

Tall buildings: Green Fire Safety Issues conference

Dr Peter Wilkinson
International President 2022/23



Agenda

- The challenges;
- Priorities as IFE President;
- How the IFE can help;
- CROSS.



What do I say in a keynote address to a conference on fire safety of tall green buildings?



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Good morning, everyone.

I'm honored to be here today to speak to you about the fire safety of tall green buildings.

As you know, tall green buildings are becoming increasingly popular. They offer a number of benefits, including energy efficiency, reduced carbon emissions, and improved occupant health and well-being.

However, tall green buildings also pose some unique fire safety challenges.

One challenge is that they often use innovative materials and technologies that may not have been fully tested in fire situations.

Another challenge is that they are often complex in design, with multiple levels and interconnected systems. This can make it difficult to evacuate occupants and fight fires quickly and effectively.

Despite these challenges, it is possible to build tall green buildings that are safe from fire.

There are a number of things that can be done to mitigate the fire safety risks associated with tall green buildings.

These include:

- Using fire-resistant materials and construction techniques
- Designing buildings with clear fire escape routes
- Installing effective fire suppression systems
- Conducting regular fire drills and training
- Ensuring that occupants are aware of the fire safety procedures

By taking these steps, we can help to ensure that tall green buildings are safe and healthy places to live, work, and learn.

Thank you for your time.

In addition to the above, here are some other things you can mention in your keynote address:

- The importance of collaboration between architects, engineers, fire safety experts, and other stakeholders in the design and construction of tall green buildings.
- The need for ongoing research and development to improve the fire safety of tall green buildings.
- The importance of public education about the fire safety risks associated with tall green buildings.

I hope this helps!

Enter a prompt here



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Priorities as IP

- Fire safety is important to a wide range of professionals;
- Fire safety is a collaborative endeavour;
- Aim to strengthen the ties between IFE's international presence and as many of the other players as possible;
- Focus on fire safety **competence, collaboration and co-operation.**



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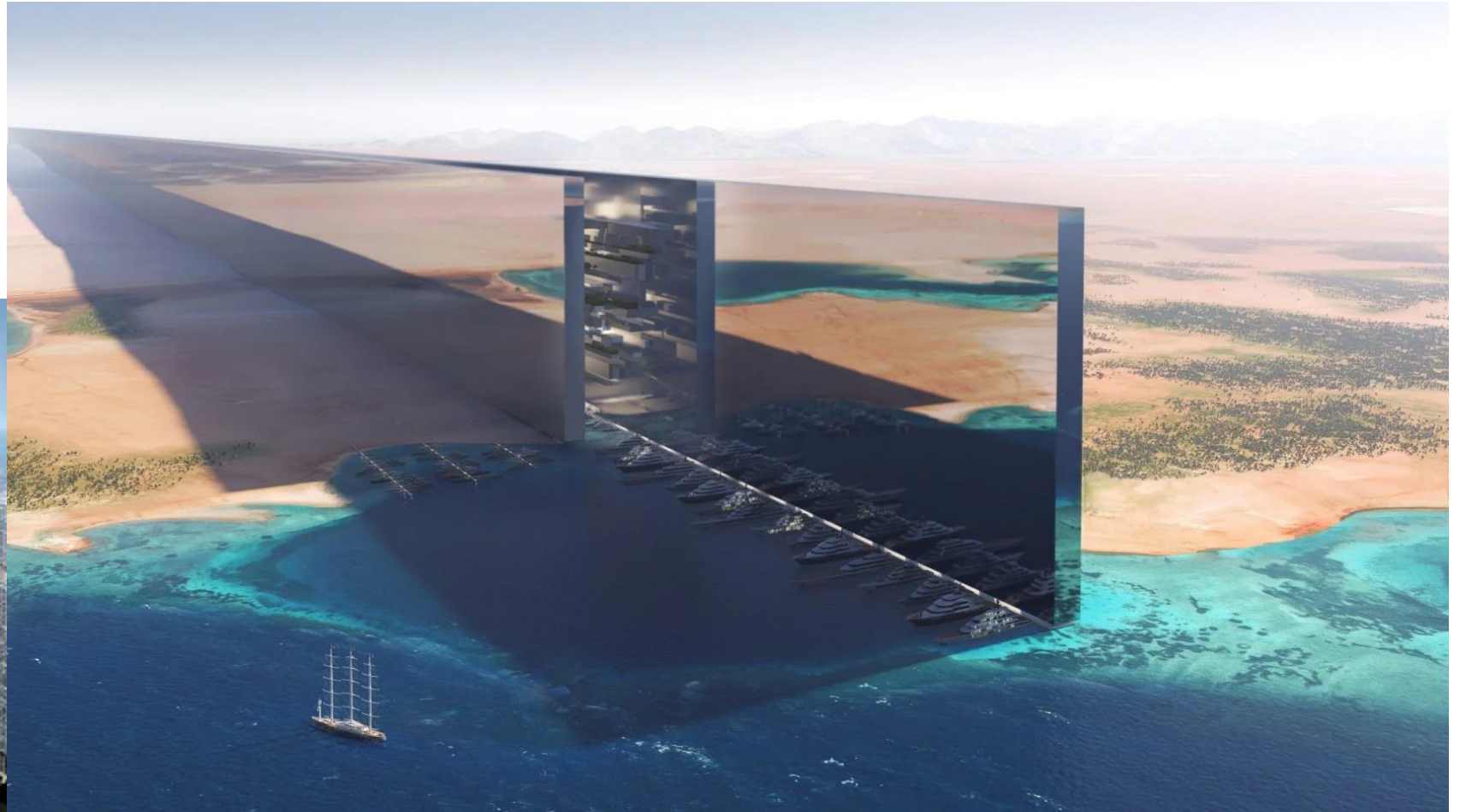
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Fire engineering tomorrow

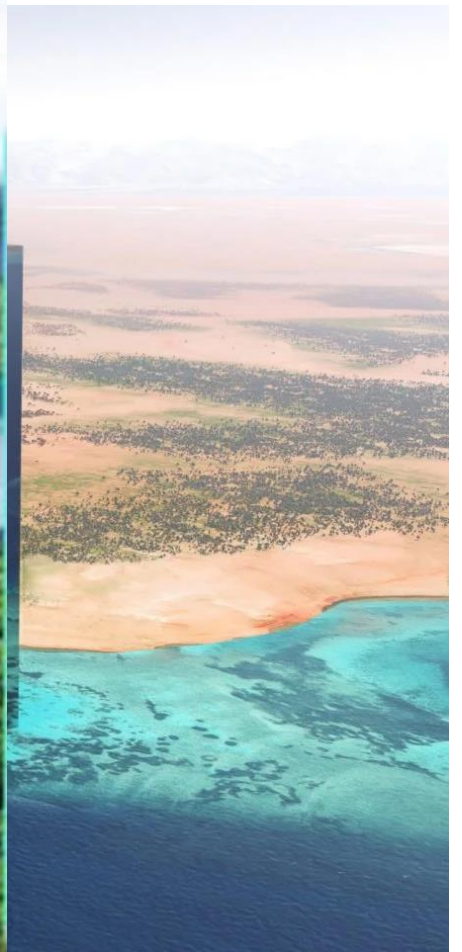
Fire engineering tomorrow



Fire engineering tomorrow



Fire engineering tomorrow



Fire engineering tomorrow



Fire engineering tomorrow



Fire engineering tomorrow





Who are the IFE?

- Independent global charity registered in Scotland
- Established in 1918
- Connecting fire professionals from around the globe, we share best practice and expertise
- Regulated by OFQUAL
- A Professional Engineering Institution (PEI) with an Engineering Council licence.

About us



11k

Members
worldwide



100

Exam Centres
Worldwide



270+

Fire Risk Assessors



19

UK
Branches



23

International
Branches



700+

Volunteers
Worldwide



6k+

Exam Sat
Worldwide Per
Year



730+

Engineering Council
Registrants

Technical support

18 July 2022

IFE's increased focus on sustainability

The Institution of Fire Engineers (IFE) has announced the launch of a new dedicated alternative fuels coordinator.

The introduction of this role comes at a crucial time with the world changing at a faster pace than ever before driven by the challenges raised by climate change and sustainability. We are seeing the adoption of alternative fuels have implications for the fire industry, and as the international professional body for those in the fire sector, it is our role to assess these changes, identify their impacts and educate our members.

The IFE has appointed its Technical Support Manager, Paul Trew, as the dedicated alternative fuels coordinator. Paul will be responsible for developing a knowledge pool which explores alternative fuels and energy storage systems including hydrogen, electric vehicles, and lithium-ion batteries. This will provide members with quicker access to the latest guidance and advice via technical updates and ensure IFE are at the forefront of consultations for the new standards and regulations needed to keep pace with change.

“ With a dedicated resource in place to focus on alternative fuels, the IFE will provide a flow of knowledge which is critical to our sector and in turn will enable members to advance their knowledge, improve their competence and raise standards across the industry. ”

Working with IFE members, volunteers and branches from around the world as well as external partners, Paul will create a resource to support members and the sector in understanding the impact of alternative fuels on fire safety and engineering.

Paul comments: "Our world is changing and innovations are constantly being introduced as we strive for a more sustainable future. With new investments in hydrogen infrastructure, renewable energy and other green technologies, come new risks.

Engineering Council Registration



The IFE is licensed by the Engineering Council to:

Recommend fire professionals for registration

What is professional registration?

- **Recognition**, through membership of a relevant professional engineering institution, **that an individual's competence has been assessed**, and **they have attained the standard** required for admission to the national register at the appropriate level.
- Is open to any competent practising engineer or technician, with different levels and pathways to registration available.
- The categories have been developed to provide a progressive registration structure.

Registration Titles

EngTech

- Use engineering solutions to solve problems
- Perform engineering activities

IEng

- Maintain engineering solutions
- Supervise engineering activities

CEng

- Develop engineering solutions
- Manage engineering activities

Engineering Council registration



- CEng – Chartered Engineer (MIFireE)
- *Interim CEng (AIFireE)*
- IEng – Incorporated Engineer (MIFireE)
- *Interim IEng (AIFireE)*
- EngTech – Engineering Technician (GIFireE or TIFireE)

UK-SPEC



The Engineering Council sets and maintains UK Standards for Professional Engineering Competence.

A – Engineering Knowledge

B – Theoretical and Practical Methods

C – Responsibility

D – Communication and Interpersonal Skills

E – Commitment to Engineering

Ethics



Sources:

- IFE Code of Conduct
- Whistleblowing Policy

Principles of fire engineering

- Accuracy and rigour
- Honesty and integrity
- Respect for life, law and the public good
- Responsible leadership

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<https://raeng.org.uk/policy-and-resources/education-policy/the-engineering-profession/global-responsibility-and-progressive-engineering-leadership/ethics>



Principles of fire engineering



Principles of fire engineering

Principles of fire engineering

- Competence vs Accreditation

Principles of fire engineering

- Competence vs Accreditation
- Competence vs Confidence

Principles of fire engineering

- Competence vs Accreditation
- Competence vs Confidence

“Real knowledge is to know the extent of one’s ignorance.”

Principles of fire engineering

- Competence vs Accreditation
- Competence vs Confidence

“Real knowledge is to know the extent of one’s ignorance.”

“Are you confident because you have knowledge or are you confident because you have no knowledge?”

Principles of fire engineering

Competence:

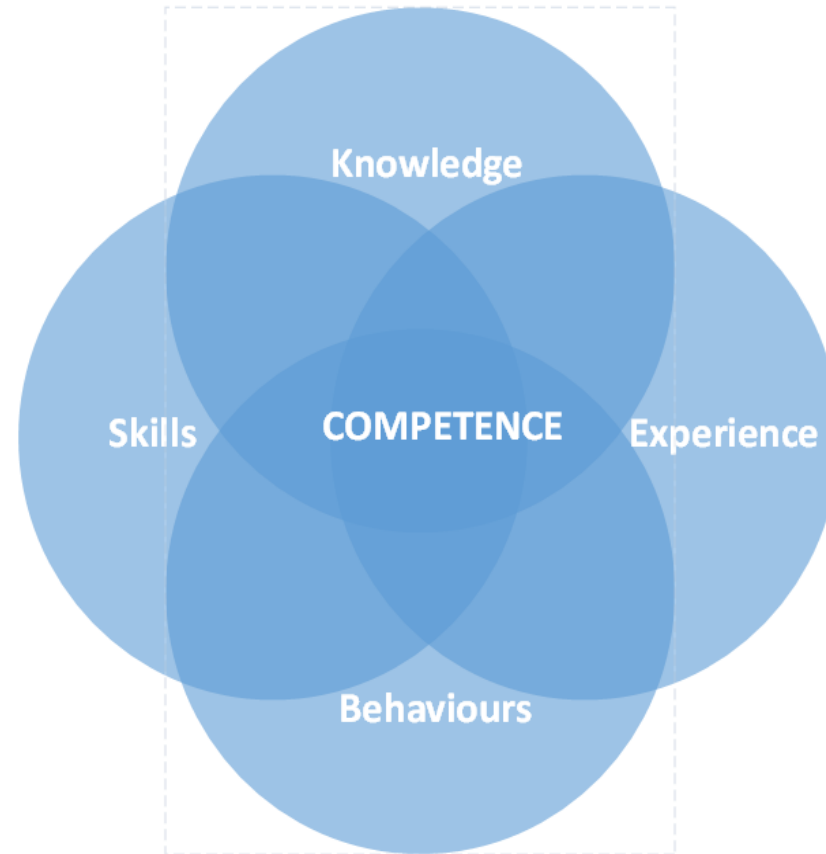
- Knowledge
- Skills
- Experience

Principles of fire engineering

Competence:

- Knowledge
- Skills
- Experience
- Behaviours

Principles of fire engineering



Collaboration

Collaborative Reporting for Safer Structures (CROSS)

Collaboration

Collaborative Reporting for Safer Structures (CROSS)



Create a CROSS account

- Go to bit.ly/cross-account
- Fill in your details and set your email preferences

CROSS on social media



Twitter

@cross_safety



LinkedIn

Collaborative Reporting for Safer Structures (CROSS)

Collaboration

CROSS – Building on excellent progress



CROSS looks back on its progress to date and provides readers with a selection of reports focussing on the safety of structures in the climate emergency.

Regular readers of International Fire Professional (IFP) will know that CROSS was relaunched in March 2021 to improve the culture of building safety, as suggested by the Hackitt review. The organisation's new name, Collaborative Reporting for Safer Structures, was designed to reflect a wider remit that included fire as well as structural safety. We're proud of the involvement from the Institution of Fire Engineers to help shape the fire safety reporting system and develop the fire safety Expert Panel. Since the relaunch, CROSS has received more than 100 new reports from built environment professionals raising concerns about safety issues. A third of these relate to fire safety – a significant proportion, given that the organisation has only been receiving reports on the issue for 18 months, compared to almost 18 years for those on structural safety.

Due to the importance of the topic of climate change and sustainability, CROSS has developed a theme page focussing on the safety of structures in the climate emergency: [cross-theme-page/safety-structures-climate-emergency](https://cross-safety.org.uk/safety-information/cross-theme-page/safety-structures-climate-emergency). It reminds us that, in the current climate emergency and the race to achieve zero emissions, we must ensure our

structures remain safe as we develop and implement any climate-motivated innovation or change of approach.

And in keeping with this theme, which echoes the theme of this issue of IFP, Pater Wilkinson highlights three relevant reports that CROSS have published.

Fire safety risks with lithium-ion batteries

The first report focuses on an issue that we are hearing about with increasing frequency. A reporter raised concerns regarding the increase in the use of lithium-ion batteries, along with their related hazards which currently remain unregulated. Of the currently available technologies, lithium-ion batteries have the highest energy density. Their failure probability is calculated to be extremely low when stored and operated within the recommended limits, but their normal operation can be disrupted if there is electrical or mechanical abuse. If the heat losses (usually convective) cannot offset the amount of heat increase within the battery system (either by internal exothermic reactions or external heat fluxes), then a phenomenon called 'thermal runaway' occurs. During thermal runaway, the

News and views

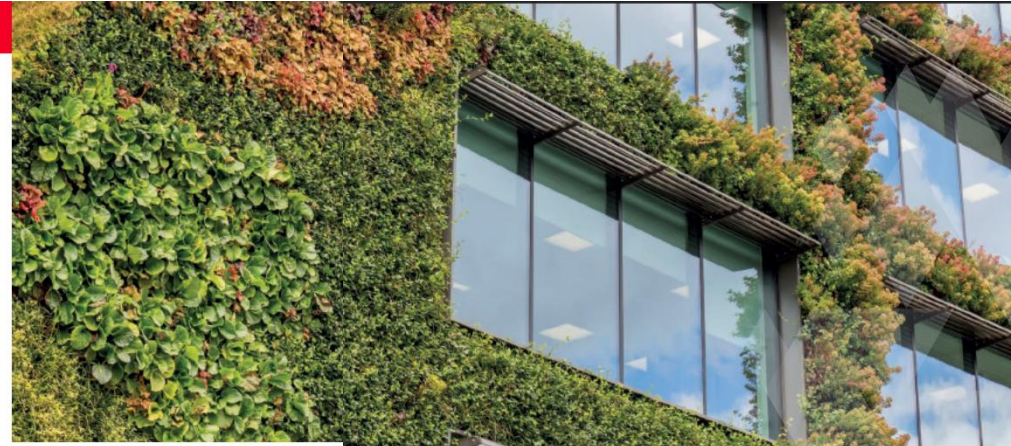
temperature increase leads to an exponential increase in the reaction rate within the battery, leading to a cascading effect that can evolve into a very serious fire or explosion. The reporter explains some of the mechanisms involved in this interesting report, which gains agreement from the Expert Panel.

This exponential rise in the use of lithium-ion batteries (and other alternative energy sources with their own respective risks) is being driven by the reduction of emissions and the agenda for achieving 'net-zero'. This drive has led to the use of lithium-ion batteries in all environments and scales, from small portable devices to scooters and electric vehicles (EVs), and to domestic, mid-scale (shipping containers) and grid-scale (Solar Farms) Battery Energy Storage Systems. How these alternative fuels and systems interact with the built environment is of particular interest in this case, because the hazards and risks identified in the report are real – to not only the attending emergency services, but also to occupants and those in the vicinity of buildings, as well as to the environment. The full report contains Key Learning Outcomes for designers, for fire engineers, and for Authorities Having Jurisdiction (AHJ), and is worthy of a read. Search for report 1058 on the Safety Information page on the CROSS website (cross-safety.org.uk/safety-information-uk) for the details.

The risk of collapse of multi-storey CLT buildings during a fire

Another sustainable-environment related topic, a reporter presents concerns about the fire safety of multi-storey buildings comprised of cross-laminated timber (CLT) structures. These concerns suggest to them an unacceptable risk of collapse in the event of an uncontrolled fire. The concern particularly relates to multi-storey sleeping risk buildings in the UK. The reporter highlights issues surrounding compliance with Clause B3 (1) of Schedule 1 of the Building Regulations, which requires that a building's 'stability will be maintained for a reasonable period' in the event of a fire. The reporter also goes on to say that there is considerable academic research indicating that CLT does not reliably self-extinguish, and along with other concerns, suggest to the reporter an unacceptable risk of collapse in the event of fire.

CROSS Expert Panel recognises that in the drive to meet the commitment to achieve net zero carbon by 2050, the use of CLT and other modern methods of construction will lead to changes to traditional construction. This report questions whether the building regulations guidance has kept up with some of those changes. This could potentially



lead to the construction of buildings that may not satisfy the functional requirements of the regulations or the expectations of the owners and their insurers. Some of these buildings might allow fire development that could endanger the occupants, neighbours, and firefighters. The use of alternative, reduced carbon components and methods of construction should be encouraged, but only when those involved in the design, construction, approval and management of the building are fully aware of the risks and relevant protective measures. Designers have to take responsibility for their designs which means understanding the limitations of codes, and the reporter's case study demonstrates the importance of abiding by this principle. For engineers who are using innovative construction materials, their professional duty of care requires diligence in checking that commonly applied design assumptions have not been invalidated by their chosen materials or systems. CLT can be used if it has been designed in a thoughtful and correct way with guidance from specialists if necessary. The full report contains Key Learning Outcomes for designers, for fire engineers, for civil and structural design engineers, and for firefighters. It also points to additional resources which are considered useful. Search for report 996 on the Safety Information page on the CROSS website (cross-safety.org.uk/safety-information-uk) for the details.

Fire safety concerns over green walls

A further report discusses how building close-down procedures that include isolating automated irrigation systems might result in the drying out of green walls, thus presenting a significant fire hazard in external walls. CROSS Expert Panel agrees that there is greater pressure to plan for green walls, for reasons of biodiversity, urban heat island effect and wellbeing. Planning will often require the maintenance of the planting, for visual reasons, but when approving for building regulations irrigation is a critical factor.

Any system which is important to safety needs to have appropriate measures in place to allow for maintenance, or for breakdown. It is probably not currently on people's radar that irrigation may fall under the same category as sprinklers or fire alarms, so fire strategies and fire risk assessments need to reflect its importance. The full report contains Key Learning Outcomes for building owners, managers and occupiers, and fire risk assessors. Search for report 976 on the Safety Information page on the CROSS website (cross-safety.org.uk/safety-information-uk) for the details.

If you have concerns or similar experiences to those discussed above, please submit a CROSS report. The secure, confidential reporting system allows you to share your experiences for the benefit of all in the built environment.

"For engineers who are using innovative construction materials, their professional duty of care requires diligence in checking that commonly applied design assumptions have not been invalidated by their chosen materials or systems."

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Thank you

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