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**Grenfell: The Missed Opportunities**

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Protecting people, property and the environment

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# It all goes back to 1999

- The 1999 Garnock Court fire resulted in a change to Scottish Building Standards which effectively banned the use of combustible cladding on Scottish high rise buildings from May 2005
- DCLG for England & Wales said that all future cladding should be Class '0' rated (non combustible).
- Sadly, this does not appear to have been effectively promulgated nationally
- The Lakanal House refurbishment was carried out in 2007 while that of Grenfell Tower in 2015/16
- There had been an earlier fire at Knowsley Heights, Liverpool in 1991 where a fire spread vertically from the bottom to the top of tower block via a 90mm air gap behind the cladding

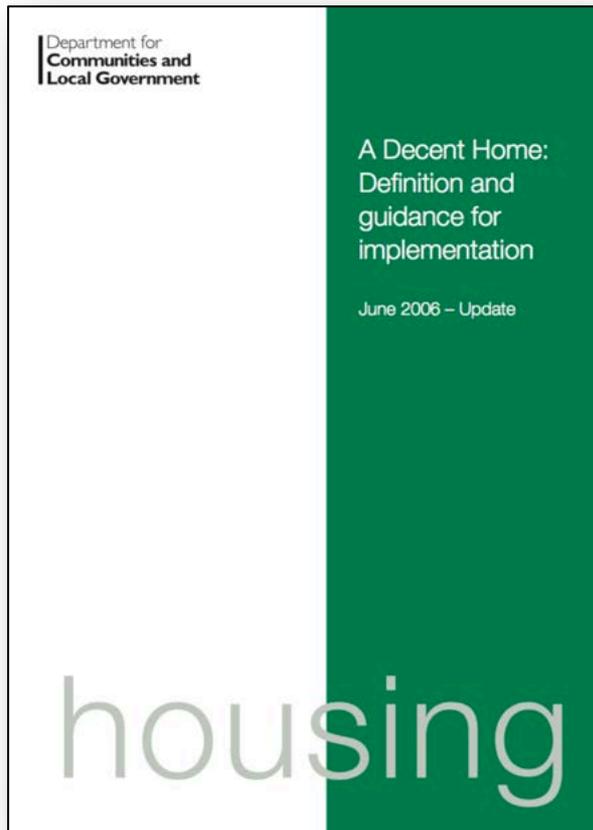


# But: Fires in combustible cladding were known of as far back as 1973

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- Summerland (1973)
  - More than 50 deaths
- Sun Valley Poultry (1993)
  - 2 FF deaths
- Atherstone Packing Plant (2007)
  - 4 FF deaths
- Lakanal House (2009)
  - 6 Deaths
- The increase in the numbers and costs of food industry fires between 1989-94 created concerns among insurers
- In 1994, The FPA identified 19 fires in which 'sandwich panels' had played a significant part in allowing fire spread
- LPCB issued LPS 1181 Part 1 (external cladding) and Part 2 (internal panels) (1995)

# The Real Villain of the Piece?



- Sets out how funding is to be allocated and used to achieve 2010 target of ‘all homes to be decent homes’
- Quotes ‘Housing Health and Safety rating System’ and requires that all homes be free of category 1 hazards\*
- However, the definition of ‘decent home’ in Sections 4 and 5 **does not** mention fire safety
- Great stress is laid on ‘thermal comfort’ and external insulation for fuel efficiency
- ‘Buildings which cannot be cost-effectively upgraded should be considered for demolition’

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\* *The most extreme harm outcome – death from any cause*

# Missed Opportunities (1)?

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- Coroners' Letters after Lakanal and Shirley Towers fires
  - Common areas of high rise flats became regulated only in October 2006 – Fire Safety Order 2005
  - Coroners' Rule 43 Letters to Authorities advising them to 'consider use of sprinklers'
  - LB Southwark review concluded 'not cost effective solution' for 317 tower blocks
    - But they agreed to install sprinklers in 12 out of 20 sheltered housing units and 19 temporary accommodation blocks
  - Southampton subsequently installed sprinklers in Shirley Towers and two other blocks

# Missed Opportunities (2)?

- No references to LB Southwark's possible non-compliance with Section 3(2) of the Building Regulations
  - This could have triggered a requirement for sprinklers during the refurbishment
- Action against LB Southwark would have ensured that LB K&C would have known that sprinklers would be required in Grenfell Tower as part of its refurbishment
- The fact that Lakanal also had only a single staircase appears to have been largely overlooked
- No separate investigation into impact of 'stay put' policy at Lakanal fire

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**News**  
FLAHERTY

The fire at Lakanal House, Camberwell, killed six people, including three children

## Flat fire victims died after being told not to flee by 999 operators

David Brown

A fashion designer who died in a tower block fire that killed six people could have survived if she had ignored a 999 operator's orders to stay inside, an inquest jury said yesterday.

Catherine Hickman, 31, was repeatedly told to remain in her 11th-floor flat and await fire crews after a blaze was sparked by a faulty television in a flat two floors below. During the 28-minute telephone call, Ms Hickman reported that her flat was filling up with smoke but was told not to try to escape.

The Coroner, Frances Kirkham, has written to Eric Pickles, the Local Government Secretary, recommending that the Government should encourage the fitting of sprinkler systems in all high-rise residential buildings. The jury returned a unanimous narrative verdict at a "super inquest" into the deaths at the 14-storey block, Lakanal House in Camberwell, South London, in July 2009.

Dayana Francisquini, 26, and her children Thais, 6, and Felipe, 3, were also killed while sheltering in the same flat on the 11th floor, as were Helen Udoaka, 34, and her three-week-old daughter Michelle. Ms Udoaka also followed a 999 operator's advice to shelter in the bathroom with her daughter. She reported that she was finding it hard to breathe, before she stopped answering her phone.

In the six narrative verdicts read out at Lambeth Town Hall yesterday, jurors agreed that the flats had inadequate fire protection. The jury said that London Fire Brigade personnel who took emergency calls from some of the victims failed to react to the situation when they told them to stay where they were.

"Evidence suggests that existing training documents are contradictory and inconsistent, particularly in regard to either 'staying put' or 'getting out' when there is a fire in the building," it said.

The jury found that it would have been possible for the victims to escape without assistance in the early stages of the fire.

"The training of brigade control officers failed to promote active listening or encourage operators to react to dynamic or unique situations," it added.

Catherine Hickman could have survived, the jury decided



A family was rescued from the 12th floor because they ignored 999 advice to stay put and made their way on to the escape balcony where they were rescued by the first firefighters, the inquest was told.

The fire found that the fire officers were

# Lessons Not Learnt?

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- Stay put policy
- Dangers of high rise blocks with single staircases
- AFD systems and sounders and remote signaling
- Internal fire compartmentation issues
- Removal of fire resisting doors and closers
- Sterility of lobbies
- Damage to fire stopping
  - Even during construction

*“Was going fine until we discovered the electricians were making their own holes through our seals and resealing with their own mastic therefore contaminating five floors of seals”.*

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# The Stay-put Policy

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- Fundamental to all advice from Government to F&RS and landlords
- Key factor in fire fighting strategy for blocks with single staircase
- Hard to see what else F&RS can do in such situations
- Also informs advice on fire alarm systems for social housing in LGA *Guide*



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Mr. Egan wrote: "The reason LFB advice is to "stay-put" is because the building should have been compartmentalized. If this had worked, each flat should have been safe for at least an hour".

"However, the control room giving the advice couldn't see the fire."

# LGA Guidance (1)

- In England, 10% of the population live in flats
- 25% of dwelling fires take place in flats
- 23% of fire fatalities in dwellings occur in flats
- People living in flats experience more fires than people living in houses. However, a fire in a flat is no more dangerous than a fire in a house.
- High-rise does not mean high-risk
- In blocks of flats, each flat is designed to be a fire-resisting 'box'. It is important to maintain the integrity of this compartment, particularly when building work and alterations take place.
- It is important to ensure that fires cannot start in the common parts or common facilities.
- It is certainly rare for anyone, outside the flat where a fire starts, to die as a result of a fire in a flat.

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# LGA Guidance (2)

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- Most blocks of flats are designed on the 'stay put' principle. Although this relies on there being effective compartmentation, it is a principle that should be adopted wherever possible.
- Provided there is effective compartmentation and means of escape, 'general needs' blocks of flats will not normally require a communal fire alarm system.
- Communal fire alarm systems should not be installed unless it can be demonstrated that there is no other practicable way of ensuring an adequate level of safety.
- However, it should not automatically be assumed that constructional standards will be inadequate in the absence of evidence to that effect.
- Proposals to upgrade fire protection in an existing block should aim to ensure, or restore, a satisfactory standard of compartmentation in order to maintain the original 'stay put' policy.
- More generally, application of current benchmark standards to an existing block of flats is not normally appropriate.
- Certain developments in fire safety technology and practice (e.g. smoke alarms within flats) should be adopted. However, other developments such as automatic suppression systems will only be appropriate if the cost and effort of adopting them is proportionate to the risk.



# Enforcement of Maintenance Standards

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As long ago as September 1994, the Home Office had collated data which showed that there was:

*‘a 55% failure rate in respect of the maintenance of fire protection arrangements in commercial premises’.*

The sample of *‘1779 inspections showed that 991 were in breach of the Fire Precautions Act 1971’*

\*Fire Prevention 273 (October 1994)  
Quoting HMI (Fire Safety) Gerry Reid at Fire '94.

Anyone care to estimate what the shortfall in maintenance is under the Fire Safety Order?

# Grenfell – Defects and Deficiencies

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- Flat entrance doors ‘were non-compliant’ (i.e. not FRP30)
- Fire doors to stairs ‘not replaced since 1972’
- Ventilation system ‘did not work as intended’
- ‘Firefighters’ lift could not be used’
- Dry risers ‘not to standard and non-functional’
- Cladding ‘a clear and significant hazard’
- Stay-put policy ‘no longer appropriate after the fire had spread outside Flat 16’
- Stay-put policy ‘was clearly not appropriate by 0126 but was not abandoned until 0247’

*Quotes are all from evidence given to the Moore-Bick Enquiry*

# High Rise Fire Risks and Impact

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- Fire Risk Assessment reports
  - Evidence suggest that many FRA's are not fully intrusive
  - Experience suggests passive measures are not adequate or are not being maintained (eg: cross-over stairs at Lakanal)
  - Failure to ensure compartmentation not breached by installation of other services and damage
    - Fire development in many incidents supports this belief
  - Dry risers and fire equipment 'often unavailable'
- Potential for fire growth and spread
  - Risks to other occupants of building
  - External cladding 'often a factor'
  - Risks to fire-fighters
  - Arson a common cause of fires – often in communal areas
- Financial and social impact of incidents
  - Authorities
  - Residents
  - Community
  - Liability for owners

# Fire and Rescue Service Response to High Rise Social Housing Fires

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- 2 FF Fatalities at Shirley Towers and 2 more at Harlow Court
- Additional risks to fire service personnel in high rise premises
  - Risk of prosecution under H&S legislation (e.g. Atherstone)
- Guidance and fire service policy to establish bridgehead two floors below level of fire
  - Staffing and response implications
  - Increased demand for longer duration BA and impact on FF well-being
- All equipment and personnel to be in place before fire fighting commences
- Estimated time to achieve this for higher levels is approximately 20 minutes (Herts F&RS study, post-Harlow Court fire)
- Significant time delay compared with fire in low rise premises with associated longer period of fire growth and increase of spread and intensity
  - Where compartmentation is compromised this can be critical
- Water supply issues

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Harlow Court, Stevenage:  
18 February 2007



# Missed opportunity: - Waddell Court, Glasgow

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- Major refurbishment programme 2007 – 2009: £4.25 million cost
  - Fire improvements did not include sprinklers (these would have been required in new build – estimated at £250-300k)
- 16 December 2009
  - Serious fire on 5<sup>th</sup> floor
  - One fatality and two injuries
  - Fire spread externally to upper floors
- Most residents rehoused for up to 11 months
- Total costs of rehousing, refurbishment and loss of rental income = £2.6 million
- Only 1 of the 77 residents had home contents insurance



# Missed Opportunity: Sprinklers: Post Lakanal

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- Lakanal House Fire, 2009: Report by Chief Fire Advisor (E&W) to CLG
  - *“It is not considered practical or economically viable to make a requirement for the retrospective fitting of fire suppression systems to all current high-rise residential buildings”.*
- With support from CACFOA, NFSN, BSA and BAFSA decided to determine what was actually involved in retrofit
- Sprinkler Coordination Group issued scoping document for what became the Callow Mount Project
  - South Yorkshire FRS/Sheffield Homes participation
  - BAFSA to manage project
  - Steering Group formed to manage project including external scrutiny from Warrington FIRAS, Zurich Insurance with independent rapportuer.

# Impacts of Fires Case Studies – South Ayrshire District Council

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- South Ayrshire Council
  - Fitted sprinklers as part of a refurbishment programme in 2002/3 in all high rise and selected sheltered housing
  - Subsequently experienced six kitchen fires in individual flats
  - Minimal water damage
  - Refurbishment limited to redecoration of flats involved
  - No decanting of other tenants



# Relaxations and Compensations

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- Design freedoms if undertaking major refurbishments
  - Building Regulations/Standards approval and compliance
  - Relaxations permit changes to internal layout
- BS 9991:2011
  - Permits relaxation of standards for means of escape, levels of fire resistance and fire alarm standards
  - Relaxation of fire service access requirements
  - Hydrant locations/proximity
- Northampton House
  - Former office block converted to flats in 2003
  - Sprinklers only way to satisfy Building Regulations and make conversion commercially viable
  - Three fires since occupancy, residents escaped uninjured



# BS 9991 - Variations when AFSS is provided

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## 11.1.2 Permitted variations of guidance

Where a sprinkler system or watermist system is fitted throughout a house, the internal layout of the ground floor may be open-plan and in a four-storey house, a second staircase is not required.

Where a flat is fitted with a sprinkler system and an LD1 fire detection system in accordance with BS 5839-6, it may have an open-plan living room with inner rooms leading off it (see 9.7).

Where sprinklers are fitted throughout a house or block of flats, the minimum distance between the side of the building and the relevant boundary may be halved.

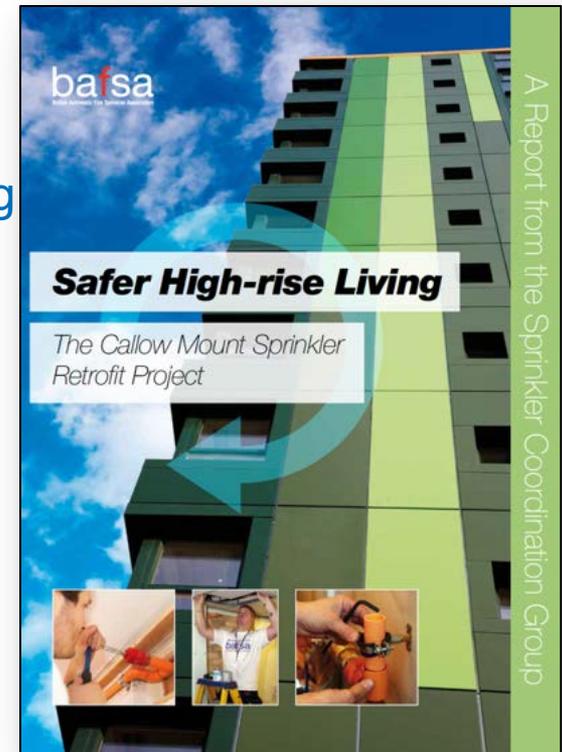
Where attendance time of the local fire and rescue service is expected to be no more than 10 min:

- a) the distance between the fire appliance and any point within the house (in houses having no floor more than 4.5 m above ground level and having a sprinkler system throughout) may be up to 90 m;*
- b) the distance between the fire and rescue service pumping appliance and any point within the house or flat may be up to 75 m (in houses or flats having one floor more than 4.5 m above ground level and a sprinkler system installed throughout).*

With the exception of sheltered and extra care housing, where a block of flats is fitted with a sprinkler system in every flat, the maximum travel distance for escape in one direction only may be increased from 7.5 m to 15 m and for escape in more than one direction it may be increased from 30 m to 60 m.

# The Callow Mount Project: Retrofits Justified?

- Callow Mount retrofit: major report – 6000 copies + DVD circulated
- Provided reliable evidence for owners to consider the potential cost-benefits of retrofitting sprinklers
- Proof that sprinklers can be installed without decanting tenants
- Costs averaged £1,150 per flat
- Housing authorities and associations now using a targeted approach in both high and low rise premises:
  - Vulnerable residents and extra care facilities
  - As part of major refurbishment programmes
  - To address specific fire safety concerns such as single staircases



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# Costs of Sprinkler Installation: Actual

Location	Total System Cost	Cost per Flat/Home	Comments
Callow Mount (2011)	£55,134	£1,148	5 heads per one bedroom flat Includes bin store, communal room and office
Bryn Arfon Housing Assoc (2011)	£80,000	£1,150	5 - 7 heads per one/two bedroom flat Includes communal areas, bin and cycle stores and rooftop pavilion
Sheffield Low Rise (2014/5)	£1,152,450	£2,132	8 - 15 heads per home – includes 1, 2 and 3 bedroom units

These costs include profit, builders' work and making good

# Scottish Government's Response

- Combustible cladding banned in 2005
- Existing sprinkler requirement to be extended to make it compulsory in all social housing

## Scotland mandates sprinklers for social housing

The Scottish government is introducing legislation to make sprinkler systems compulsory in all new social housing.



Scotland already requires all new high-rise domestic buildings over 18 metres, whether private or social, to have automatic fire suppression systems fitted. The new move extends this requirement to all new social housing regardless of size.

The measure was initially proposed by David Stewart MSP but has now been adopted by the government.

Scotland's housing minister Kevin Stewart said: "I am very grateful to David Stewart for his work on bringing forward this important issue and gaining cross-party support for his proposal. I can confirm that the Scottish government will implement the aim of Mr Stewart's proposal and will bring forward legislation as soon as is practicable in this Parliamentary session.

"This is an opportunity to further improve standards in our social housing and this work will be taken forward alongside the recommendations of the two reviews of building standards and fire safety which we will consult on later this summer."

# Final Words: *Inside Housing Survey: 2018 (1)*

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## The Numbers:

- Number of councils and housing associations which provided data: 16
- Number of towers covered by the data: 92
- Number of fires suppressed by sprinklers in social housing: 12
- Number of sprinkler-related complaints recorded: 11
  
- Systems installed between 2010 - 2018.
- 'The vast majority since 2015'
- None of the landlords reported any negative impact from insurers
- Average per-flat cost of installing sprinklers: £3,219.
- Lowest cost was £1,176, highest £6,124.
- One London Borough reports being quoted > £10,000/flat

# Final Words: *Inside Housing Survey: 2018 (2)*

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## Costs:

- Amount landlords spent on installing sprinklers: £13.7m
- Average: £149,000 per tower
- Annual maintenance costs range from £17.59 to £176 per system with a median of £50/year.

## The Complaints:

- Only two authorities recorded complaints including:
  - 1 tenant who wanted to live in a sprinklered block!
  - 1 leak due to faulty batch of heads
  - 1 dispute with sprinkler contractor
  - 1 or more related to tenants who did not want sprinklers

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A silhouette of a city skyline in shades of blue, featuring various building shapes, spires, and a dome. The skyline is positioned behind the main title text.

# Grenfell: The Missed Opportunities

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