellenbosch University.
2. Fire behaviour
3. Fire safety challenges in transport
4. Developing solutions

Fire safety engineering at SU

- MEng and PhD programs
- Masters and short courses
- **Online distance-learning masters in fire engineering to be launched in 2024.**
- Research, consulting, expert witness, and development work for industry.




Making Fire Engineering Education Accessible




Understanding standard fire furnace testing

116 views • 2 months ago




Understanding passive fire protection products for...

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Fire Behaviour - Introduction to the course - Stellenbosc...

607 views • 11 months ago



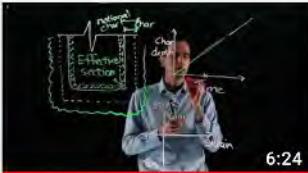
Concrete in Fire: Behaviour and Beam Design

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Design of Structures Exposed to Fire: Loading

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Timber Structures in Fire: Fundamentals of Design

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Advanced Structural Fire Models: Fire Modelling...

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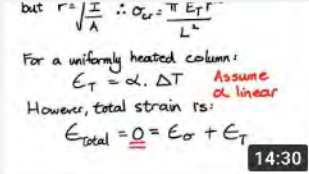
Advanced Structural Fire Models: Modelling Membe...

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Advanced Structural Fire Models: Composite...

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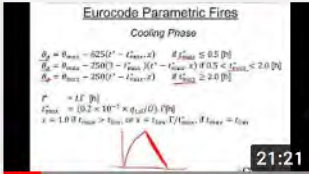
Design of Structures Exposed to Fire - Restraine...

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Fire Severity & Resistance - Standard fire time...

436 views • 1 year ago



Fire & Heat - Eurocode Parametric Fire Worked...

1.4K views • 1 year ago



Fires And Heat - Enclosure Fire Dynamics

835 views • 2 years ago

The team

- Three staff members.
- Three adjunct faculty members.
- Over 20 researchers active on fire-related projects (PhD, MEng, honours).



Prof Richard Walls



Mrs Courtney Devine



Dr Natalia Flores-Quiroz



Mr Dirk Streicher



Ms Danielle Antonellis



Dr Antonio Cicione

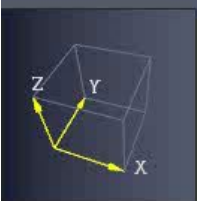
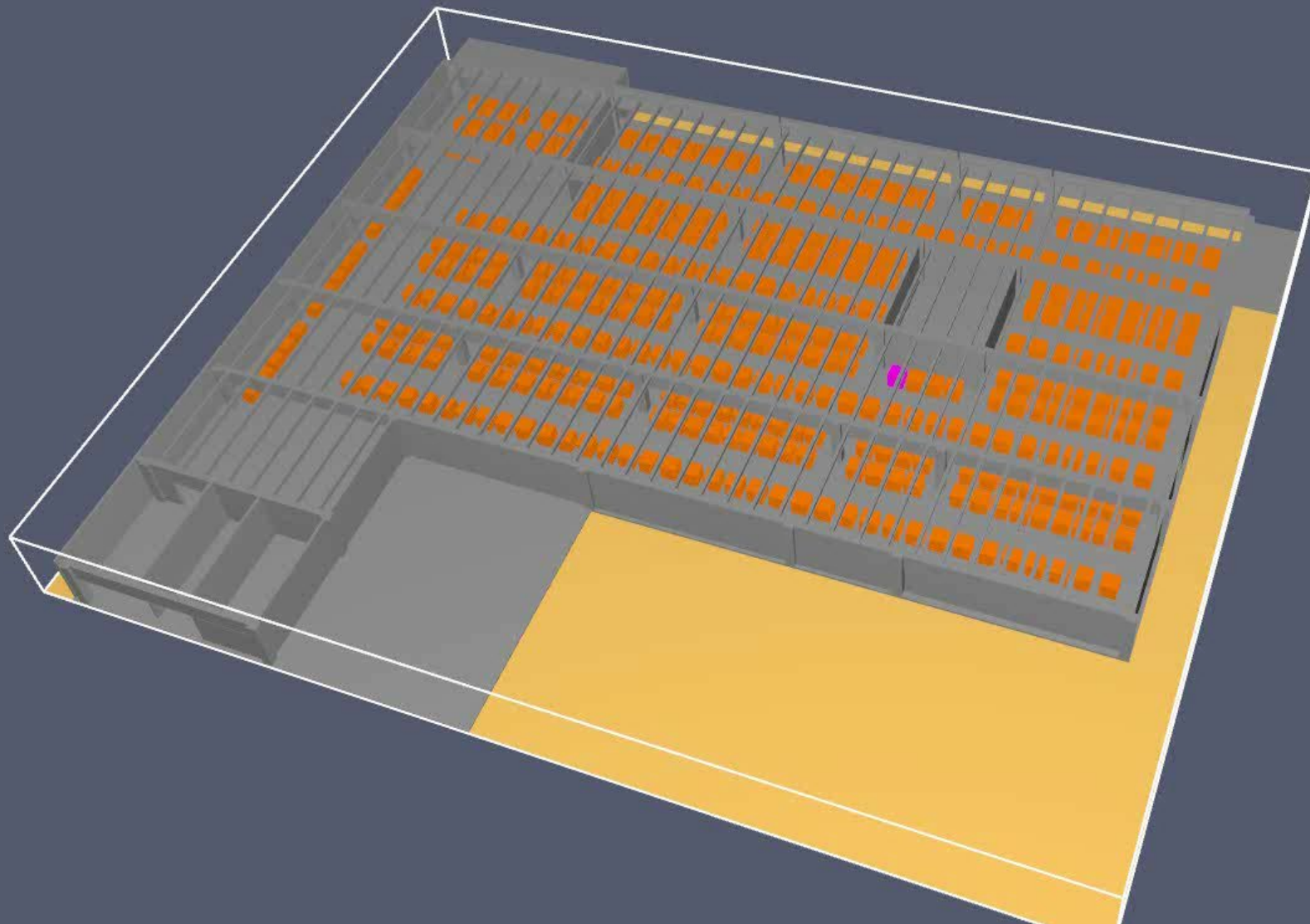
Research topics

- Biomass and recycled products
- Agricultural and bulk storage facilities
- 3D printed concrete
- Mass timber buildings
- Green energy fire risks (green hydrogen, solar, etc.)
- Fire investigations
- Informal settlement fire safety
- Wildland fire safety

Understanding fire behaviour

- Fire behaviour is badly misunderstood by most (even some fire inspectors and investigators).
- The basics of a compartment fire are relatively straight forward and will now be explained. This will help in identifying when fire may spread, and why.





Emerging transport fire risk issues

- Lithium-ion batteries
- Electric vehicles
- Material handling vehicles
- Trains

<https://youtube.com/shorts/iY6QBTY2EaI?feature=share>



<https://youtu.be/HBUGEEFEXxA>



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New York



Wilfred Chan *in New York*

Tue 15 Nov 2022 06.00 GMT



E-bike batteries have caused 200 fires in New York: 'Everyone's scared'



[Home](#) > [Airline News](#)

easyJet Airbus A320 Returns To Geneva Following Fire In Overhead Locker

It's presumed an electronic cigarette started the fire.

BY **AARON BAILEY** PUBLISHED 22 HOURS AGO

Photo: Markus Mainka/Shutterstock





Multiple fire departments battle fire at West Valley Red Bull warehouse



Photo by: Glendale Fire Department

<https://www.abc15.com/news/region-west-valley/multiple-fire-departments-battle-fire-at-west-valley-red-bull-warehouse>

<https://www.solarreviews.com/blog/solar-home-energy-news-walmart-tesla-solar-panel-fire>

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What the Walmart solar panel fires tell us about solar safety... and about Tesla

Updated 01/19/2022



Walmart is suing Tesla because its solar panels keep catching on fire!

This is big news for anyone interested in solar. It involves Walmart, the [largest company in the world in terms of revenue](#), and Tesla, the most famous company in the solar industry. And the faults in question are no ordinary malfunctions but real, blazing fires, the nightmare of anyone who has solar panels. The stakes could not be any higher.

Train fire safety



<https://www.iol.co.za/capeargus/news/commuter-killed-in-alleged-arson-on-train-carriage-at-ottery-station-15243803>
<https://www.iol.co.za/news/prasa-outraged-by-train-arson-1739112>

Testing of full seats



Figure 6.2: Condition of seat before and after Experiment 1

Testing of full seats



Figure 6.10: Fully developed stage Experiment 2

Testing of full seats



Figure 6.11: Decay stage of Experiment 2

Modelling of seats

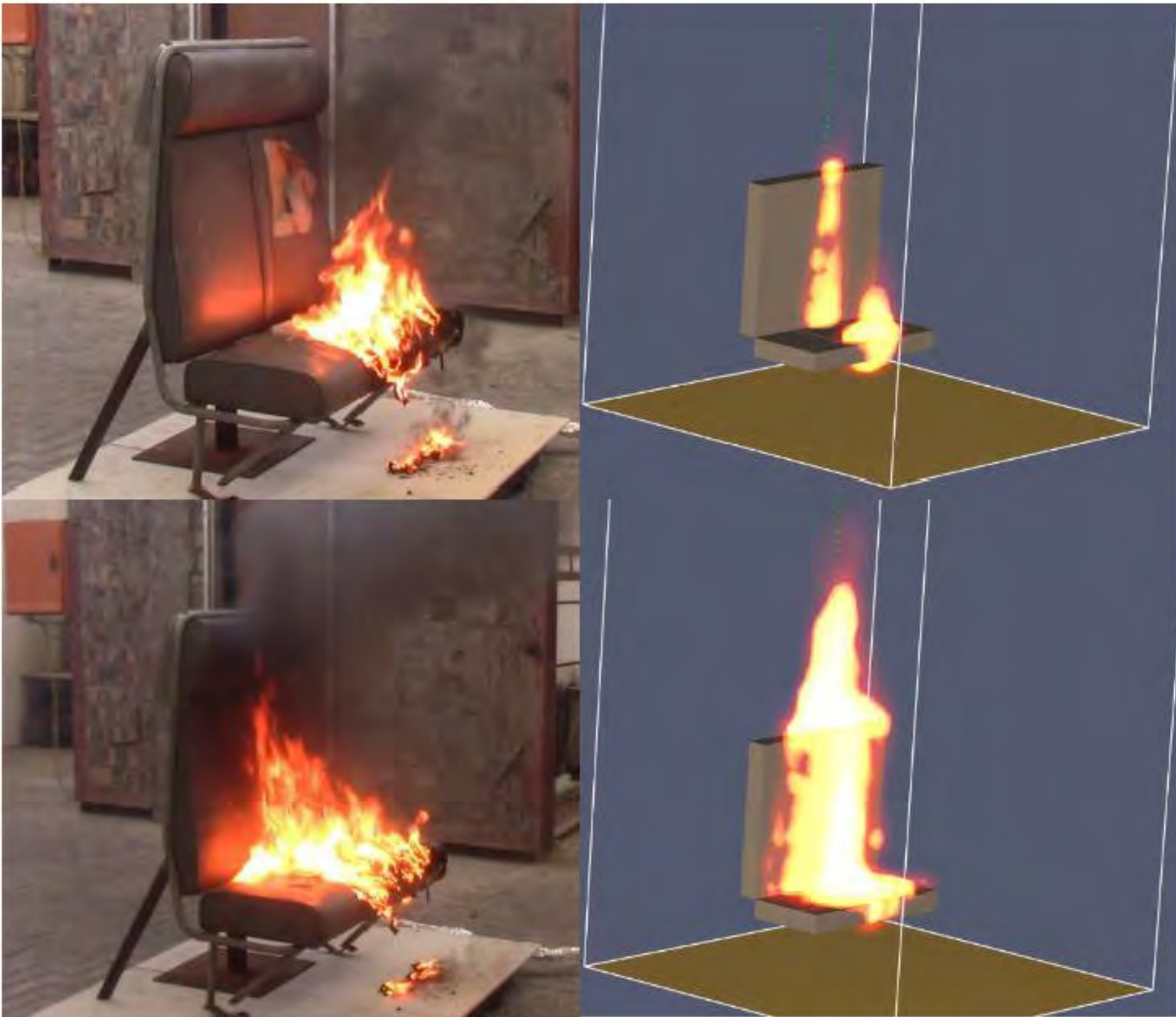


Figure 7.14: Flame spread in Experiment 1 and Scenario 1

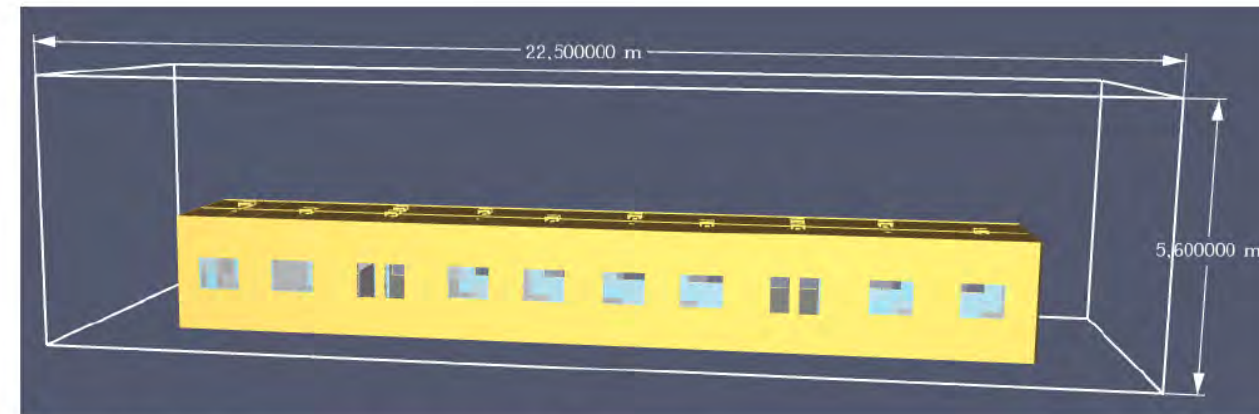


Figure 7.33: Full-scale carriage domain size

Modelling of carriages

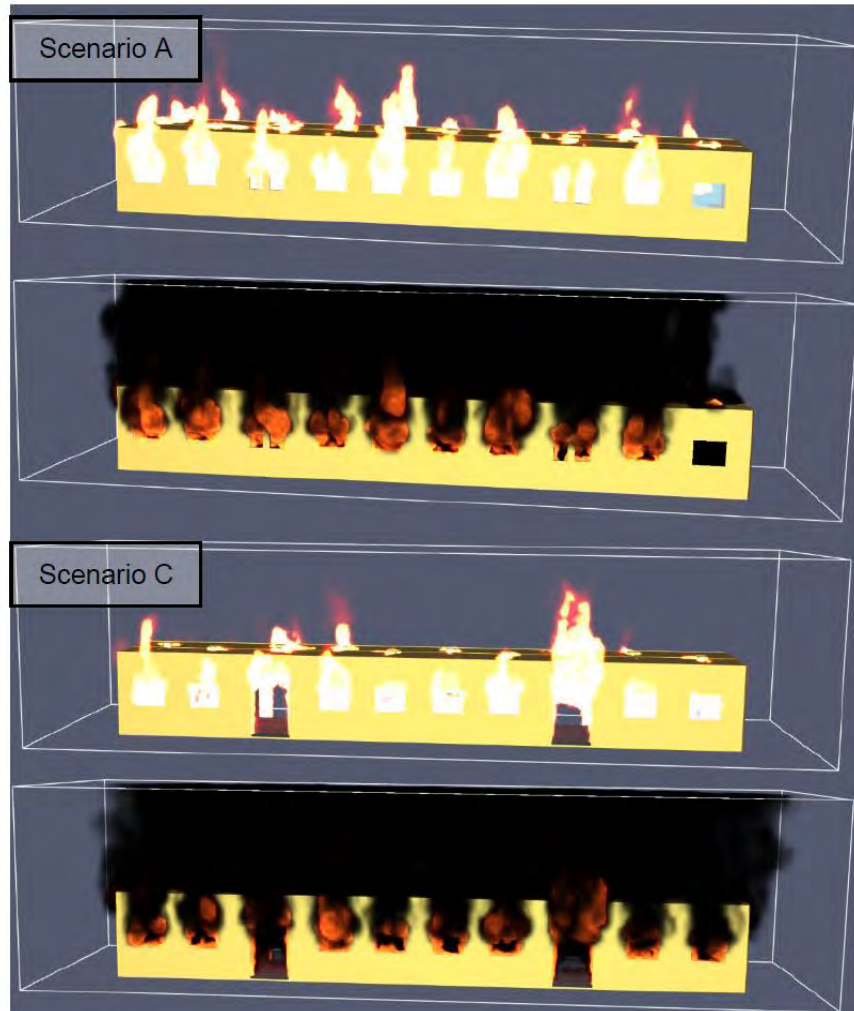


Figure 7.40: Fully-developed fire flames and smoke from carriage side for Scenario A and C

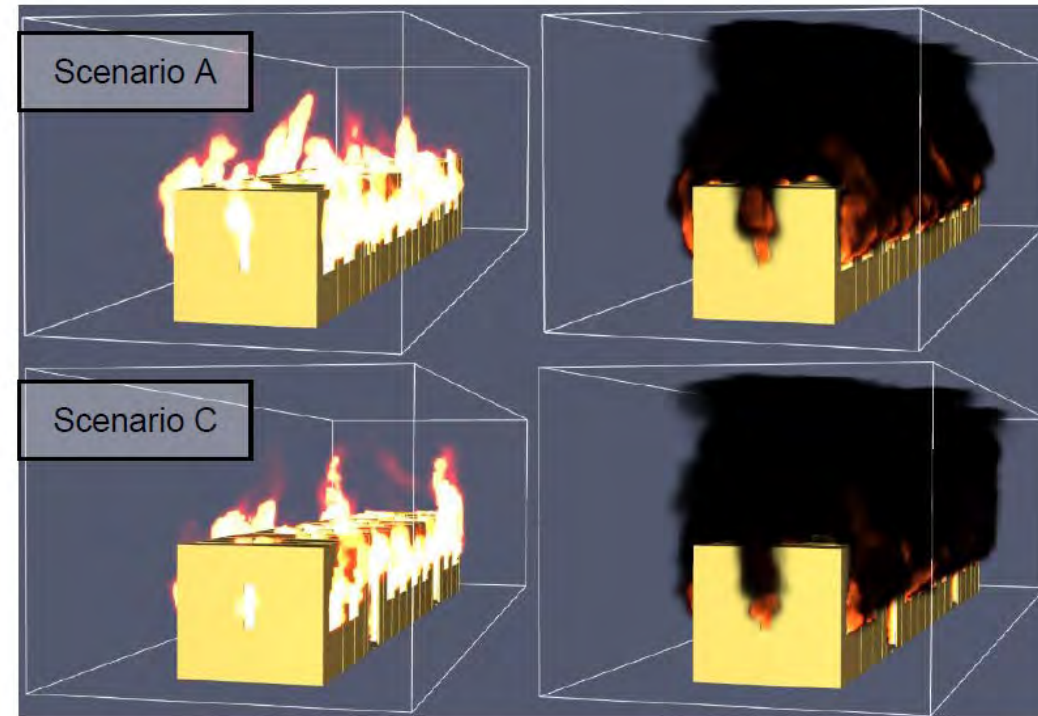


Figure 7.41: Fully-developed fire flames and smoke from carriage front for Scenario A and C

Conclusions

- Many challenges facing transport systems in terms of fire safety.
- Lithium-ion and other battery storage systems pose a fire risk that is difficult to handle. This can even affect vehicles such as for materials handling.
- Solar energy generation also poses a fire risk.
- Material specifications are important to reduce fire spread.
- For public transport high numbers of passengers are present in confined spaces resulting in high levels of risk.

Thank you
Enkosi
Dankie