“With the exception of language, it would not be an exaggeration to characterise global fire safety standards as the most urgent outstanding issue in the pursuit of the public interest in global safety and performance comparability.”

Gary Strong BSc (Hons) FRICS FCIArb CBuildE CABE FCILA FUEDI-ELAE
Global Building Standards Director, RICS

Chair – CTBUH Fire & Facades Group

Chair – International Fire Safety Standards Coalition

CTBUH

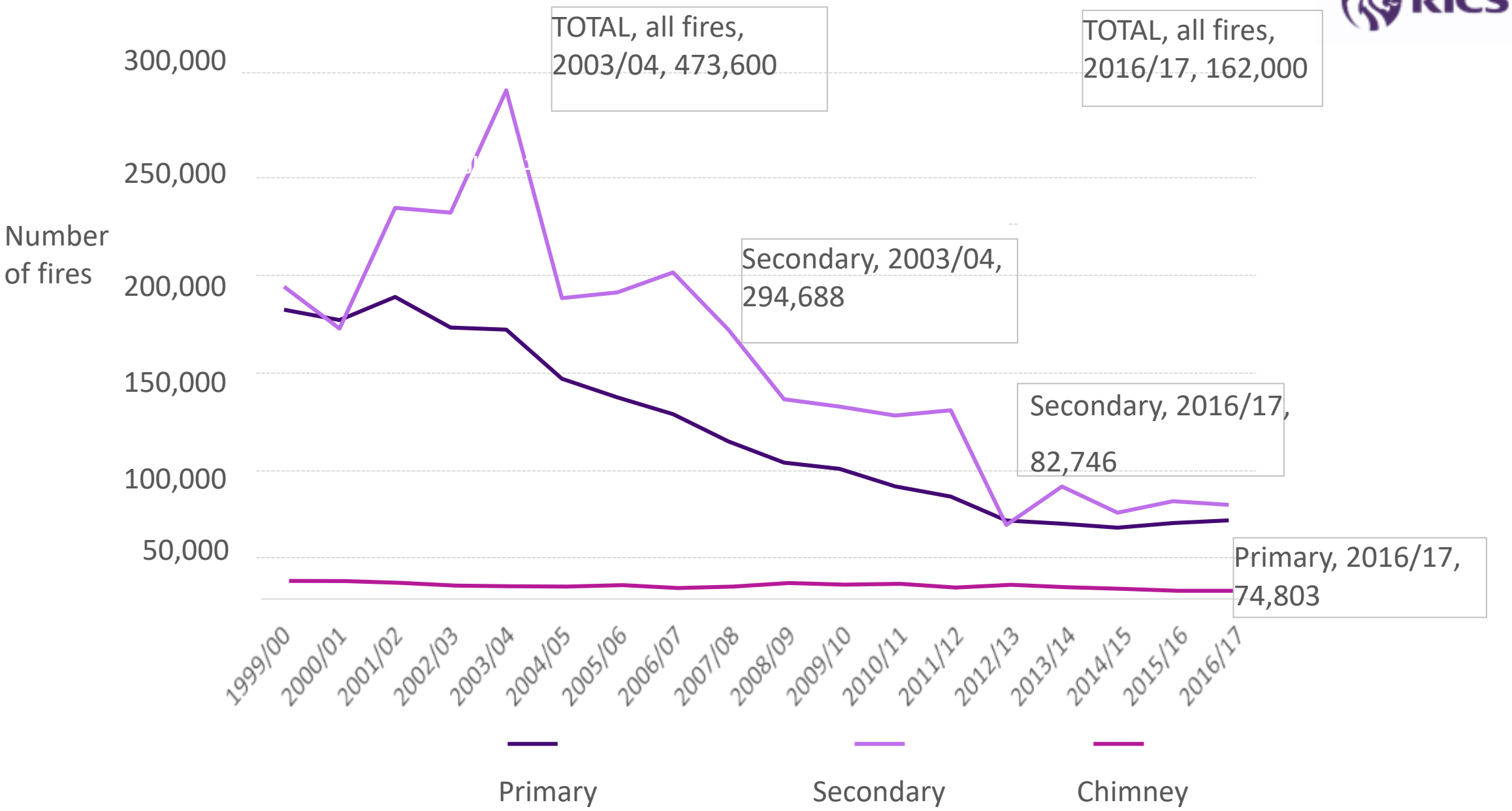
Council on **Tall Buildings** and **Urban Habitat**

Established 1969 in Chicago

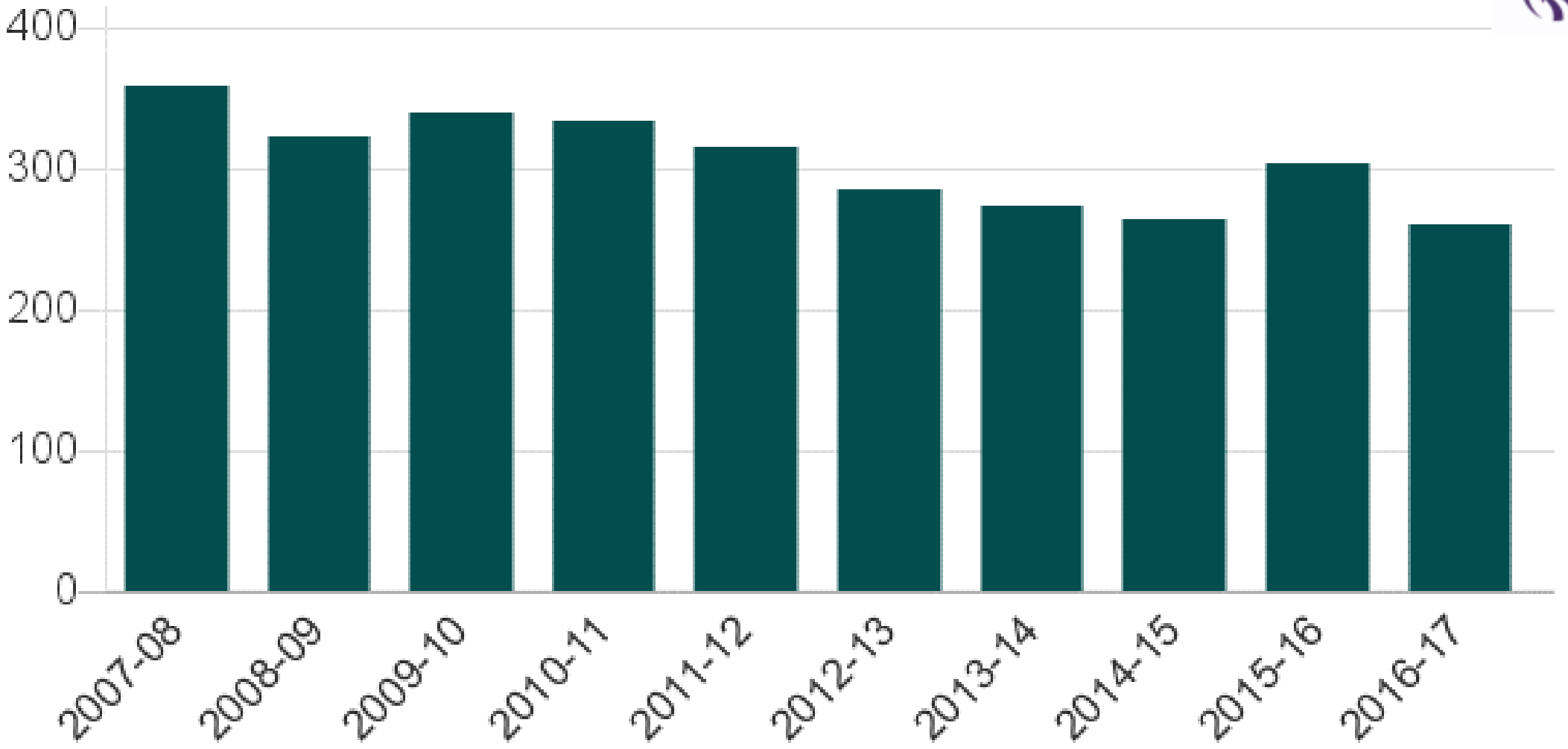
Fire performance of facades group established 2015 – linking to other groups

http://www.ctbuh.org/

Trends in fires, England, 1999/00 to 2016/17



Fire-related fatalities in England



Source: Home Office

Trends in fire safety

Fire safety checks declined 2010/11 – 2017/18

Fire safety checks across England fallen by 42% over the last 7 years*

84,575 fire safety audits in 2010-11

49,423 fire safety audits in 2017-18

* HM Inspectorate of Constabulary, Fire and Rescue Services

Trends in causes of fire

Smoking – less carelessly discarded smoking materials

Chip pan fires

Lithium ion batteries

Domestic appliances

BBQ’s

Risks of car park fires

* HM Inspectorate of Constabulary, Fire and Rescue Services

Fire in historic buildings

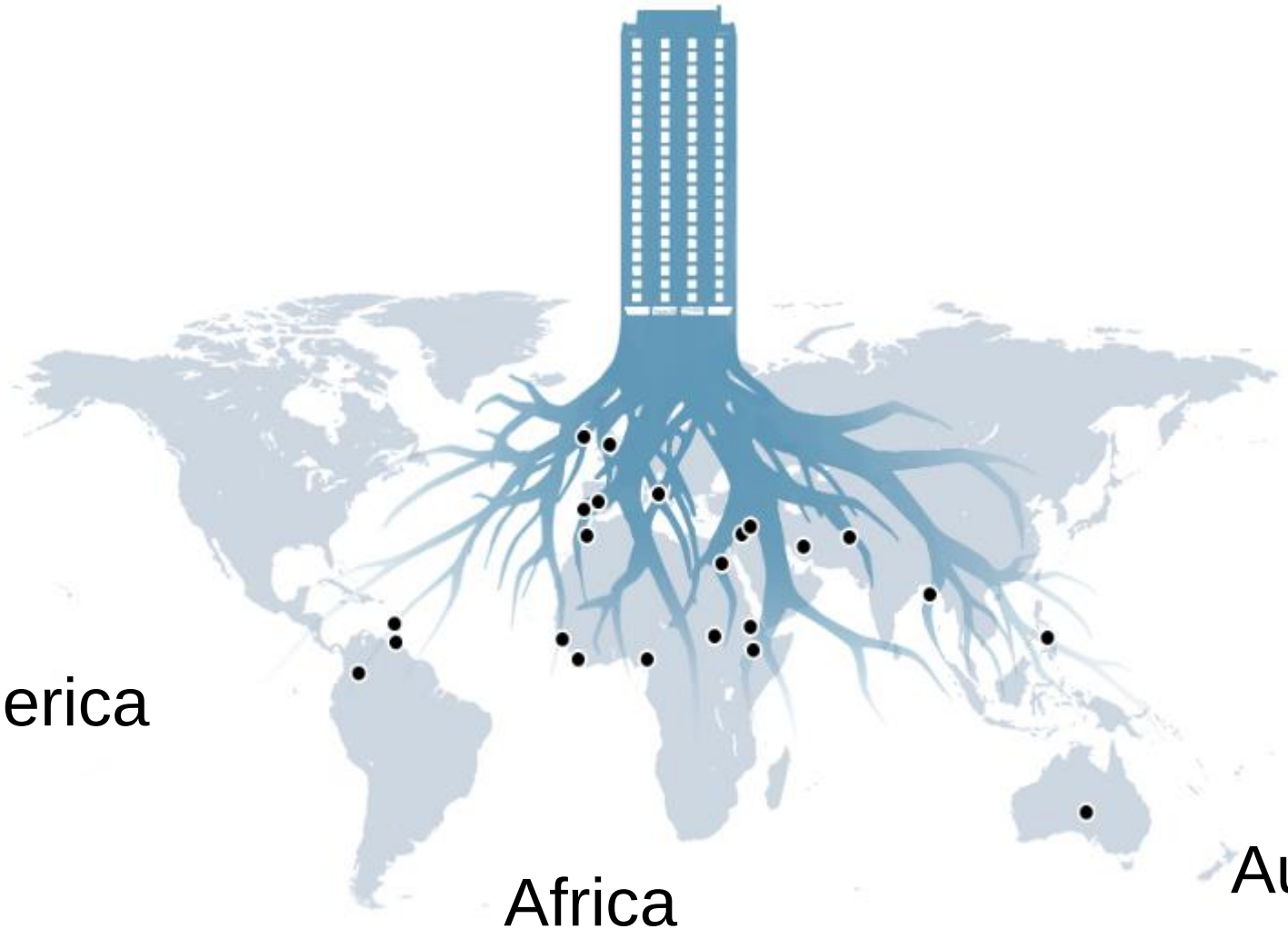
UK Houses of Parliament caught fire
40 times between 2008 and 2012

Notre Dame cathedral fire April 2019

Getty images

The Roots of Grenfell

bbc.co.uk



Middle East

Europe

India &
Bangladesh

South America

Africa

Australia

Grenfell Tower update

Independent Expert Advisory Panel
IRG – Industry Response Group
Public Inquiry
Dame Judith Hackitt Building Regulations and Fire Safety Review
Criminal investigation – 7k interviews, 13 under caution
7 large scale BS8414 tests
Guidance issued to building owners by MHCLG continuing
Building Safety Programme
Building Solutions Programme

Grenfell Tower update

- Initial focus on ACM
- Clear that little understanding of building regs requirements
- Ban on ‘combustible’ cladding wef 21/12/18 in England
- Scotland changes Feb 2021

Grenfell Tower update

- Testing non ACM cladding
- Implementation Plan
- Early Adopters Group
- AILOT's (desktop studies) banned for buildings in scope
- AD B review consultation – closed 28 Feb

Grenfell Tower update

- Industry Safety Steering Group, chaired by Dame Judith
- Social Sector Engagement Best Practice Group

Grenfell Tower update

- More than 20,000 social housing tenants still at risk

Hotel building - Rostov-on-Don, Russia

Grenfell tower, London

Shanghai, China

Baku, Azerbaijan

Address Downtown hotel, UAE

Lacrosse tower fire, Melbourne

(kate.nguyen@unimelb.edu.au)

Building	Location	Year	Description	Damage
Grenfell Tower	London, UK	2017	External cladding which consisted of ACM panels with PE core	72 dead 70+ injured
The Address Downtown Dubai (302m tall)	Dubai, UAE	2016	An electrical short circuit on a spotlight was the cause	16 minor injuries
Marina Torch (352m)	Dubai, UAE	2015 & 2017	Fire initiated in the 52nd floor and spread quickly due to high winds, combustible cladding	No injuries
Tamweel Tower (160m tall)	Dubai, UAE	2012	Vertical bands of exterior cladding from ground to roof level ACM panels with PE core	Repair works have begun after 3 years
Saif Belhasa Building (13 stories)	Dubai, UAE	2012	Cladding consisted of ACM panels with PE core	9 flats destroyed 2 injured Debris damaged 5 vehicles
16 Storey apartment building	Baku, Azerbaijan	2015	Rapid fire spread along the cladding. Combustible panels according to reports.	17 dead 60 injured
Lacrosse Building	Melbourne, Australia	2014	External wall cladding and aided by combustible material located within the wall structure quickly spread to the top of the building	No injuries
18 storey building	Roubaix, France	2012	Highly flammable outer cladding	1 dead 1 injured
28 storey building	Shanghai, China	2010	Polyurethane insulation to external walls	53 dead 90 injured
Monte Carlo Hotel (32 stories)	Las Vegas, US	2008	Exterior insulation and finish system which consists of a layer of expanded polystyrene foam adhered to gypsum sheathing	13 minor injuries

Cladding system tests	Result
Test 1 **cladding system formed using ACM panels with an unmodified polyethylene core (PE) and a rigid polyisocyanurate foam (PIR) insulation**	Failed
Test 2 **cladding system formed using ACM panels with unmodified polyethylene core (PE) (Cat 3 in screening tests) and stone wool insulation**	Failed
Test 3 **cladding system formed using ACM panels with a fire-retardant polyethylene core (FR) and a PIR foam insulation**	Failed
Test 7 **cladding system formed using ACM panels with fire-retardant polyethylene filler (Cat 2 in screening tests) with phenolic foam insulation**	Failed
Test 4 **cladding system formed using ACM panels with a fire-retardant (FR) core and stone wool insulation**	Passed
Test 5 **cladding system formed using ACM panels with a limited combustibility filler (A2) with PIR foam insulation**	Passed
Test 6 **cladding system formed using ACM panels with a limited combustibility filler (Cat 1 in screening tests) and mineral (or stone) wool insulation**	Passed

Combustibility

(kate.nguyen@rmit.edu.au)

National Construction Code (NCC)	International Building Code (IBC)	Building regulations (ADB)
1) $t_t \leq 5$ s 2) $\Delta T_{furnace} \leq 50^\circ$ C 3) $\Delta T_{specimen} \leq 50^\circ$ C	1) If the weight loss of specimen ≤ 50% I. $\Delta T_{furnace\ \&\ specimen} \leq 30^\circ$ C II. No flaming from the specimen after the first 30 seconds 2) If the weight loss > 50% I. $t_t = 0$ s II. $\Delta T_{furnace\ \&\ specimen} = 0$	Non-combustible 1) $t_t \leq 5$ s 2) $\Delta m \leq 50\%$ 3) $\Delta T_{furnace\ \&\ specimen} \leq 30^\circ$ C Limited combustibility 1) $t_t \leq 20$ s 2) $\Delta m \leq 50\%$ 3) $\Delta T_{furnace\ \&\ specimen} \leq 50^\circ$ C
Mat. 1 ✓	✗	✗
Mat. 2 ✗	✓	✗ (Limited combustibility)
AS 1530.1	ASTM E136 or ISO 1182	BS EN ISO 1182 and/or BS EN ISO 1716 (and EN) 13823

Assembly Test Comparison

Test	Test Dimension	Fire Source	Peak Heat Flux to Panels*	Primary Criteria (Failure Evaluation)
NFPA 285	17.5 feet tall, 13.3 feet wide	Two gas burners (HRR = 1.3 MW)	40 kW/m2	**Temperature via thermocouple measurement (10 ft elevation, 1000°F)**
BS-8414	32 feet tall, 9 feet wide, with a 5 foot wide wing Wall	Wood crib (HRR = 3±0.5 MW)	75 kW/m2	**Temperature via thermocouple measurement (16.4 ft elevation, 1110°F above ambient)**
FM 16-ft PPT	**16 feet tall, 3.5 feet wide**	**One gas burner (HRR = 360 kW)**	**100 kW/m2**	**Peak HRR > 1100 kW**

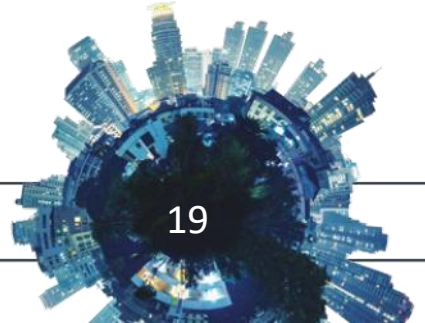
MHCLG cladding categorisation

1. ACM cladding with A2 filler (**category 1**) can be safe on buildings over 18m with foam insulation or stone wool insulation

2. ACM cladding with fire retardant polyethylene filler (**category 2**):

- presents a notable fire hazard on buildings over 18m when used with *rigid polymeric foam insulation* based on the evidence currently available.
- can be safe on buildings over 18m if used with *non-combustible insulation (e.g. stone wool)*

- ACM cladding with unmodified polyethylene filler (**category 3**) presents a significant fire hazard on buildings over 18m with *any* form of insulation.



Further cladding test categorisation

1. Copper Composite Materials
2. Zinc Composite Materials
3. Honeycomb aluminium
4. Reconstituted stone
5. Brick slips
6. HPL

Non ACM cladding is an issue

Balconies are also an issue

Innovation will pose challenges

Electrical issues

21st October 2017

Residents evacuated in Walpole Road and Hamilton Road, Bournemouth on Friday after power surge sparks five fires

http://www.bournemouthecho.co.uk/news/15610931.Hundreds_of_people_sti

ll_without_electricity_after_power_surge_causes_house_fires/

Sprinklers

In Wales, sprinklers are now mandatory for ALL residential new buildings

Scotland above 18m (changing in Feb 2021 to 12m) - but not in England, or

Northern Ireland.

Recommended in AD B above

30m but NOT mandatory.

NOT retrospective.

Sprinklers

Fake sprinkler heads ? (SFPE)

Joint call by RICS / RIBA / CIOB

Procurement

1. Hyde launches £2.4bn fire safety procurement framework
News12/07/18
A major London housing association has launched a £2.4bn fire safety procurement framework.

2. ‘value engineering’ = cost savings

Fire door issues

Fire door manufacturer withdraws products from sale following post-Grenfell tests

News 19/07/18

Media – every day

Housing associations face being stuck with dangerous cladding on leased blocks

Grenfell Inquiry day 22: description of hectic scenes within control room

Hyde launches £2.4bn fire safety procurement framework

Grenfell Inquiry day 21: account from 'nerve centre' of fire brigade response

Control room technology caused Grenfell response difficulties, inquiry hears

London association to remove non-ACM laminate cladding after failed test

FPA to launch alternative cladding testing regime

Widely used combustible cladding has never passed large-scale test

Grenfell Inquiry day 20: firefighter describes 'huge volume' of calls from trapped residents

Britain flouting human rights over ACM

Shergold & Weir report Building Confidence

24 principal recommendations:

- Registration of building practitioners
- Consistent requirements for registration
- CPD
- Career paths for building surveyors
- Improving collaboration between regulators
- Effective regulatory powers
- Strategy for regulation of commercial buildings
- Collaboration with fire authorities re design
- Integrity of private BS’s
- Codes of conduct for BS’s
- Role of BS’s in enforcement
- Collecting & sharing data and intel

Shergold & Weir report Building Confidence

24 principal recommendations:

- Responsibility of designers
- Adequate documents for performance solutions
- Approval of performance solutions
- Approval of docs during construction
- Independent third party review
- Mandatory inspections
- Inspection & certification of fire safety system installation
- Building manuals for commercial buildings
- Building product safety
- Dictionary of terminology
- Implementation of recommendations
- Implementation Plan

Dame Judith Hackitt final report Building a Safer Future

53 principal recommendations:

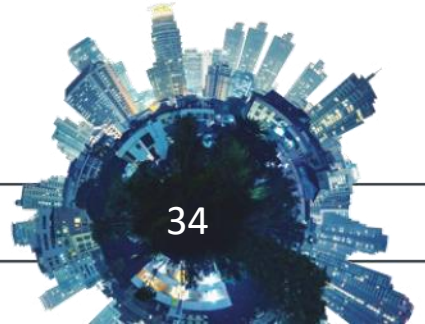
- a stronger and tougher regulatory framework for higher risk residential buildings (HRRBs) that are 10 storeys
- a Joint Competent Authority (JCA) comprising fire and rescue authorities, Local Authority Building Standards and HSE to oversee better management of safety risks (through safety cases) across their entire cycle
- introduction of a safety case approach & permissions
- clear responsibilities to actively manage on-going safety during occupation

Dame Judith Hackitt final report Building a Safer Future

- mandatory incident reporting
- key roles & responsibilities
- overhaul of guidance
- digital records – inc BIM
- stronger enforcement & criminal sanctions
- effective leadership & competence for key roles
- stronger testing, labelling & traceability of products
- empowering residents' voices

CSG – Competency Steering Group

Established May 2018, after Hackitt Report
13 work groups
Focus is on HRRBs but will be widened out
Final report expected late summer 2019 to SoS
Professional bodies may be overseen by UKAS
Higher level comps for HRRBs



UK Govt consultations 6th June – 31st July 2019

Two consultations;

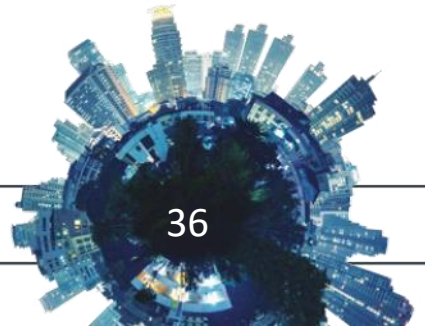
1. ‘Building a Safer Future: Proposals for reform of the building safety regulatory system’ – goes further than Hackitt

2. Regulatory Reform (Fire Safety) Order 2005

Insurance issues

Buildings insurance

PI insurance



Legal issues

- Where does the liability sit if the government publish the building code ?
- Corporate manslaughter
- Lacrosse Tower judgement – Owners Corporation no.1 v LU Simon 28 Feb 2019
- Lawsuits expected – Arconic, Cellotex, Whirlpool

Benefits to business of standards

From investors to the public, they offer significant benefits to different stakeholders:

Professional advisors

enhance performance and reputation 1

Investors

comparability of sound investments on a like for like basis 2

Multinationals

better understanding of property portfolio 3

Developers

ability to attract new clients from all markets/regions 4

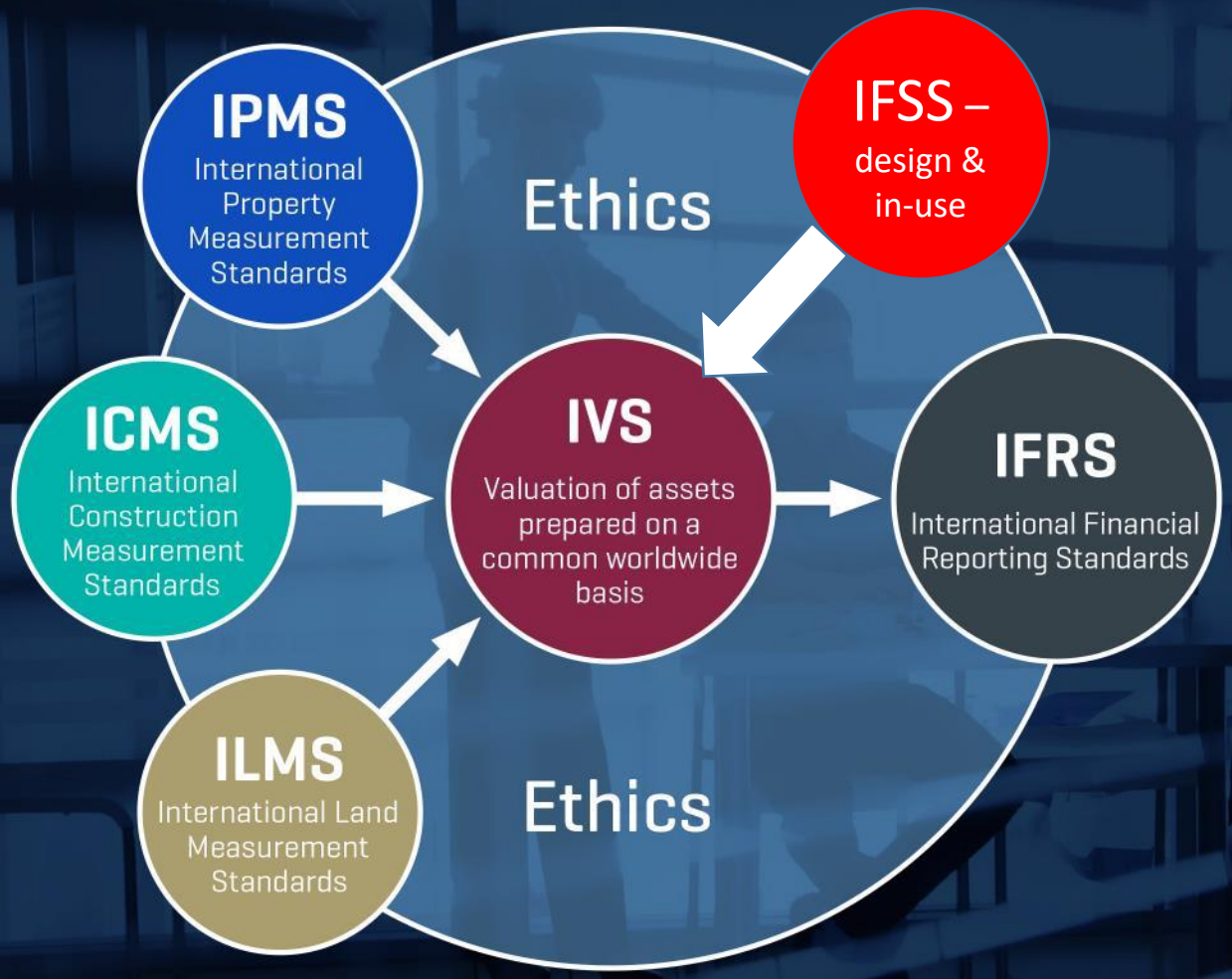
Governments

political, market transparency and investment potential 5

Public

confidence in governments and buildings 6

International standards – working together



Valuation

- Based on open market value
- Use best comparables available
- Public sentiment is against dangerous buildings
- Global investors very aware of this as a global issue
- Local investors very aware
- Banks very aware of inconsistencies
- So **no investment and inability to raise finance**

IFSS - International Fire Safety Standards

Why is there a need for IFSS?

Property of all types is built and managed differently around the world, which leads to:

- Difficulty in providing consistent and transparent information from one market to the next
- Inconsistency further undermining existing international standards such as IFRS and IVS
- A degree of uncertainty in property markets
- Uncertainty for international financial investors
- Uncertainty by the public leading to political instability

Fire Safety in Buildings

Fire safety in buildings has three arenas:

- Design and construction – providing the fire safety infrastructure
- Building in use – using and maintaining the fire safety infrastructure
- Demolition

Design and Construction – Providing the fire safety infrastructure

Fire safety design needs to address:

- Holistically the whole building, not just cladding, on a fire engineered approach
- Fire prevention and arson resistance
- Fire detection and alarm
- Means of escape/evacuation
- Structural fire resilience
- Fire growth control incl fire suppression
- Fire fighting facilities
- Fire engineers input
- Supervision of construction
- Competency

Building In Use – Using and maintaining the fire safety infrastructure

- Fire risk assessment
- Building management
  - Regular inspection, reporting & testing
  - Maintenance
- Training
- Existing buildings – incremental improvements
- Competency

What are International Fire Safety Standards (IFSS)?

IFSS will offer a global solution to:

- Address current inconsistencies in the way property is designed, built and managed for fire safety
- Ensure different types of property including offices, residential, retail and industrial are safe for users
- Ensure confidence in property investment

IFSS will be implemented by all coalition organisations, through their members.

Consistency

- Consistent standards enable governments & clients to accurately quantify risks and other sustainability measures.
- Enable governments to reassure the public and investors

Transparency

- Improved confidence in national market for foreign direct investment at all stages of the property lifecycle.

Comparability

- Removes need for multiple differing standards within countries (such as the UK), and allows for better foreign direct investment assessment.

Future proof

- Utilising international best practice early as the world moves to this set of standards, as it has done with IFRS and other international standards.

Why not ISO ?

- Takes too long and costs too much
- ISO set up for products not professional behaviour
- IP owned by ISO and cost (of downloading) is a barrier
- Any one country can veto a standard
- IFSS Coalition members develop the standards and ensure it’s adoption

IFSS – Team approach

- **These issues need a team approach**
- **Skilled fire professionals are key to the future**
- **Opportunity to build a global fire safety profession is huge, particularly in high risk buildings**
- **Professional bodies must collaborate, globally**

United Nations

Will adopt IFSS as UN standards in 2020

10 year Decade of Action for Fire Safety 2020-2030

Get involved – gstrong@rics.org

Get involved – gstrong@rics.org

Get involved – gstrong@rics.org

Professional standards are

Good for business
Good for govts
Good for the public

rics.org/standards