

Notable Tall  
Building Fires of  
the Past and the  
Future

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9<sup>th</sup> International Tall Building HRB  
Fire Safety Conference (AUS) 2025

*fire safety network*

# 9th International Tall Building/High Rise Fire Safety Conference

Indianapolis, US | April 7th-9th 2025  
Indiana Convention Center 100 S Capitol Ave, Indianapolis, IN 46225



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# Tall Buildings

Fire Safety Network

## 9th International Tall Building Fire Safety Conference

18 & 19th June 2025 | London Olympia



THE BLUE LIGHT SHOW  
OLYMPIA LONDON  
18-19 JUNE 2025

FIRE SAFETY LIVE  
LONDON | Olympia | 18-19 June 2025

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# Tall Buildings

Fire Safety Network

## 9th International Tall Building Fire Safety Conference (Australia)

29th-30th July 2025 | Sydney Masonic Centre

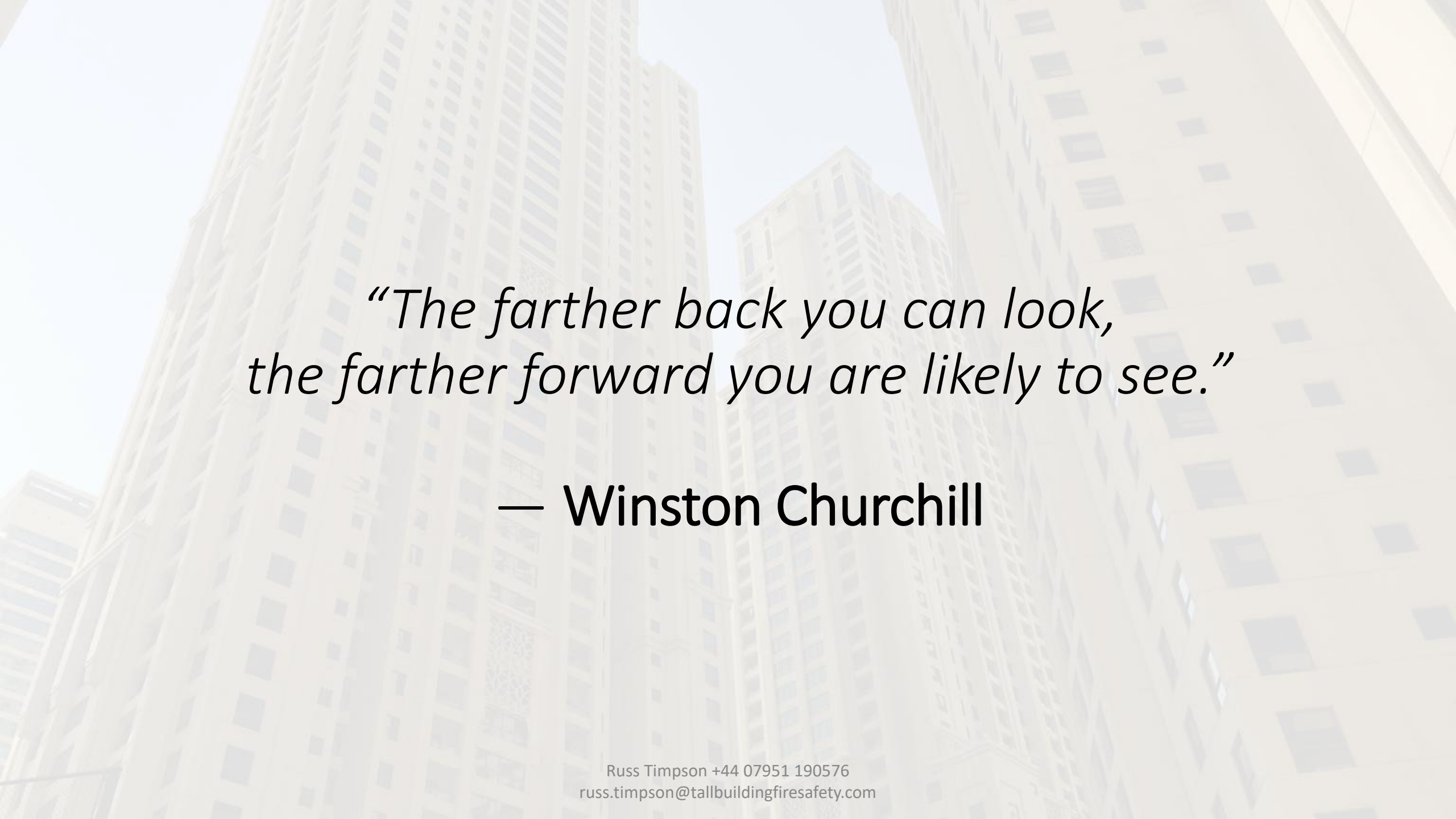


SMC  
SYDNEY MASONIC CENTRE

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*“The farther back you can look,  
the farther forward you are likely to see.”*

— **Winston Churchill**



# 1400 - 1500

## Yemen City of Shibam

- Comprises 500 buildings over 100ft high
- Made with mud bricks
- Oldest high-rise city in the World



# 1509 Canonbury Tower, London N1

Built to survive the 'great deluge' of a flooding Thames



# 1871 Home Insurance Building – Chicago

- Built after the great fire of Chicago– 10 floors
- William Le Baron Jenney, classmate of Gustave Eiffel
- Bird cage concept of steelwork to bear the weight of the building
- July 11<sup>th</sup> 1876, it suffered a fire which opened questions about Tall Building Fire Safety.

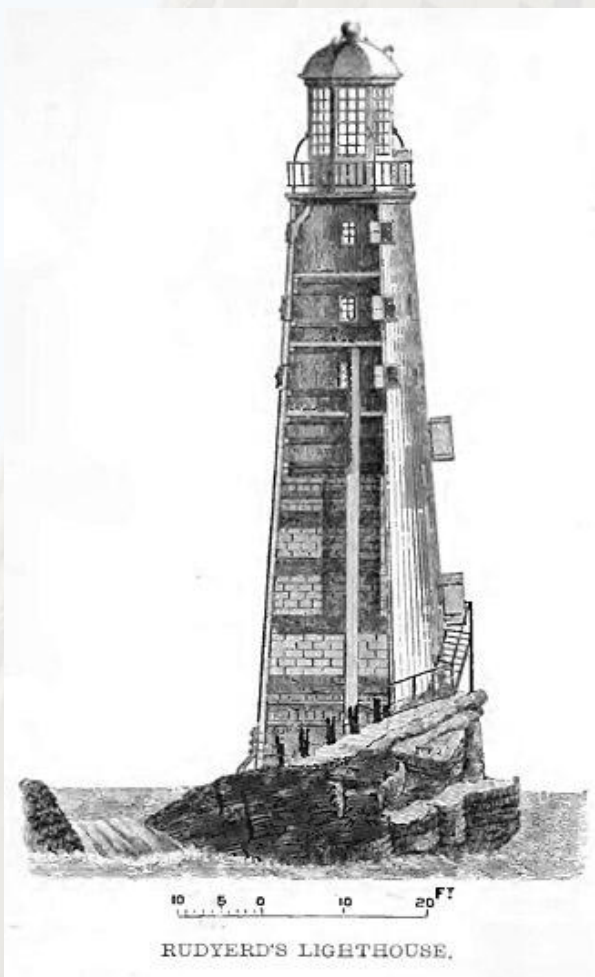




# Case 1 – ‘Tall Buildings are Different’

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# 1755 – The Ruddyer's Lighthouse



The fire had likely started from a spark emitted by a cracked chimney pipe leading from the kitchen stove below, which traveled through the lantern room and out through the roof. The lead covering over the candles, encrusted with soot and grease from nearly half a century of candle burning, had readily caught fire.

# Henry Hall – Lighthouse Keeper (94)

Flames had already engulfed the lantern roof causing lead to melt and drip down upon Hall's head and neck and over his clothes as he stood below hurling water towards the flaming room. At that moment, Hall had a violent sensation from within. "God help me, I'm on fire inside!", he screamed and explained to his companions that a nugget of molten lead had dropped into his open mouth and passed down his throat.



# Notable:

- New Construction & Technology being deployed at height
- Fires in Tall Buildings will cause falling, hazardous debris
- Single staircase building
- No possibility of responding intervention





# Case 2 – ‘Fit Sprinklers in Tall Buildings’

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# 1901 - The Asch Building, New York

- 146 garment workers (123 women and 23 men) were killed by fire, smoke inhalation, or falling or jumping to their deaths. Most of the victims were recent Jewish and Italian immigrant women aged 16 to 23
- likely cause of the fire was the disposal of an unextinguished match or cigarette butt in the scrap bin, which held two months' worth of accumulated cuttings by the time of the fire.
- locked doors (a common practice used to prevent workers from taking unauthorised breaks) and inadequate, flimsy fire escapes had a major impact on the death toll.





# Notable:

- Over occupancy or cramming taking place
- Established the **Factory Investigating Commission** to *"investigate factory conditions in this and other cities"*
- led to **38 new laws** regulating labour in New York state, mandating better building access and egress, fireproofing and fire extinguishing requirements, the installation of alarm systems and automatic sprinklers





# Case 3 – ‘Fire Compartmentation is Vital for Tall Buildings’

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# 1946 - The Winecoff Hotel, Atlanta

- **119** died, about 65 were injured
- likely cause of the fire was the disposal of an unextinguished match or cigarette butt
- The Winecoff Hotel was advertised as "absolutely fireproof." While the hotel's steel structure was indeed protected against the effects of fire, the hotel's interior finishes were combustible, and the building's exit arrangements consisted of a single stairway serving all fifteen floors.
- locked doors (a common practice used to prevent workers from taking unauthorised breaks) and inadequate, flimsy fire escapes had a major impact on the death toll.



# Notable:

- Single Staircase
- *“The public is being defrauded when a hotel is advertised as ‘fireproof,’ but really isn't.”*
- led to research into the flammability of building materials into code requirements and design standards, recognizing the existence of flashover as a means of fire propagation.





# Case 4 – ‘Electricity is the biggest cause of Fires in Tall Buildings’

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# 1972 – Joelma Building, San Paulo

- **179** died, 300 were injured
- At 8:50am, an air conditioning unit on the twelfth floor overheated, starting a fire. There were 756 people in the building at the time. Because flammable materials had been used to furnish the interior, the entire building was engulfed in flames within 20 minutes.
- 40 people jumped to escape the conditions inside and in failed attempts to grasp unreachable fire ladders. None survived.
- At the time, no emergency lights, fire sprinkler systems, or emergency exits were fitted to the building. There was only one stairwell, which ran the full height of the building



# Notable:

- The Joelma Building was a reinforced fire-resistant concrete hull construction.
- The air conditioning unit on the twelfth floor, which started the fire, needed a special type of circuit breaker to function properly, which was unavailable at the time it was installed.
- The fire quickly reached the building's only stairwell and climbed as high as the 15th floor. It did not reach any higher because of a lack of flammables in the stairwell







# Case 5 – ‘Tall Buildings are Complex’

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# 1980 – MGM Hotel, Las Vegas


- **87** died
- The casino and restaurants were not protected by a fire sprinkler system. They were exempt due to them being occupied 24 hours a day.
- The fire spread from the Deli to the lobby, fed by wallpaper, PVC piping, glue, and plastic mirrors, racing through the casino floor at a rate of 15–19 ft per second
- There was a major reformation of fire safety guidelines and codes. From then onwards, vertical openings needed to be protected to avoid smoke and fire spreading between floors, and concealed spaces could not contain combustible materials.



# Notable:

- Most casualties occurred well away from the fire due to the migration of carbon monoxide.
- Solving the risk of earthquake damage aggravated the fire safety deficiencies, within the building.
- MGM was a Tall and Complex building. Complexity must be a factor in any fire engineering strategy.





Case 6 – *‘Our starting position is that none of the building fire systems will work when we respond’*

– Las Vegas Fire Chief

# 1991 – One Meridian Plaza, Philadelphia

- **3 Firefighters** died
- By the time firefighters reached the 11th floor, the building had lost power after the heat from the blaze damaged electrical cables. The emergency generator never began producing electricity, and despite efforts to restore power the building was without electricity for the entirety of the event. This forced the firefighters to work in darkness and without the aid of elevators.



# Notable:

- All safety related electrical systems and backups were in the same conduit – no separation or resilience.
- Firefighters had to move all equipment physically – no lifts/elevators, no emergency lights.
- Firefighters were again hampered when it was discovered that the pressure relief valves on the standpipes were insufficiently adjusted to fight the fire - 60psi pressure instead of the needed 100+psi.





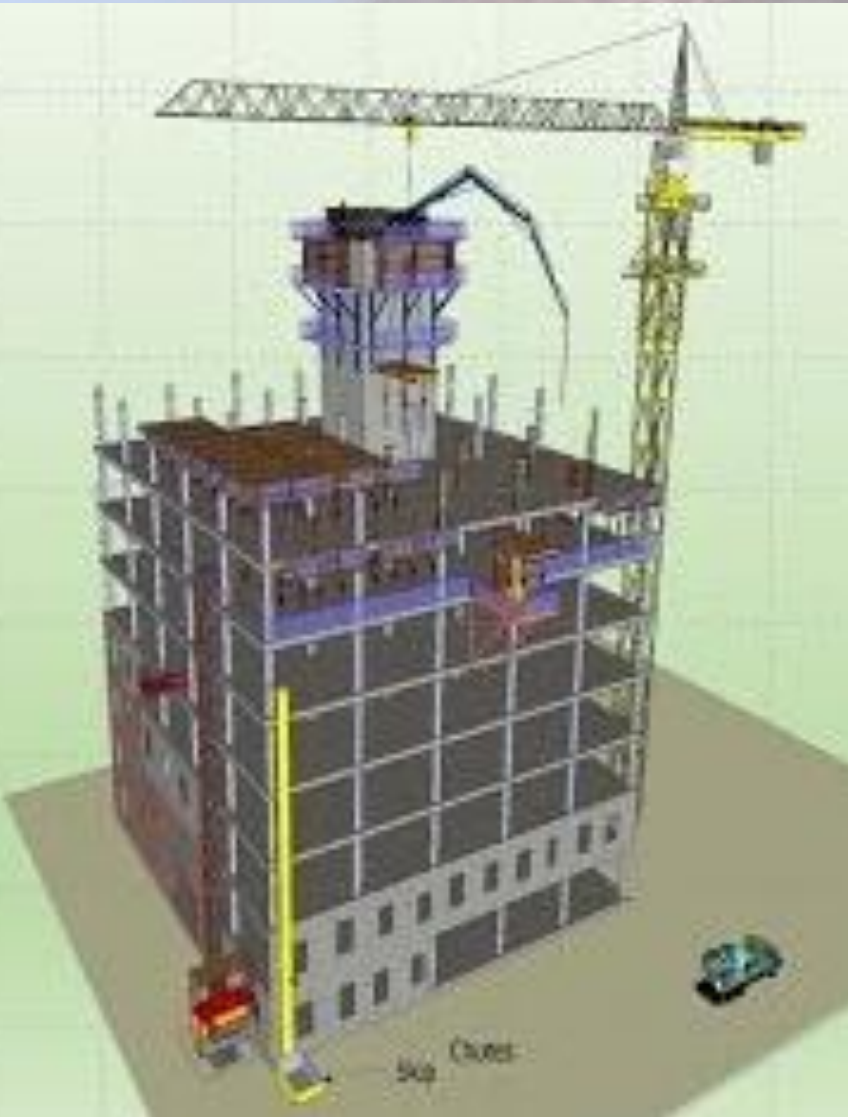
***Case 7 – ‘Construction whilst Tall building  
remains occupied is a high risk activity’***

# 1991 – Jing'an District, Shanghai, China

- **58** died and 70 injured
- Building was undergoing refurbishment surrounded by bamboo scaffolding.
- The fire began on the tenth floor at around 2.15pm. Its origin was in highly combustible construction materials, from where it spread throughout the building.
- It was officially established that the fire "was caused by unlicensed welders improperly operating their equipment"



# What are the risks to Fire fighters



- Type of construction ie Timber frame- rapid fire spread
- Building stability
- Stability in floors
- Falling from height
- Neighbouring buildings
- High winds
- Electrical services
- Wet/dry rising main, non functional
- Poor visibility
- Protruding steelwork
- Entrapment
- Non compartmentation and smoke logging
- Staircase fire spread
- Appliance positioning
- Falling objects
- Flammable materials, liquids, solids
- Solar, LPG, Battery storage systems, Lithium ion, Hydrogen

# A Growing Problem, but Why?

- Lithium-ion batteries are highly reactive with the environment, i.e. shock impact, general wear, poor maintenance.
- Fires are becoming more frequent within the construction and waste industries.
- Lithium-ion batteries become a self-oxidising chain-reacting fire and often cannot be extinguished.
- Likely to be hundreds of batteries on site at any one time, posing a significant fire risk.
- Battery powered transport including e-scooters and e-bikes have increased in popularity.
- Current charging arrangements on site are not sufficient and need to be improved



# First arriving units



8 minutes later





# Notable:

- Construction work in Tall Buildings is a high risk activity
- Scaffold and temporary over-cladding must be fit for purpose
- Tall Building Construction firefighting has some unique challenges





# Case 8 – ‘External Envelope of a Tall Building is a route for fire growth’

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# 2015 – Baku, Azerbaijan

- **15** died and 63 injured
- Widespread use of flammable plastic cladding in renovation projects on central streets - designed to present a “veneer of prosperity”
- Mayor ordered the removal of facades made of the low-quality material.



# Notable:

- Fire engineering was developed around 'design fires' that were contained within boxes.
- External Fire Spread was not recognised as hazard to life, due to perceived lack of impact on escape routes.





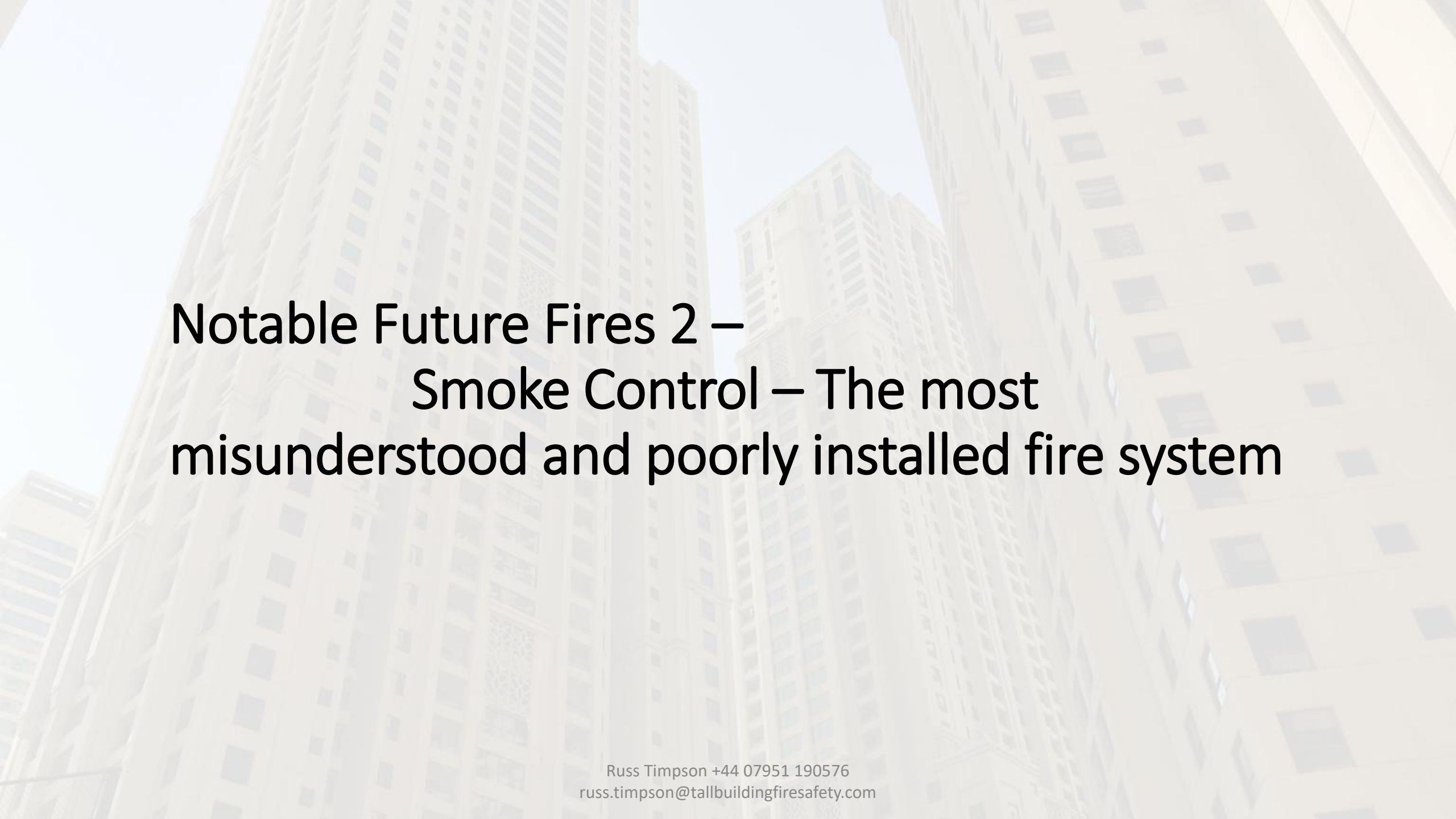
**Notable Future Fires 1 –**

**Balconies**



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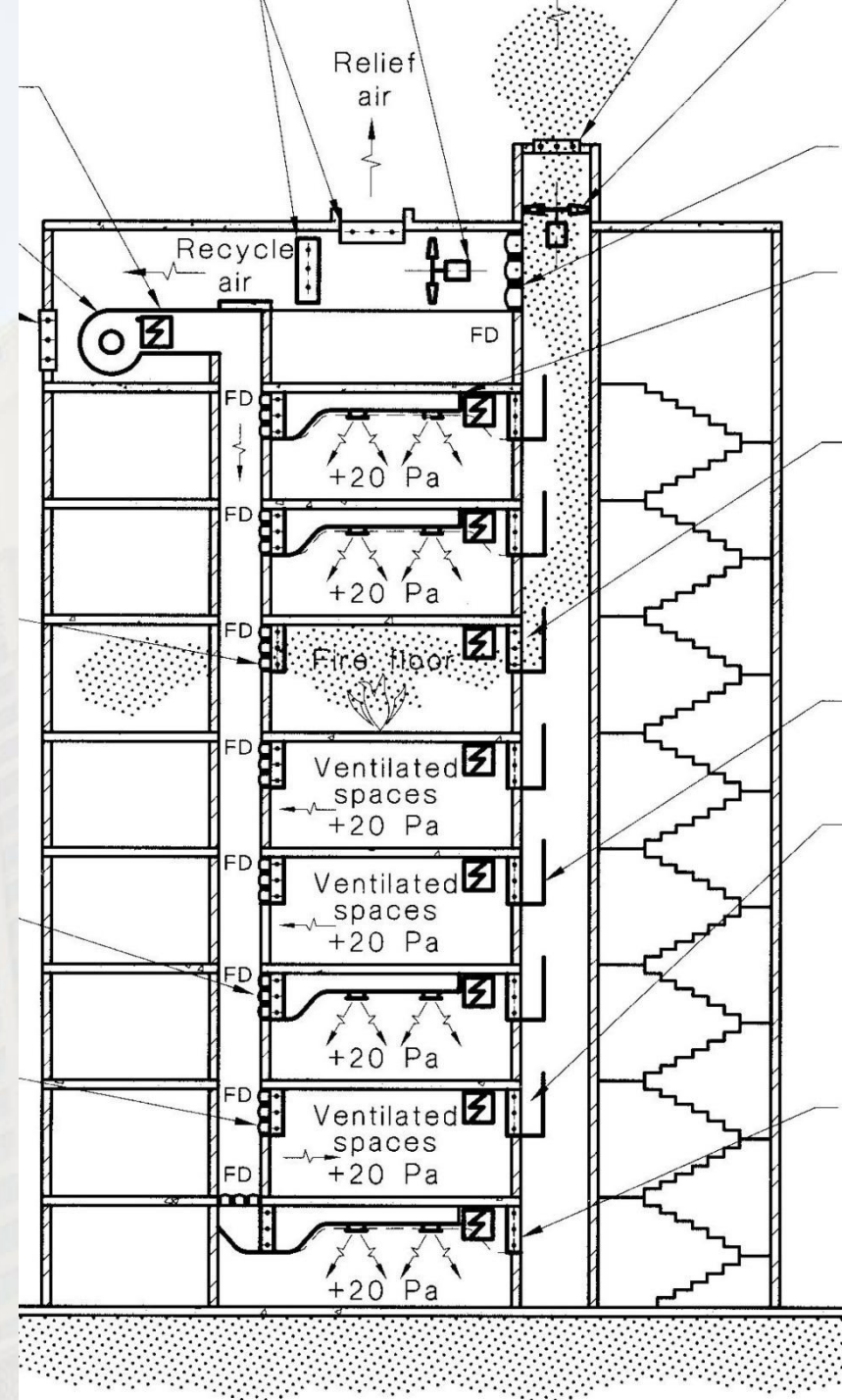




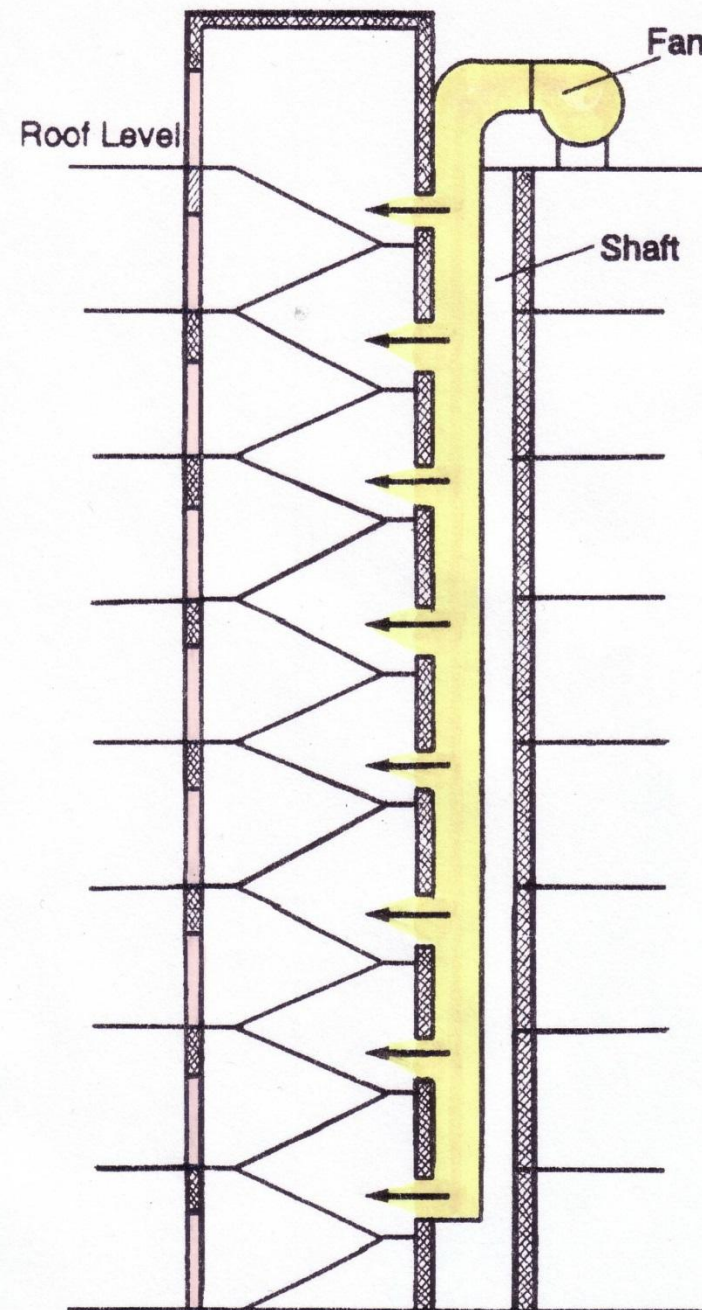
**Notable Future Fires 2 –  
Smoke Control – The most  
misunderstood and poorly installed fire system**

# Smoke Control Systems

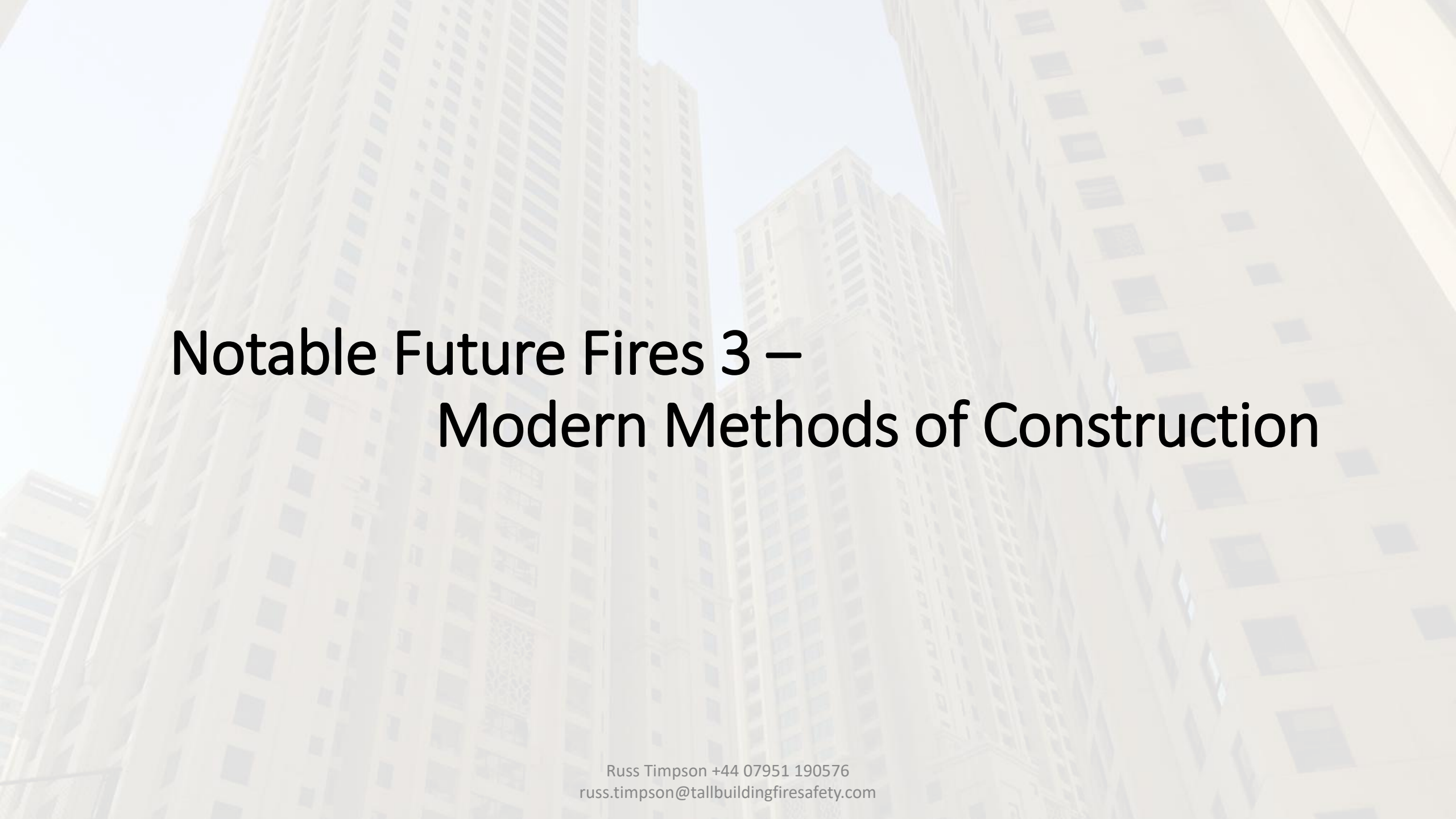
## Multi-Compartment Buildings



# Exit Pressurisation Systems



*Stairwell pressurization by multiple injection*



# Notable Future Fires 3 – Modern Methods of Construction

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87 Meter Ascent Tower



159 Meter 30 Marsh Wall



# Notable Future Fires 4 – Healthcare in the Community

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# Deployable Door Curtains – GET THEM

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# Rumsfeld Conclusions

- We've forgotten what we should have learnt
- What we know now is already out of date
- The Statistics will not help our work, they will work against us
- However, if we work together we can increase the number of known known's. That is the goal.