

Initial discussion to help inform evidence base

**Automatic fire suppression systems for
existing high rise domestic residential
buildings (sprinkler systems)**

Building Standards Division

9 August 2017

Holistic overview of fire safety



Fire safety comprises a package of measures to mitigate fire spread and provide people the opportunity to escape from the building

Automatic fire suppression is only one aspect – the holistic approach includes:

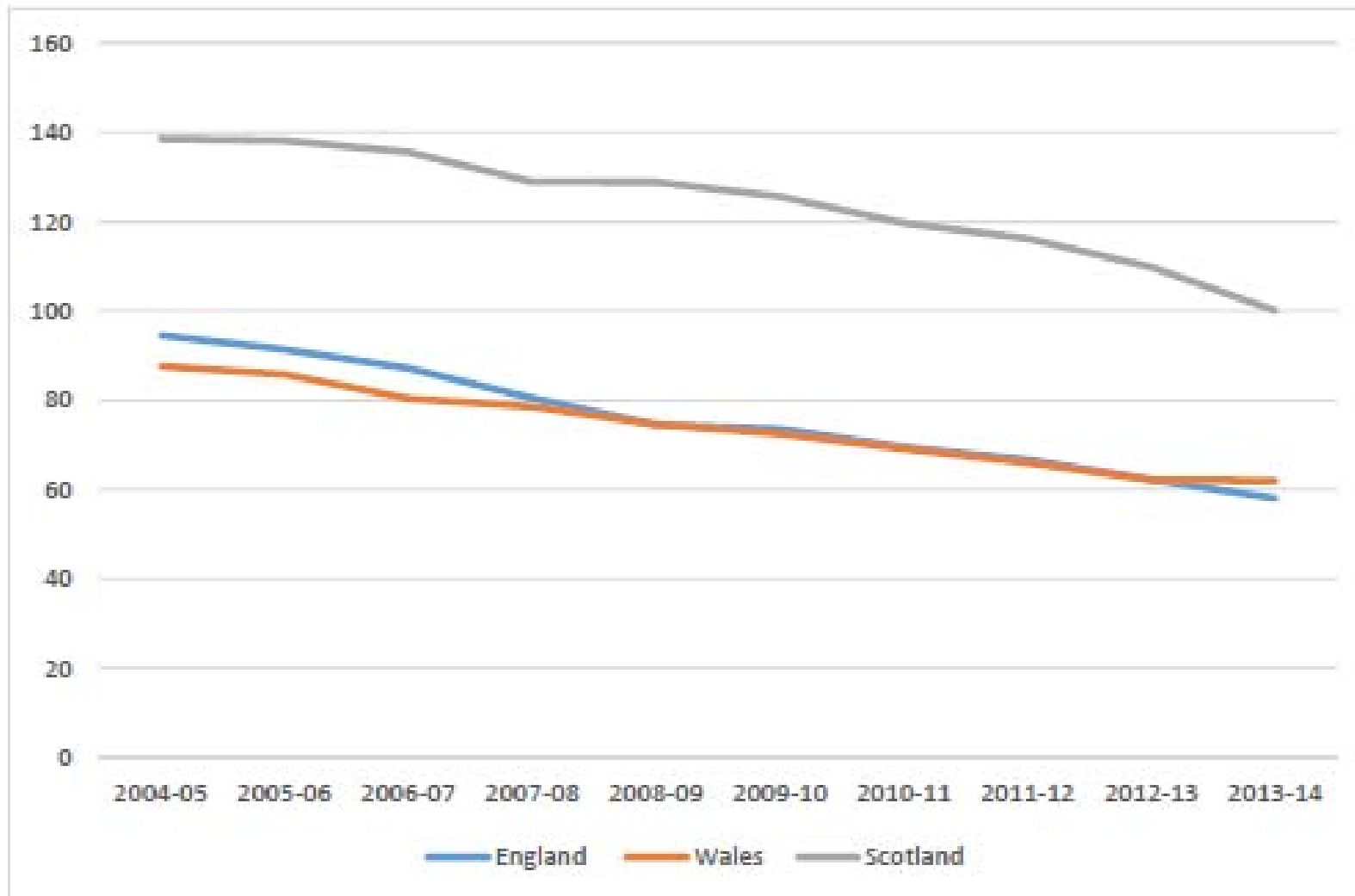
- Fire safety management, risk assessment and education
- Fire separation/compartimentation
- Fire spread within building (wall/ceiling linings and cavities)
- Fire spread to other buildings

Holistic overview of fire safety



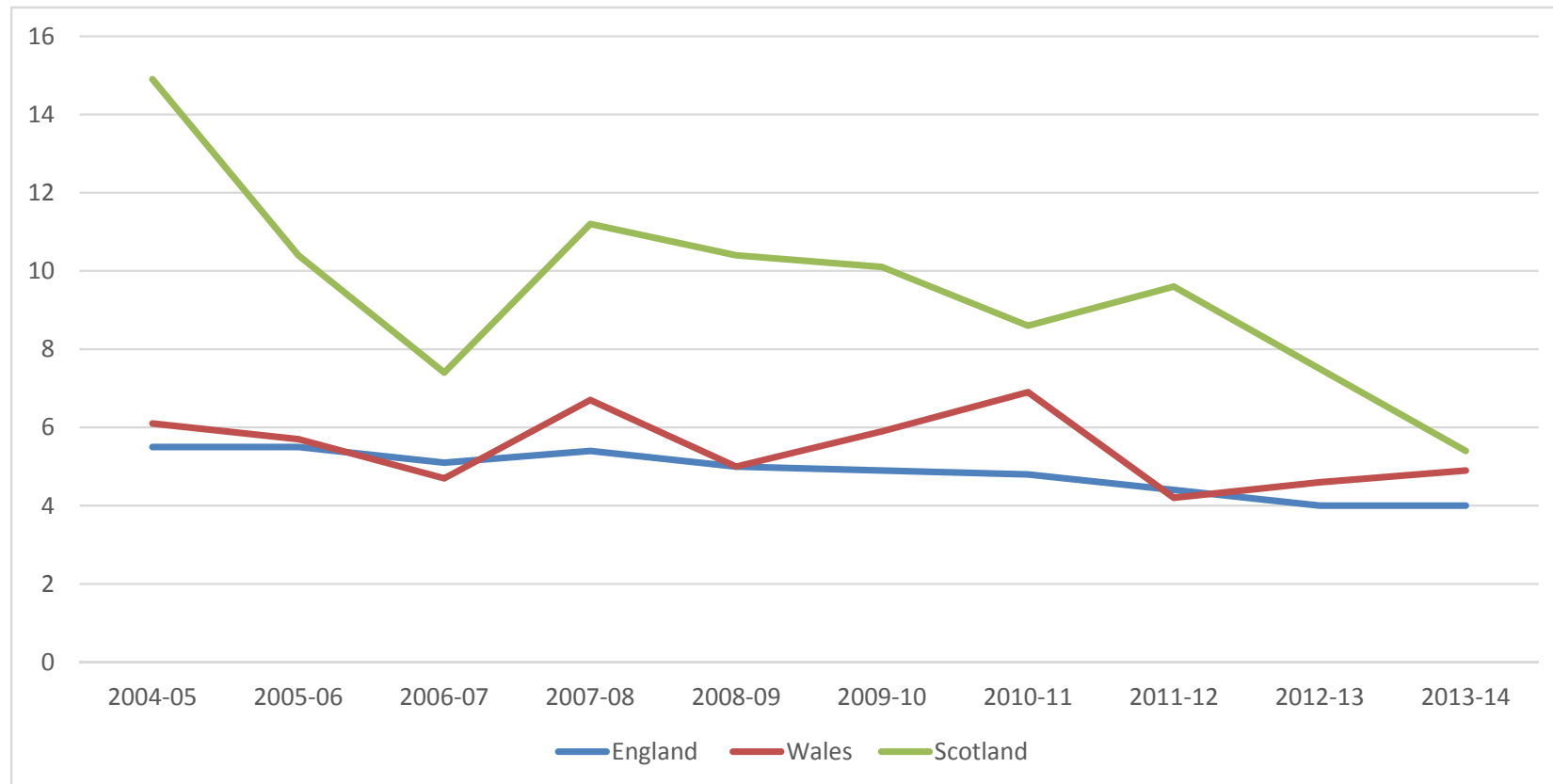
- Fire spread on external walls and roofs
- Means of escape and escape lighting
- Fire detection and warning systems
- Automatic fire suppression systems (sprinklers, mist, fog, bespoke personal systems targeted at specific identified risk)
- SFRS response - access, water supply and facilities for fire-fighting (e.g. SFRS high reach appliances, dry and wet risers, fire-fighting lifts etc.)

Dwelling Fires per 100,000 Population 2004-05 to 2013-14



Dwelling Fires - Fatalities

per 1,000,000 Population 2004-05 to 2013-14



What is an automatic suppression system?

- Most common - sprinkler system
- Consists of:
 - Water supply, either from main water supply or a tank
 - Distribution pipework
 - Sprinkler heads
- BS 9251: 2014



Sprinkler Heads

- Sprinkler heads are activated by heat
- and can be

exposed



or concealed



or sidewall



Why Don't Building Regulations Require Sprinklers?



They do in certain new buildings

- High rise domestic buildings (over 18 m storey height)
- Care homes and sheltered housing complexes
- Can also be used in dwellings with three or more storeys or open plan flats

Sprinklers and another Grenfell Tower type fire?



- There is currently an on-going forensic investigation into the Grenfell Tower fire
- As part of this and the recently announced review of building regulations the UK will assess the role sprinklers
- Grenfell Tower fire spread rapidly up the face of the building
- Sprinklers can and do stop the fire from growing internally in most cases
- Designed to contain a fire within the room or dwelling of fire origin
- Do not discharge for indefinite period of time
- Do not necessarily prevent spread of smoke but dilutes toxicity

Sprinkler Effectiveness

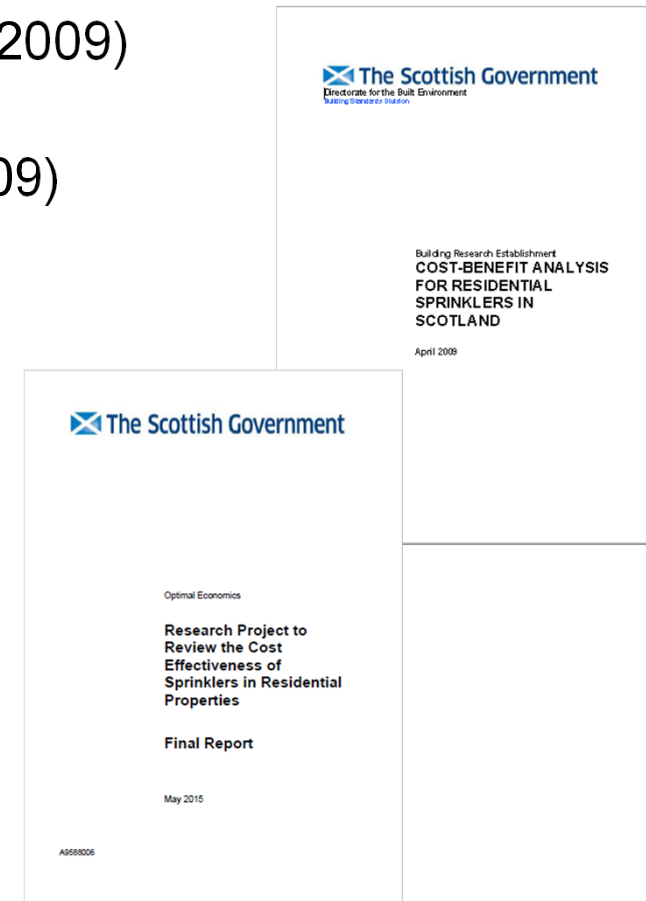


- In 67% of cases the systems contained/controlled the fire
- In 37% of cases the fire was extinguished
- Domestic – Average fire damage $<5\text{m}^2$ where sprinkler activated compared to 18m^2 - 21m^2 where there were no sprinklers.
- Non-Domestic – Average fire damage 30m^2 where sprinkler activated compared to 60m^2 where there were no sprinklers.

Residential Sprinkler Research



- Building Research Establishment for SG (2009)
- Scottish Community Fire Safety Study (2009)
- Building Research Establishment for Welsh Government (2012)
- Building Research Establishment for Chief Fire Officers Association (2012)
- Optimal Economics for SG (2015)



Related Challenges



Technical

- Capability of buildings to accommodate retrofitting in dwellings
- Infrastructure and utilities – installation of independent storage tanks and pump sets
- Riser renewals

Related Challenges



Practical and Operational

- Servicing and maintenance
- No access and customer refusals – Owner occupiers
- Staffing resource – delivery and on-going maintenance
- Internal Decoration and aesthetics – surface mounting/ lowered ceilings/ceiling height
- Faults and activations/insurance/damage

Related Challenges



Logistical

- Customers- potential requirement for decant
- Vulnerable clients
- Timescale
- Contractor/availability – specialist installations contractors and demand

Related Challenges

Financial

- Significant upfront capital costs
- Annual maintenance, repairs and insurance
- Lifecycle component and replacement
- Procurement approach and costs
- For Housing Associations impact on business planning and borrowing

Retro-fit: Estimated Costs



- Typical cost per flat - **£2,500 - £4,500**
- Typical cost per tower block - **£265,000 - £477,000**
- Estimated cost to retrofit all tower blocks in Scotland - **£136,740,000 - £246,132,000**
- Maintenance - **£1,925,000 - £11,000,000** per annum

Mitigating factors – Good Practice in multi storey flats



- Hard wired smoke and heat detection
- Regular security and fire safety patrols- and on-site staff
- Regular inspections of bin chutes, refuse areas, common areas, escape routes
- Sprinklers in bin storage areas
- Regular inspections and checks on fire doors – their operation and effectiveness. Main house front doors – fire rated (60 mins)
- Communication with customers to promote fire safety e.g. Home Fire Safety visits through partnership with Scottish Fire and Rescue Service
- Mandatory fire safety training for all staff