



# HORIZONSCAN

RISK - RESILIENCE - READINESS

Can we Fight and Extinguish Full  
Height, Tall Building Fires?




June 22<sup>th</sup> 2016



Can we Fight and Extinguish, Full Height Tall Building Fires?

**I SAY  
NO**



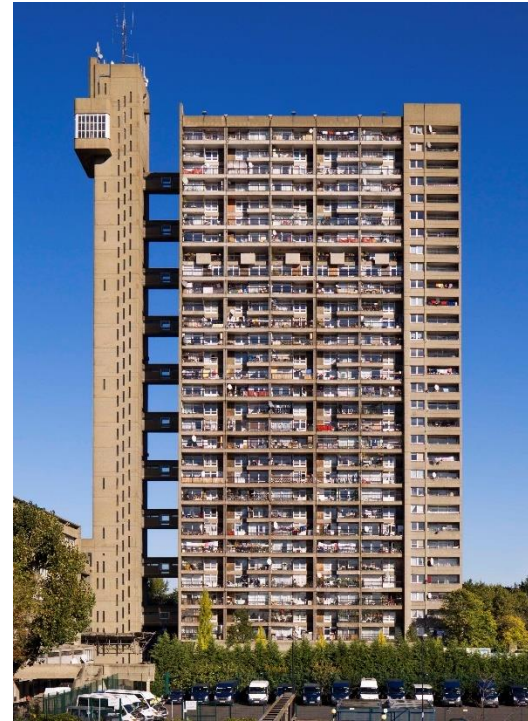
Can we Fight and Extinguish,  
Full Height , Tall Building  
Fires?

# Tall Building

From who's perspective?

Approval Document (B)  
Architect / Designer  
Owner /Occupier  
NFPA 101®, Life Safety Code  
Design Council (CABE)  
British Standards  
International Building Code (ICC)  
And many more....

**The Fire Service**



# Tall Building

## What is that to the Fire Service?

Generally called “High Rise”

“For the purpose of this generic risk assessment, a high rise building is defined as a building containing floors at such a height or position that the deployment of external firefighting equipment and rescue operations may not be feasible”



Department  
for Communities  
& Local Government



Fire and Rescue Authorities  
Operational Guidance

**GRAs**  
generic risk assessments

**GRA 3.2**

Fighting fires –  
In high rise buildings

# Tall Building

## What can we reach?

Equipment portfolio

13.5m (14m) Ladder.

Standard tallest carried on Fire engines

Working Height 12m

3rd floor Safely



# Tall Building

## What can we reach?

Equipment portfolio

“Height Vehicle”

Turntable ladder, Hydraulic platform ALP-DPHV

28-32M reach

Laden weight 32 tonnes (LFB GN25)

9<sup>th</sup>-10<sup>th</sup> Floor (Ideal pitching)



# Tall Building

## What could we reach?

Equipment portfolio

90M Hydraulic platform (Bronto FL90)

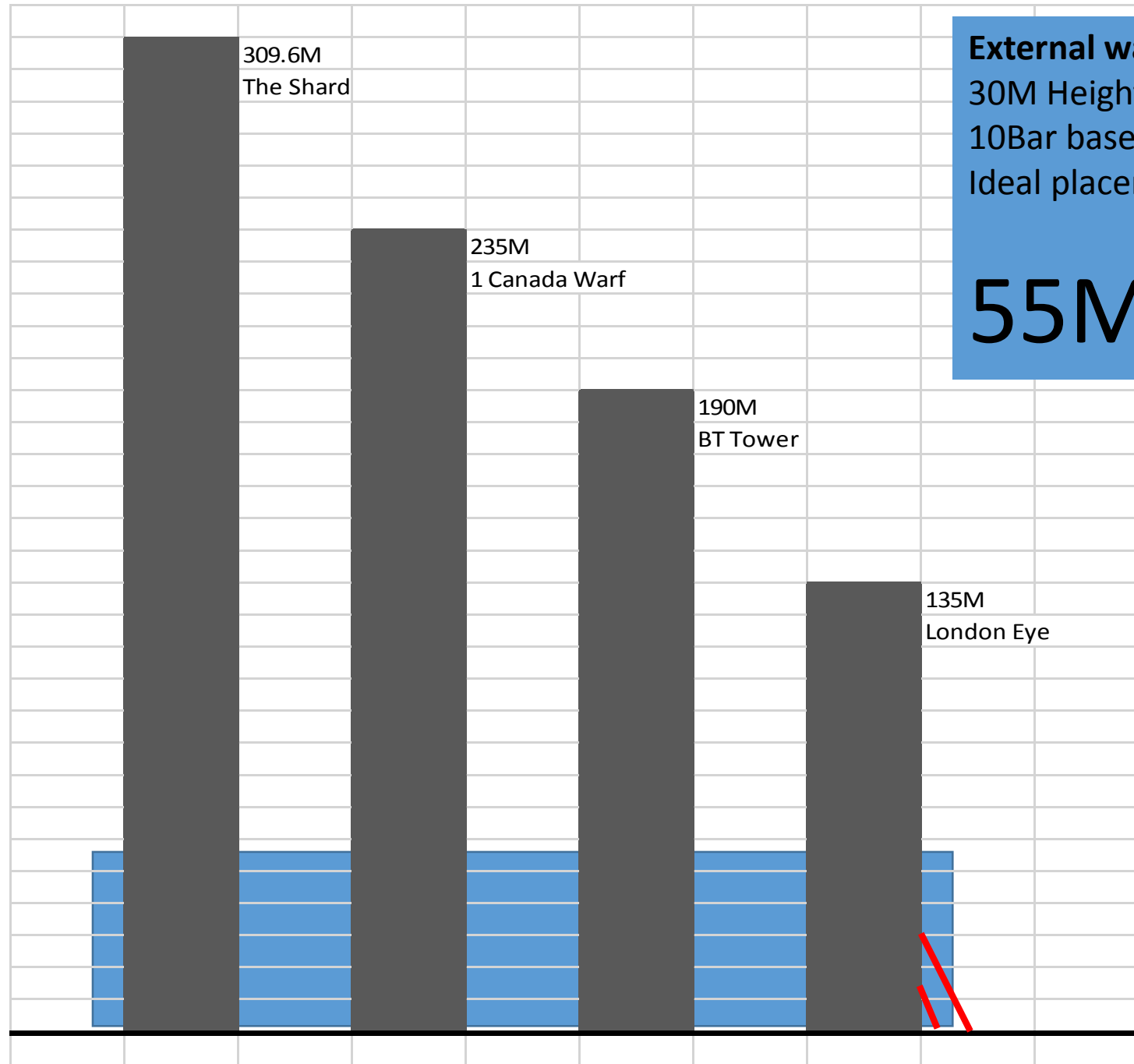
25<sup>th</sup> Floor

Dubai : Has ordered 20, Martin Aircraft Company, Jetpacks for firefighters.





# Reach



**External water projection:**  
30M Height vehicle,  
10Bar base pump,  
Ideal placement=

# 55M

30M Height Vehicle

135 Ladder

# Full Height

What do we mean?

**A fire that has the ability to spread from its ignition point to potentially involve the FULL HEIGHT of the building**





# Full Height

## Mechanisms of spread?

A fire that has the ability to spread from its ignition point to potentially involve the FULL HEIGHT of the building.....BY:

- 1. External Floor-to-Floor travel**
- 2. Internal fire spread: Ineffective compartmentation (vertical shafts, unprotected Service and duct ways)**
- 3. Combustible external surfaces**

# Full Height spread

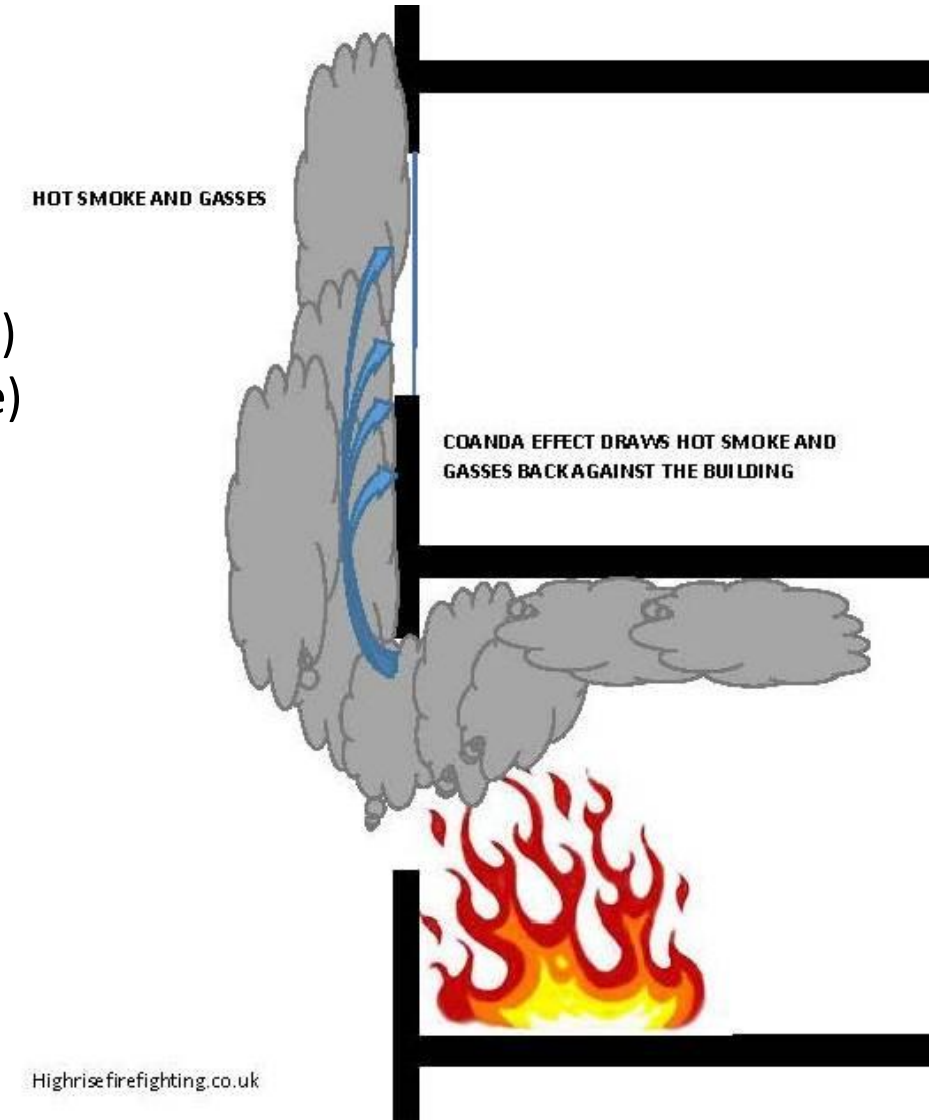
## External (Floor-to-floor) Travel

Combination of:

**Convection** (hot gas rising)

**Coanda Effect** (holding hot gas against building)

**Radiation** (hot gases and flame in smoke plume)



# Full Height spread

**Internal fire spread: Ineffective compartmentation**  
(Vertical shafts, Unprotected Service, openings and duct ways)



# Full Height spread

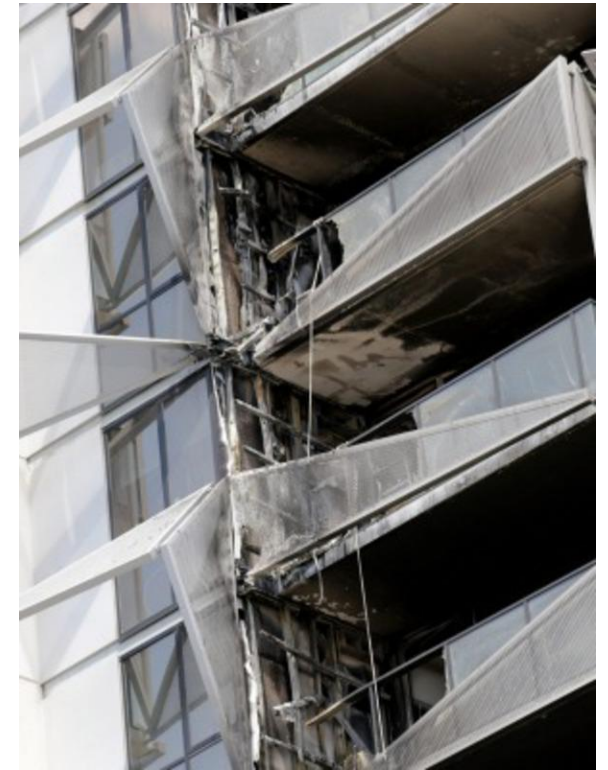
## Combustible external surfaces



Grozny 2013



Al Tayer Tower 2012




Lacrosse Dockland,  
Melbourne 2014

# What do we know about externally combustible surfaces?



Post the Great fire of London... The Fire Courts and the Fire Royal Commissioners rules that the rebuilt "houses and buildings" shall be of brick with a much lesser use of wood. Roof and building covers shall be of a material that will not burn"

*The Rebuilding of London After the Great Fire by T.F. Reddaway (1940)*



# Why are we using potentially combustible products (Cladding) on High Rise?

- Its 'Green'
- It looks good
- Provides enhanced weather protection (water)
- Its light
- Its quick
- Its cheap
- Its easy to install
- Low maintenance
- **Its SAFE .... 'fire compliant'**



# Cladding, Safe?

Following the Garnock Court fire, Irving 1999 a parliamentary inquiry was undertaken to investigate the potential risk of fire spread in buildings by way of external cladding systems. The report was published early in 2000.

*18. The evidence we have received during this inquiry does not suggest that the majority of the external cladding systems currently in use in the UK poses a serious threat to life or property in the event of fire. ...*

**Potentially 49.9% of external cladding systems in the UK poses a serious risk to life or property in the event.**





# Cladding, Safe?

Fake or forged materials (from China)

Non compliant or unspecified materials being used

Poor installation techniques and methodology

Post installation abuse

Are standards good enough?

# Compliant ...how?

Customer D-B (England)

Building Law

construction

18M... LIV

BS 478

BS 8

(B...

LPS1... 582

ETAG C

bre





# Why upgrade compliance standards?

No account of **Wind Driven** element  
All testing is static

Is the current testing suitable for very large scale supertall installation?  
Is it reflecting outcomes from recent research and incidents?

Flame height and lengths at high rise fires

[NFPA : Fire Hazards of Exterior Wall Assemblies Containing Combustible Components](#)

NIST Research Wind driven fires

[NIST TN1618: 2009](#)



# Compliant ...how it should be!

All component materials that are elements of an external wall :

- 1) Buildings over 18M NON-COMBUSTIBLE (Existing standards)
- 2) Buildings over 50M NON-COMBUSTIBLE (New 'wind driven' standard)

NEW BS 478 : Combustibility of building materials under **wind driven** conditions

NEW BS 8414 : **Wind driven** fire performance

NEW Building control requirement for actual materials testing (Buildings +50M)

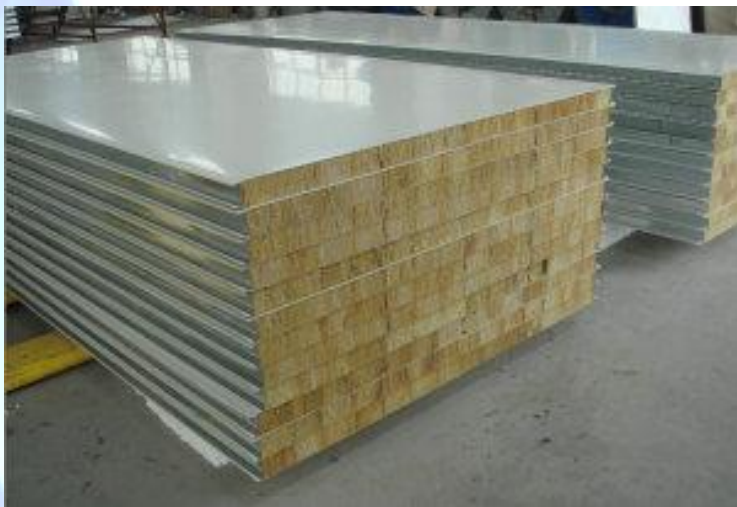
# Compliant ...how it should be!



Aerated Cement, Pumice, Silica  
Composite Cladding

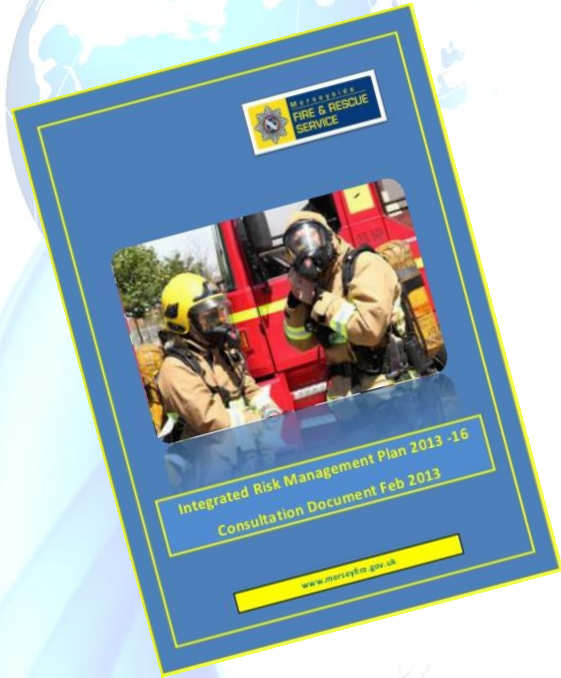


Inert Gas Aluminium Honeycomb Sheet



MMMF Composite sheeting (Rockwool)

# Fighting Fire



Standards of fire cover change  
Firefighting technology changes, slowly.  
Firefighters are arguably less fit  
Fire Engineering is complex



# Fighting Fire

**BUT at a basic level most firefighting is carried out by application of water to the fire. Nothing much has really changed.**





# Perfect storm?

**The outsides of High Rise buildings can burn**

**Firefighters can not apply water externally much above 55M**

**Sealed building prevent firefighters applying water from inside**

**Materials specification standards are not good enough**

**Construction standards are not good enough**

**Fatalities and Multimillion dollar fires**

**It can happen in the UK and it WILL**

Fifteen people were killed and dozens more were injured in the blaze at the 16-storey block in the capital, Baku.





Can we Fight and Extinguish, Full Height Tall Building Fires?

**I SAY  
NO**



**Any questions?**